ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

ANNE ARUNDEL COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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INTRODUCTION

This report summarizes the ecological significance of each area in Anne Arundel County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

ANNE ARUNDEL COUNTY

Site Name: **Benfield Bottomland**

USGS Quad: **Odenton**

Excellent examples of deciduous and mixed pine-deciduous bottomland forests border the streams that flow through this site. Percolation through the adjacent sandy uplands provides a significant source of fresh water to these bottomland forests. The steep, highly erodible slopes that border much of the main stream are unsuitable for development or cultivation. These forested slopes maintain the high quality of groundwater that feeds the bottomland forests. The sandy soil of the uplands is very low in nutrients and supports an oak-pine forest community that is uncommon on the Western Shore.

In the dense cover of shrubs, vines, and herbaceous species that borders the main stream grows a rare plant that is listed as Threatened in Maryland and known from only four other sites in the State. The population along this stream is extensive, consisting of more than a thousand plants. Patches of the rare species dot one mile of the stream's eastern bank. The rare plants appear to be reproducing successfully and the population appears stable. Because this population is large and the habitat quality of the bottomland and adjacent upland forests is high, this site provides the best opportunity to preserve this rare species in Maryland.

A small population of a second State Threatened species grows in the semi-permanently flooded bottomland forest downstream from the first rare species. This species is known from fewer than ten other sites in the State.

The large, contiguous forest in this area provides excellent habitat for forest interior dwelling birds.

Paths along the stream's eastern bank are well-used and reveal that this area is visited frequently by hikers. The bottomland and upland forests provide opportunities for birdwatching and environmental education.

Site Name: **Blackhole Creek Bog**

USGS Quad: **Gibson Island**

Blackhole Creek Bog is a small evergreen shrub bog dominated by a heath shrub found more commonly farther north. Coastal Plain peat bogs are uncommon in Maryland, and this site is

particularly unusual because it is thought to be naturally-formed. Most of Maryland's remaining Coastal Plain bogs have formed as a result of human activities such as impoundments. Until recently this site was relatively undisturbed. Unfortunately the area was clearcut in the mid-1980's to the edge of the bog, disrupting the hydrology and perhaps altering the vegetational composition of the bog over time.

Seven rare or uncommon plant species grow in Blackhole Creek Bog and the surrounding uplands. The shrub that dominates the bog is listed as Threatened in Maryland, and is known from fewer than 10 sites in the State. Five rare sedges grow at the site, two of which are Threatened in Maryland, each occurring at fewer than five locations statewide. Two additional sedges are not yet considered Threatened but are uncommon and warrant monitoring. The fifth sedge grows in moist soils at the base of one of the slopes that form the watershed of the bog. It is considered State Rare and is known from fewer than five sites in the State. A small tree that is uncommon in Maryland grows in the sandy uplands near the bog.

Site Name: **Cockey Creek Swamp**

USGS Quads: **Round Bay, Gibson Island**

Cockey Creek Swamp consists of a Coastal Plain bog and a large shrub swamp with deep, inundated, organic soils. The Coastal Plain bog was formed at the site of an abandoned millpond. Coastal Plain bogs are a rare habitat type in Maryland. They are characterized by low-nutrient, highly acidic, wet soils and unusual plant communities especially adapted to these stressful soil conditions.

This site supports a very high quality population of a large grass that is listed as Threatened in Maryland. This species is known from fewer than 10 locations in the State. The population at Cockey Creek Swamp is unusually large, containing more than a thousand individual plants dispersed over several acres of bog, shrub swamp and floodplain forest habitat. The Maryland populations of this species occur near the northern limit of this species' range. Plants at the edge of a species' range are important to protect because they often differ genetically from plants in the central portion of the range. This genetic variation may help the species survive major environmental changes such as climate changes due to global warming.

A small population of an uncommon tree species grows in the saturated soils of the shrub swamp downstream from the bog. Two individuals are exceptionally large, including one with a circumference of seven feet. Although small, the population is

reproducing successfully. Another uncommon species, a wetland sedge, grows on the sphagnum mat of the Coastal Plain bog.

Site Name: **Conrail/Patuxent River**

USGS Quad: **Laurel**

This site consists of a sandy, marshy area with inundated soils. It forms part of a large wetland complex that contains extensive forested swamps. Many of these forests are old, with large, mature trees and standing dead timber offering superb nesting sites for birds and other wildlife species. The size as well as the age of the undisturbed forest and wetlands make them important habitat for forest interior dwelling species.

In the past (1970's) the marsh at this site was reported to have supported a population of an extremely rare, herbaceous wetland species. The Conrail/Patuxent River site has not been searched for the species in recent years. This plant is currently listed as Endangered Extirpated in Maryland, because no current populations are known. If it were to be rediscovered at this or any other Maryland site, its status would be automatically changed to Endangered in Maryland.

Site Name: **Fort George G. Meade**

USGS Quads: **Laurel, Odenton**

Over 6900 acres of nearly contiguous forest occur on Fort George G. Meade south of Route 198. Approximately 1200 acres of this area consist of old bottomland and swamp forest within the 100 year floodplains of the Patuxent and Little Patuxent Rivers. These swamps offer unique biological resources. A species of nematode controls the mosquito population in the swamp along the Patuxent River. Large, old trees, including a Sycamore over 4 ft. in diameter, inhabit the swamp along the Little Patuxent. In addition, the swamps and the adjacent forested uplands that drain into them filter sediment and other pollutants that would otherwise lower the quality of the waters fed by these wetlands.

The wetlands and old forests at Fort Meade provide excellent habitat for native plants, including potential habitat for many rare species. The forests have not been thoroughly surveyed for rare plants, although one Highly State Rare species is known to grow along the banks of the Big Patuxent River. Twenty-six records of rare plants have been reported historically from the adjacent Patuxent Wildlife Research Center. These species may inhabit the similar upland forests and wetlands of Fort Meade. More than 50 rare species of plants have been reported historically from the Laurel area. Aerial photographs and

wetland maps indicate that the forests of Fort Meade provide potential habitat for these rare species.

The upland forest is composed of stands of various ages. In conjunction with forests on adjacent Federal lands managed by the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture, and the National Air and Space Administration, the forests of Fort Meade are part of one of the largest contiguous tracts of forest remaining in central Maryland. Commercial and residential development and clearing for agriculture and timber harvest have fragmented the forests of this region, leaving small isolated patches. Many species of wildlife and plants native to this region cannot survive in the small patches of forest, and their populations are declining in central Maryland. The extensive contiguous forests of Fort Meade and adjacent Federal lands offer outstanding habitat for these forest interior species.

Among the many animals that inhabit Fort Meade are numerous species of forest interior dwelling birds that require large tracts of forest for feeding and breeding. Of the 19 species identified by the Maryland Forest, Park and Wildlife Service as forest interior breeding birds native to this State, 18 are known to inhabit Fort Meade. All but one of the forest interior breeding birds that inhabit Fort Meade require the habitat provided by an old forest. Much of the forest on Fort Meade is at least 60 years old. As the forest ages it will provide increasingly higher quality habitat for forest interior species.

The older forests of Fort Meade also provide habitat for a variety of other wildlife. Beaver, geese, and a variety of ducks inhabit the swamps and marshes along the Patuxent and Little Patuxent Rivers and their tributaries. Six rare species of animals have been reported historically from the Laurel area and may inhabit Fort Meade. Two historical records of a rare fish, and records of a rare snake and insect have been reported from the Fort. Many species of game and non-game wildlife inhabit the upland forests.

Site Name: **Freetown Swamp**

USGS Quad: **Curtis Bay**

Excellent examples of two significant plant communities occur at this site--a Red Maple-Sweet Bay Swamp and a Mature Pine-Oak Forest. Vegetation studies of the Baltimore-Washington, D.C. area conducted in the early 1900's indicated that several Sweet Bay Bogs occurred in this region. Few, if any, of these bogs survive; they have been cleared or drained. The Red Maple-Sweet Bay Swamp in this protection area provides an example that

is similar although not identical, to the bogs found historically.

Few plant species can endure the lack of available soil nutrients in the highly acidic, sphagnous swamp. Among the plants that grow in this stressful environment is an herbaceous species that is known from just four other sites in Maryland. This globally rare species is listed as Endangered in Maryland and as Threatened under the U.S. Endangered Species Act. The species inhabits the acidic swamp and appears to thrive on the fresh water flowing through the adjacent sandy ridges. The population at this site is large and is reproducing well, whereas two other State populations of the species are quite small. Although rare throughout its range, this plant is most frequently found in association with pine barren communities similar to the forest in this protection area.

Although some of the upland Pine-Oak Forest was cleared within the last 50 years, a large stand of mature pine remains. Pines of similar age are rare on the Coastal Plain, and this pine barren community is particularly unusual in this county. A development now underway may destroy the upland forest community before the end of 1991.

A nature trail planned for the adjacent development will provide naturalists and local residents an opportunity to observe an unusual example of the native vegetation of this region. A small nature center staffed during the growing season would greatly increase the educational value of the nature trail by providing further interpretation of the local landscape.

Site Name: **Fresh Pond**

USGS Quad: **Gibson Island**

The Fresh Pond area contains a large freshwater pond bordered by a Coastal Plain bog, a rare habitat type in Maryland. Coastal Plain bogs are open, acidic, nutrient-poor wetlands that support many rare plant species adapted to the unusual conditions of bogs. The bog at Fresh Pond is one of the largest and floristically most diverse of Maryland's bogs. Also known by the name "Angel's Bog," it has long been considered important by botanical experts. This area was designated by the Maryland Department of State Planning as an Area of Critical State Concern in 1981. It was designated as an Ecological Priority site in the 1974 report by the Smithsonian Institution entitled "Natural Areas of the Chesapeake Bay Region: Ecological Priorities."

Two plant species listed as Threatened in Maryland grow in the bog at Fresh Pond, including one which is known from fewer

than ten sites in the State. The Maryland populations occur at the southern edge of this species' range. Populations at the edge of a species' range are especially important to preserve because they often differ genetically from the rest of the species. The unique genetic makeup of outlying populations may help the species survive catastrophes such as disease outbreaks or climate changes due to global warming. Five plant species considered uncommon in Maryland also grow in the bog.

Six additional rare species have been reported from Fresh Pond in the past, and are still likely to occur at the site. Additional field studies will be required to confirm the presence of these species.

Many of Maryland's nontidal wetlands have been lost due to ditching and draining for development and agriculture. The wetland complex at Fresh Pond contributes to the maintenance of water quality in the lower Patapsco River and the Chesapeake Bay.

Many species of wildlife reside in this wetland and the surrounding mixed hardwood forest. The site is part of a larger forested tract and provides habitat for forest interior breeding birds such as the Scarlet Tanager. Other animal species that have been identified at the site include the Northern Cricket Frog, Painted Turtle, Bullfrog, Purple Martin, Great Blue Heron, Kingfisher, Wood Thrush, Red-Bellied Woodpecker, Bobwhite Quail, and White-tailed Deer.

Site Name: **Gumbottom Wetland**

USGS Quad: **Round Bay**

This site contains a large, high-quality freshwater wetland complex that includes several habitat types. Many wetlands in the Coastal Plain of Maryland have been lost due to ditching and draining for development or agriculture. Chief in ecological significance among the habitats represented here is a prime example of a mature Coastal Plain bog. The bog is more than an acre in size with a springy, well-developed mat of sphagnum moss. Coastal Plain bogs support unusual botanical communities adapted to this acidic habitat and influenced by the high water table, relatively cool temperatures, and the sparse cover of trees. Fewer than a dozen bogs are known from Maryland's Western Shore, and Gumbottom Wetland is one of the most significant.

This bog may have originated as an oxbow of the stream that runs through the site. Saturated conditions are maintained by groundwater-influenced seeps on the slope above the bog and by a very old road which bisects the site and has served as a dam for many years.

The bog in Gumbottom Wetland is one of the most diverse and botanically interesting bogs on the Western Shore. It encompasses a broad array of bog shrubs and herbs, including at least three carnivorous plants and eleven rare species. One of the rare species is listed as Endangered in Maryland, and is known from only one other site in the State. That population is quite small, whereas the population at Gumbottom is large and extensive. Four other plant species are listed as Threatened in Maryland. One of these is a shrub that is represented here by one of its largest and most vigorous populations in the State. Individual shrubs are large and form the dominant vegetation throughout much of the bog. This species is also an important component of the adjacent shrub swamp. Another of the Threatened species is a carnivorous plant that occurs in fewer than five locations on the Western Shore and is rare throughout Maryland. The population at this site is unusually large, with numerous plants in all stages of maturity. Six additional species are considered uncommon in Maryland, not yet threatened but worthy of monitoring due to declining or restricted populations.

In addition to its important botanical resources, Gumbottom Wetland should be preserved for its scenic beauty, its role in maintaining the water quality of the nearby river and the Chesapeake Bay, and its importance as wildlife habitat.

The site was recommended for maintenance as a "natural use area" in a 1970 report by the Maryland Department of State Planning, entitled "Scenic Rivers in Maryland". The Severn River, into which this wetland drains, was designated a Maryland Scenic River in 1971. In 1988, the wetland was included in a report entitled Gems of the Severn which recommended maintaining the site in a natural state for such purposes as wetland and forest wildlife reservations, scientific monitoring, and natural management of stormwater. This report noted several additional habitats at this site that are worthy of protection. A small ravine downstream from the bog was noted for its scenic qualities, including a rich herbaceous layer, open understory and large Tulip Trees. The shrub swamp was reported as an example of "alluvial drowning". It was noted for the size and age of its trees, which, along with several other factors, suggest that this wetland has been in equilibrium (undisturbed) for an unusually long time. Several large Sweet Bay trees were recommended for measurement as potential State Champions.

The shrub swamp offers important feeding and nesting habitat for migratory and resident birds and for amphibians. The large size of the undeveloped area makes it a valuable habitat for larger native animal species as well.

Site Name: **John Wesley Church**

USGS Quad: **Round Bay**

The John Wesley Church area contains an unusually high quality wooded swamp bounded by forested, steep slopes. Undisturbed swamp forests of this size and maturity are rare in this region due to development, draining and filling for agriculture, and logging. The high quality of the water in the swamp and stream is maintained by the forested slopes. The development which has occurred in the area is limited to the more level uplands, well away from the wetlands. The vegetation in this protection area is very diverse due to the lack of recent disturbance and the gradual changes in soil moisture with distance upstream.

A State Threatened plant grows among the diverse herbaceous species on the wooded slopes just above the wetland. This species is known from just four other sites in Maryland and only one of these sites is protected. This population is unusual in that its habitat is drier than at any other site in the state. The plants that grow here may provide an important source of genetic variation in their ability to tolerate drier soil.

The wooded swamp provides superb nesting and feeding habitat for migratory songbirds, shorebirds, and waterfowl. Preservation of this site is also critical to the maintenance of water quality in the marsh downstream, which is part of the Chesapeake Bay Critical Area. The 1970 report "Scenic Rivers in Maryland" recommended this site as a "natural use area". Waters from this swamp forest feed into the Severn River, designated as one of Maryland's Scenic Rivers. In 1986, this area was recommended by the Severn River Commission as one of the "Natural Areas of Highest Priority for Preservation". Gems of the Severn (1988) recommended the preservation of this site for passive recreation or a wildlife reservation. Nontidal wetlands such as this swamp are increasingly valued for their role in protecting the water quality of the rivers they feed and ultimately, the Chesapeake Bay.

Site Name: **Little Patuxent Oxbow**

USGS Quad: **Laurel**

Little Patuxent Oxbow contains a large wetland complex associated with an old meander of the Little Patuxent River that has been cut off from the river channel. Steep slopes surround and drain into the wetlands, which include palustrine forests, seepage areas, open water, and a palustrine emergent marsh. The wetlands contain excellent community examples with extremely high

diversity of native species. Many plants form a floating mat over more than one-half acre of water in the emergent marsh.

Three rare plant species grow at Little Patuxent Oxbow. A small but dense population of a State Endangered parasitic plant grows on Mild Water-pepper and Jewelweed plants in the marsh. This small population is the only known locality for the species in the State. An attractive wildflower listed as Threatened in the State grows in the wet soils at the edge of the marsh. It is known from only five sites in Maryland. An uncommon insectivorous species grows in the marsh's shallow water.

Site Name: **North Gray's Bog**

USGS Quad: **Gibson Island**

This wetland complex includes a large Coastal Plain bog, an old pond, an emergent marsh, and a shrub swamp. Coastal Plain bogs are an extremely unusual habitat type in Maryland and contain rare botanical communities that should be preserved. Fewer than a dozen Coastal Plan bogs are known from Maryland's Western Shore, and all of them are ecologically important. Such sites support a suite of species found only in acidic, wet habitats where tree canopy closure is inhibited and a mat of organic peat has developed over many years. North Gray's Bog is especially important because portions of the bog are in the early stages of development, and the potential habitat for rare species will increase in size as the development of the sphagnous mat continues.

North Gray's Bog harbors a small population of a State Endangered sedge that is known from only one other site in Maryland. It also supports sizeable populations of two species listed as Threatened in Maryland, each of which occurs in fewer than 10 other sites statewide. The North Gray's Bog populations occur at the edge of the species' distribution for both plants. One plant grows primarily farther north and the other has a southern distribution. Outlying populations are important to preserve because they often differ genetically from the remainder of the population. They may help the species to survive catastrophic conditions such as disease outbreaks or climate changes.

Four other plant species at North Gray's Bog are considered uncommon in Maryland. They are not yet thought to be threatened, but they are worthy of monitoring due to declining or restricted populations.

Wetland complexes such as this one are increasingly recognized for their essential role in maintaining the water quality of our rivers and the Chesapeake Bay. Many such wetlands

have been lost due to filling, draining and ditching for development and agriculture.

Site Name: **Patuxent Community Ponds**

USGS Quad: **Odenton**

This site consists of two freshwater ponds connected by a narrow drainage. The larger pond is surrounded by shrub swamp and palustrine forest, with Sweet Pepperbush, River Birch and Sweet Gum dominant close to the pond. The marshy edges of the pond support a diverse flora of native species such as Maryland and Virginia Meadow Beauties, Short-stalked False Pimpernel, St. Peters-wort, Cardinal Flower, and native sedges. The smaller pond is mowed to the edge of the pond, and supports only a few submerged aquatic species plus Pickerel Weed, with some Buttonbush and Black Willow along the eastern margin.

Among the native species at the marshy edge of the large pond is a small population of a State Rare plant. This species is known from fewer than a dozen sites in Maryland. An additional rare species was reported historically from the vicinity of Patuxent Community Ponds but has not been found recently here or anywhere in the State. It is currently listed as Endangered Extirpated.

Site Name: **Patuxent Maple Swamp**

USGS Quad: **Bowie**

This site is an excellent example of a palustrine floodplain forest. Red Maple dominates this section of the Patuxent River floodplain, which supports a variety of bottomland hardwood species, including Sweet Gum, River Birch, Sycamore, Ironwood, and ash. Occasional scouring by floodwaters of the Patuxent River maintains an open understory. Patches of shrubs occur on slightly elevated areas and herbaceous openings form in the depressions and channels that retain floodwaters longer. These natural herbaceous openings are unique to floodplain forests; they do not occur in other palustrine, nontidal wetlands of the Upper Coastal Plain.

Among the unusual herbaceous species that inhabit these openings are two species that are rare in Maryland. One species is known from just two other sites in the State and is listed as Endangered in Maryland. The other species is considered Highly State Rare and is known from only one other location in the State.

At the west end of the wetland complex, temporary pools and saturated soils of the Red Maple-Sweet Gum forest provide habitat for an uncommon crustacean. This species is declining and worthy of monitoring in Maryland. These small creatures are predominantly subterranean and only occasionally appear in surface waters. The bulk of the population lives in saturated soils well shaded by the deciduous bottomland forest.

The various types of forested wetlands along this section of the Patuxent River provide excellent habitat for resident and migratory songbirds. In addition, several woodpeckers were observed during both visits to this area. The natural herbaceous openings attract deer and other wildlife.

The forested wetlands along the Patuxent River absorb floodwater during storms and thus reduce the impacts of flooding downstream.

Site Name: **Patuxent Wildlife Research Center**

USGS Quad: **Laurel**

The Research Center includes over 3000 acres of nearly contiguous forest. These forests include approximately 700 acres of mature bottomland forest bordering the Patuxent River. The Society of American Foresters identified the Research Center's bottomland forest as one of nearly 400 natural areas in their national inventory of mature forests. The Society's inventory of natural areas was initiated because these relatively undisturbed forests provide a vital educational resource. The extensive tracts of forest provide a laboratory for studies of plants and animals in their natural habitats and for studies of the ecological processes that sustain the forests. These forest ecosystems remain essentially intact; for example, they include species of forest interior dwelling birds such as neotropical migratory species that are unable to survive in smaller forests. Only by understanding the natural processes that sustain these extensive, relatively undisturbed forests, can scientists assess the effects of human-induced changes to forests of this region.

At least two rare plant species inhabit this area. One, a sedge, is known from only four additional sites in the State and is listed as Threatened in Maryland. The other rare species is a State Threatened wildflower. There are several historical reports of additional rare species at the Wildlife Research Center. The forests were not searched for these species during the field surveys conducted for this report. However, it is likely that the rare species survive because there has been very little disturbance to the habitats from which they were reported. Further survey of the forest is needed to confirm the presence of these rare species.

Most of the forested acreage at the Research Center, both upland and bottomland, has been designated by the U.S. Fish and Wildlife Service as Research Natural Areas. These forests, in association with adjacent forests on Fort Meade, the U.S. Department of Agriculture Research Center, and other federally-owned lands, constitute one of the largest remaining contiguous tracts of forest in the Baltimore-Washington metropolitan area. As commercial and residential development merge formerly distinct metropolitan areas of the mid-Atlantic states, the forests that remain are usually small, isolated patches. These small patches cannot support many of the plants and animals native to this region that require extensive forests or are intolerant of frequent disturbance. The forests of the Wildlife Research Center and adjacent federal properties offer the best available opportunity to conserve the native plants and wildlife of this region that will not survive in small, isolated forests.

Site Name: **Round Bay Bog**

USGS Quad: **Round Bay**

Round Bay Bog is a large wetland complex consisting of palustrine forest and shrub swamp. An unusual and ecologically significant habitat type, a Coastal Plain Bog, occurs just east of the site, within the Chesapeake Bay Critical Area. The nontidal wetland of Special State Concern provides contiguous wetland habitat that is critical to the preservation of the Coastal Plain bog because it maintains the quantity and quality of the water in the bog.

Coastal Plain bogs are an unusual and important habitat type in Maryland, characterized by wet, acidic soils low in important plant nutrients. They support unusual plant communities with species especially adapted to the stressful soil conditions, including heath shrubs, sphagnum moss, and insectivorous plants. They frequently harbor rare species. Few naturally occurring Coastal Plain bogs remain in Maryland, due in part to the suppression of the fires and floods that once created these unusual successional habitats.

A few unusual sites where powerlines cross certain swamps simulate natural bog conditions and support some rare bog species. This occurs in only a very few, restricted areas where swamps have just the right combination of soils and hydrology to develop into bogs. The removal of woody vegetation during powerline right-of-way maintenance at these special sites mimics the natural disturbances that create bogs. Round Bay Bog is one of the largest and most significant of these "powerline bogs".

Among the unusual vegetation in the powerline bog are four rare species. One of these is an herbaceous vine that is listed as Endangered in Maryland and occurs in fewer than five sites statewide. Two are State Threatened species--one, a sedge known from fewer than five Maryland sites and the other, a fern known from fewer than ten sites. The fourth rare species is a wildflower that is considered Highly State Rare and is known from nowhere else in the State.

Site Name: **Stony Run**

USGS Quad: **Relay**

The Pitch Pine-Red Maple Swamp Forest that borders Stony Run is an uncommon community type on the Upper Coastal Plain. Several of the herbaceous species in the swamp usually inhabit colder regions in the mountains or in the Piedmont farther north. Forests as mature as the swamp along Stony Run are rare throughout the Coastal Plain. The well-stratified canopy and the presence of large trees (pines greater than 15 in. in diameter) indicate that portions of this area have not been logged in more than 60 years. A colorful display of native wildflowers blankets the forest in the spring and summer. The absence of invasive non-native species throughout much of the swamp suggests minimal recent disturbance to this area.

Three rare plant species grow in the well-developed herbaceous layer of the swamp forest. One of these plants is rare throughout its range and is listed as Threatened nationally. In Maryland it is known from only four other sites and is listed as Endangered. Portions of two of these sites are protected voluntarily by landowners, but these voluntary agreements do not provide long-term protection for these sites. The other rare species are each known from fewer than ten sites in the State. One is listed as Endangered in Maryland, and the other as Threatened. This relatively mature swamp forest offers an opportunity to preserve these rare species as well as an uncommon community.

The Stony Run area is adjacent to a State Park and provides an excellent opportunity to increase the diversity of habitats within the park. Whether this swamp forest is annexed to the park or protected as a separate entity, it will enhance the recreational and educational values of the park by providing an unusual habitat for visitors to explore.

Two additional rare plant species have been reported from this area but have not been observed recently. Because there has been little disturbance to portions of the habitat, further survey may reveal that these species still inhabit the swamp forest.

Site Name: **Watershed Woods**

USGS Quad: **South River**

Narrow, temporarily flooded wetlands border the streams of this extensive forest. Beech and species of oak dominate the adjacent uplands. Trees measuring two feet in diameter grow on the stream banks and ravine slopes. Forests of similar age are rare on the Upper Coastal Plain of Maryland. The absence of disturbance to this forest has allowed the development of rich, loamy soil that supports an abundance and diversity of herbaceous species.

Among the numerous spring wildflowers is a species listed as Endangered in Maryland that occurs in just two other sites in the State. This rare plant apparently relies on a soil fungus in order to absorb water and nutrients. However, the fungus only thrives in undisturbed, loamy soils with a well-developed organic layer. The rarity of this plant species, with its associated fungus, is attributed to the scarcity of mature, undisturbed forests on the Upper Coastal Plain.

The mature hardwood forest and adjacent swamp offer a diversity of habitats to wildlife, including numerous songbirds. The adjacent ponds provide feeding and resting grounds for waterbirds and waterfowl.

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BALTIMORE COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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BALTIMORE COUNTY

Site Name: **Beaverdam Run**

USGS Quad: **Cockeysville**

This spring-fed, calcareous marsh is one of the few remaining examples of a habitat that was once common in the stream valleys and lowlands of this region. Most similar areas of nutrient-rich soil were cleared for agriculture. Proximity to Baltimore has led to additional habitat loss to residential and commercial development. Mining of the underlying marble has also destroyed similar habitat.

Among the species growing at the edge of this unusual wetland are two State Endangered plants. For one species this small population is the only known locality in Maryland. The second species is known from fewer than five sites statewide. This site supports the only population in the state that consists of more than 100 individuals.

Site Name: **Beetree Run**

USGS Quad: **New Freedom**

Beetree Run contains a nontidal marsh located in a wooded stream valley. The marsh is dominated by native herbaceous species such as Tussock Sedge and Sensitive Fern. Among the marsh plants is a large population of a rare flowering perennial listed as Threatened in Maryland. This plant is known from fewer than ten sites in the State. This occurrence is especially important because the population is large, containing more than 500 flowering individuals in a 2-acre area. Most populations in the state are small, consisting of fewer than 100 individuals.

Site Name: **Big Gunpowder Falls - Forge Road Site**

USGS Quad: **White Marsh**

This site supports an old riparian forest with large individuals of ash, Box Elder and Sycamore growing in the floodplain. The shrub and herbaceous layers are well-developed and diverse. Forests of such age and diversity are uncommon in Maryland.

The site also contains seepage wetlands which support a large population of a fern that is Rare in Maryland. This species is known from fewer than a dozen sites in the State. The

population at this site is large, vigorous and reproducing successfully.

Site Name: **Club Hill Forest**

USGS Quad: **White Marsh**

This rich, mesic bottomland forest provides habitat for a rare herbaceous species that is listed as Endangered in Maryland. This population is large, containing more than 500 individuals growing along more than 1000 feet of river bottomland. Widespread forest clearing for residential and commercial development in this rapidly growing area has eliminated much similar habitat. The rare species at this site is known from fewer than five sites in the State.

Site Name: **Glencoe/Gunpowder Falls**

USGS Quad: **Hereford**

This riverine site encompasses a section of the river's floodplain. It supports a very small population of an herbaceous plant species that is considered Rare in Maryland and is known from fewer than 10 sites in the State. Maryland's populations are near the edge of the species range. Populations near the edge of a plant's distribution are important to protect because they often differ genetically from the rest of the species. This genetic variation can help the species survive changing environmental conditions that may threaten the majority of the species' populations.

Site Name: **Gwynns Falls North**

USGS Quad: **Reisterstown**

This small swamp contains a population of a rare wildflower that is listed as Threatened in Maryland. This is an outlying population. Most of our State's few populations occur in the mountains of Western Maryland. Most, including this population, are small and therefore especially vulnerable to habitat alteration. If the species is to be preserved in Maryland, it is important to protect as many populations as possible.

Site Name: **Gwynns Falls South**

USGS Quad: **Reistertown**

Gwynn Falls South contains a wetland complex that includes a marsh, a wet meadow, and a boggy field. The wetlands are

dominated by native species such as Swamp Rose and cattail. These wetlands support three small subpopulations of a rare wildflower that is listed as Threatened in Maryland. The species is known from fewer than a dozen other sites in the State. Only five Maryland sites are known outside the mountains of Western Maryland. Most populations are quite small, and are vulnerable to habitat destruction and natural catastrophes. The plants are slow-growing perennials that do not flower for the first several years. These attractive plants may also be vulnerable to collection by wildflower enthusiasts.

A rare plant listed as Endangered in Maryland was known historically from the site, but has not been seen recently. This plant may not have survived periods of extreme drought that have occurred since it was last observed.

Site Name: **Loch Raven - Hampton Area**

USGS Quad: **Towson**

In this area, the relatively flat shoreline of Loch Raven Reservoir is composed of a fine silt to fine gravel substrate that is seasonally inundated. The shoreline supports a large population of a sedge that is listed as Endangered in Maryland. This is the only current location for the species in the State and it was known historically from just one additional locality. This site appears to support a stable, healthy population, but the plants are potentially vulnerable to drastic water level manipulation in the reservoir.

A second herbaceous species that is Rare in Maryland grows along the calcareous shore just above the high water mark, at the edge of woody growth. It is known from fewer than five sites in the State.

Site Name: **Lower Chimney Branch**

USGS Quad: **Reisterstown**

This deciduous floodplain forest along Lower Chimney Branch supports a small population of a wetland wildflower that is listed as Threatened in Maryland. The species is known from fewer than 10 sites in the State. Many historic sites have been lost due to habitat destruction. Although small, this population is reproducing successfully. The site appears to be good habitat, as it lacks disturbances such as invasive, non-native species that could outcompete the rare species.

Site Name: **Monkton Bog**

USGS Quad: **Phoenix**

Monkton Bog is an alder and willow shrub swamp that provides excellent habitat for many species of birds. Among the birds using the swamp is one insect-eating species that is listed as In Need of Conservation. This species is known from fewer than 30 sites in the State. It is dependent on the shrub swamp habitat at this site and would be adversely impacted by hydrologic disturbances to the wetland that would result from development. Changes in the vegetational composition of the shrub swamp could also adversely impact the rare birds, which typically inhabit this type of shrub swamp.

This site is important because it is disjunct from the primary range of the rare species in the North and the Appalachian Mountains. Protection of disjunct populations may be especially important to the long term survival of species. Disjunct populations often differ genetically from populations in the primary range of the species and may enable it to survive natural catastrophes such as disease outbreaks or climate changes.

Site Name: **Phoenix Marsh**

USGS Quad: **Phoenix**

Phoenix Marsh, a large nontidal wetland at the edge of a reservoir, supports an important marsh plant community due to its unusual calcareous soils. Three unusual species grow among the emergent marsh vegetation and along the small stream that feeds the marsh. One State Rare sedge found here is known from fewer than three locations in the State. At Phoenix Marsh it grows both in large dense patches and as scattered individuals. Two uncommon marsh species, one a sedge and one a wildflower, grow along the stream that feeds the marsh. The marsh is dominated by grasses that may threaten the rare species if the grasses increase in abundance in the marsh.

Site Name: **Pikall Riverbank**

USGS Quad: **Ellicott City**

Pikall Riverbank is a riparian forest with Sycamore, Spicebush and moisture-loving herbaceous species growing near the river, and old forest covering the steep slopes above. The alluvial soils at the base of the steep slopes support a sizeable population of a fern that is Rare in Maryland. This species is known from fewer than a dozen sites in the State. The vigorous

population at Pikall Riverbank is unusually large, consisting of thousands of individuals. In some parts of the site it forms the dominant herbaceous vegetation. The rare plants appear to be reproducing successfully.

Site Name: **Putty Hill Wetlands**

USGS Quad: **Towson, White Marsh**

A high quality alluvial stream meanders down a wooded slope and along a powerline right-of-way at this site. Wetlands associated with the stream include a shrub swamp and sphagnous seeps with a sandy substrate. Some of these wetlands are temporarily flooded and others remain inundated for most of the year. A diversity of native plants grows in the wetland complex. Upper Coastal Plain wetland complexes with this degree of natural integrity are very uncommon in this highly urbanized area.

Two State Endangered plants grow in wetland openings within the powerline right-of-way. Each of these is known from fewer than five sites in the State. A State Rare plant grows in an acidic, sphagnous seep in the forest adjacent to the right-of-way. This plant is known from fewer than ten sites in Maryland. Two additional species at the site are not yet considered threatened, but are uncommon enough to warrant monitoring.

Site Name: **Red Run Branch**

USGS Quad: **Reisterstown**

This small Red Maple swamp supports a very large population of a rare wetland sedge listed as Threatened in Maryland. The species is known from only five other sites in the State, three of which are greatly threatened by disturbance. It is very sensitive to changes in hydrology, including impacts on recharge areas. An impoundment proposed for this area may eliminate the rare species population.

Site Name: **Rockland Meadows**

USGS Quad: **Cockeysville**

Rockland Meadows consists of a bottomland forest dominated by Red Maple, and a mesic, old-field meadow. The forest's alluvial soils are calcareous. This site is one of the few remaining examples of a habitat that was once common in the stream valleys and lowlands of this region. Most similar areas of nutrient-rich soil were cleared for agriculture. Proximity to

Baltimore has led to additional habitat loss due to residential and commercial development.

This site supports two rare species, although the exact status of each has not yet been determined. One of these is a rare herbaceous plant that grows at the bottomland/meadow edge and is currently known from fewer than five other sites in the State. This population is large, vigorous, and reproducing. The other is a rare woody plant that grows in the alluvial soils at the edge of the old field. This locality is the only currently known site for this species in Maryland.

Site Name: **Soldiers Delight**

USGS Quad: **Reisterstown**

Soldiers Delight is a 2,000-acre Natural Environmental Area that encompasses the largest serpentine ecosystem in the state. It is among the most important, if not the most important, serpentine area in Eastern North America. Soldiers Delight contains globally rare serpentine grassland and savannah plant communities as well as stream valleys and wet boggy areas. Serpentine soils contain high levels of magnesium and often contain naturally occurring heavy metals such as chromium, cobalt, and nickel, that are toxic to plants. Most plants cannot survive in these soils, but certain plants have special adaptations that enable them to cope with the stressful soil conditions. At least 32 Rare, Threatened, or Endangered plant species grow at Soldiers Delight.

Among the rare plants at Soldiers Delight are nine wetland species. Two of these are grasses that live only on stream banks with serpentine soils. These grasses grow nowhere else in Maryland and are both listed as Endangered in the State. Four rare sedges grow in the wetlands at Soldiers Delight. Two of these are each known from fewer than eight Maryland locations and are listed as Threatened in the State. The Soldiers Delight populations are especially important because several of the other known populations of these sedges are threatened with destruction. Another sedge found at this site occurs in only three sites in Maryland, where it is near the southeastern limit of the species range. A fourth sedge is a "drawdown" species, growing in the exposed soils of seasonal wetlands when the water recedes in late summer.

Other rare plants at this site include a colorful wildflower listed as Endangered and known from only 5 other Maryland sites, and a State Threatened plant in the Rose Family that grows in a shrub/emergent wetland.

In addition to rare plants, at least two rare insect species are known from Soldiers Delight. One is a globally rare species of planthopper that lives on a sedge found in herbaceous wetlands. It is a candidate for listing under the U.S. Endangered Species Act.

ECOLOGICAL SIGNIFICANCE OF NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

CALVERT COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Calvert County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

CALVERT COUNTY

Site Name: **Battle Creek Cypress Swamp**

USGS Quads: **Broomes Island, Prince Frederick**

Battle Creek Cypress Swamp is an extensive forested swamp dominated by an unusual community type: a large, mature, almost pure stand of Bald Cypress. This site is one of the last remaining sites where Bald Cypress grows naturally in Maryland, and it is recognized as one of the northernmost stands of cypress in the country. Fossil cypress knees and stumps with diameters up to ten ft. suggest that Bald Cypress was widespread throughout the Chesapeake Bay area prior to one of the glacial periods of the Pleistocene Epoch. Naturally occurring cypress stands are now limited in Maryland to the Battle Creek site in Calvert County and the Pocomoke River watershed on the Eastern Shore. Although logged in the past for its decay-resistant lumber, Battle Creek still contains mature cypress trees that tower 50 to 125 ft. in height with diameters up to four ft.

The extensive wetlands at this site protect the water quality of Battle Creek and the Chesapeake Bay and provide important habitat for numerous wetland plants and animals. Cypress dominates the wettest habitats, which also support Black Willow and herbaceous species such as Spring Beauty, Sensitive Fern, Royal Fern, Skunk Cabbage, and Golden Club. Slightly higher swamplands are dominated by bottomland hardwoods such as Sycamore, Sweet Gum, Red Maple, ash and elm. Southern Arrowwood, Common Greenbrier and Virginia Creeper dominate the shrub layer. Many native ferns and wildflowers adorn the ground layer, although Japanese Honeysuckle has invaded many areas. Among the many species of mammals inhabiting the swamp are deer, rabbit, skunk, opossum, fox and mink. Numerous fish occupy the creek, and its swampy borders offer important breeding habitat for sixteen species of amphibians. Seven species of snakes and eight turtles also inhabit the site. The diversity of birds at Battle Creek enables birdwatchers to view forest interior dwelling species, raptors, owls, songbirds, migratory warblers and waterfowl.

The unique characteristics of the cypress swamp led to purchase of the core area by a private, non-profit conservation organization in 1957. In 1965, the sanctuary was designated a National Natural Landmark by the National Park Service. Although the sanctuary remains in private ownership, Calvert County assumed management responsibilities through a 20-year renewable lease as of February 1977. Public activities such as nature study and appreciation, passive recreation, and educational pursuits have been encouraged at the site through construction

and staffing of a nature center, parking area, nature trails and an elevated boardwalk.

Site Name: **Calvert Cliffs State Park**

USGS Quad: **Cove Point**

Along the streams that dissect this site are excellent examples of old Tulip Tree-Sweet Bay-American Holly bottomland forest, Red Maple-Sweet Gum swamp forest, and old mixed oaks upland forest. The presence of many dead standing trees and well-decayed logs and the uneven age of the trees reveal that these are old forests. This is among the largest contiguous tracts of forest remaining in Calvert County. Numerous trees, including oaks and Tulip Tree, measure more than 2 ft. in diameter. The lack of non-native, weedy species indicates that this area has received little recent disturbance. The large size of the contiguous forest, the "wilderness character" and the relative lack of human disturbance resulted in designation of this site as a Wildlands Area by the State of Maryland in 1990.

The forested ravines and uplands maintain the high water quality of the streams in the area. Nearly the entire watershed of these streams occurs on State-owned land and is forested. Protection of these forests would also protect the water quality of this second-order stream complex that feeds directly into the Chesapeake Bay.

The old forests at this site provide outstanding habitat for many species of wildlife. Owls and numerous woodpeckers are among the species that nest in the cavities of the large trees. The maturity of the forest and the lack of disturbance in the area provide excellent conditions for forest interior breeding birds. These species are declining in abundance in this region as forests are cleared for residential and commercial development and for timber harvest. Herons and beaver frequent the swamps at the mouths of the creeks. The swamps also provide habitat for waterfowl, amphibians, and reptiles. Deer are present throughout the area.

These old forests provide important educational resources to both scientists and local residents. Because this area has received minimal disturbance, the forests provide a laboratory for the research of animals and plants in their natural habitats. Large, relatively undisturbed forests such as these are essential for scientists to study the natural processes that sustain the forest and to assess the effects of human-induced changes to the forests of this region. Plans to construct a nature center in the park have been proposed; such a facility would enhance opportunities for environmental education. Local residents, including students at local schools, may learn the natural history of the area with assistance from interpreters affiliated

with the nature center. The forests provide excellent recreational opportunities to hikers, birdwatchers, and naturalists. The existing trails provide access to much of the park.

The soils' well-developed organic layer and the lack of recent clearing or selective cutting in the old forests provide excellent growing conditions for rare plant species that inhabit this County. The forest has not been surveyed for rare herbaceous plants; however, because the habitat is of such high quality it is possible that future surveys will reveal rare plant populations within the site.

The wetlands and uplands at this site serve as a buffer for the adjacent Cove Point Natural Heritage Area. The portion of this Natural Heritage Area within the park harbors two rare species of insects known from fewer than eight other sites in Maryland. These species are rare throughout their ranges. This area also buffers a nearby Bald Eagle nesting site.

Site Name: **Patuxent Highlands**

USGS Quad: **Lower Marlboro**

Wetlands at the base of these ravines harbor a rare plant listed as Endangered in Maryland and known from only three other sites in the State. This site supports the only population in the State outside of the Allegheny Plateau in Western Maryland. Historical records indicate that this species has always been rare in the State. The non-acidic wetland habitat that this species requires is rare in Maryland. Protection of the few known sites for this species is therefore particularly important because it is likely that few other suitable sites exist in the State. In addition, this site is near the northern extreme of the plant's range. Populations at the edge of a species' range are important to protect because they often differ genetically from populations near the center of distribution. This genetic variation may help the species survive catastrophic environmental conditions, such as climatic changes due to global warming.

The forested watershed maintains high water quality in the wetlands. A small area along the wetland has been cleared and maintained as a lawn; however, most of the watershed remains forested. These wetlands feed directly into the Patuxent River and contribute to the maintenance of water quality in the river.

Although there is evidence of selective cutting on the uplands, numerous large trees are present and provide excellent nesting and den sites for many species of wildlife.

Site Name: **Port Republic Watershed**

USGS Quad: **Prince Frederick**

Port Republic Watershed contains one of the few complete second-order watersheds remaining in a relatively natural, forested condition in this region. Many large forests have been cleared or fragmented for agriculture or for residential or commercial development. Although most of the watershed has been logged within the past 100 years, the steep slopes do not appear to have suffered from the severe erosion that has affected many previously cultivated steep slopes in parts of Southern Maryland. Underlying Miocene marl deposits have produced a band of soils that are porous and much less acidic than most soils of the Coastal Plain. The circumneutral soils support a diverse group of plants that are uncommon in this region. Springs and seepage wetlands are common in these porous soils.

Parker Creek, into which this watershed drains, is unusual in that it is a "barbed" watershed. It once flowed west, rather than east, as evidenced by the direction of its feeder streams. The second-order stream featured in this protection area flows north into Parker Creek, resulting in many lateral ravines with cool, north-facing slopes. Topography, geology, and hydrology combine to produce a flora that is very unusual for the Coastal Plain. North-facing slopes, calcareous soils, and wetland seeps create microhabitats that are more characteristic of the mountain and the Piedmont--cool, nutrient-rich, and moist. Many disjunct populations of species more common in the mountains or Piedmont, such as Miterwort and Golden Saxifrage, occur in these microhabitats.

Populations of at least six rare or uncommon plants occur at Port Republic Watershed. Four of these are upland species. The other two species grow in the rich palustrine forest. One is listed as Threatened in Maryland and is known from fewer than ten sites in the State. This population is the largest in Maryland, consisting of several hundred plants. The other wetland species is considered State Rare and grows on the banks of the stream that winds through the palustrine forest. An additional plant species has been reported from the moist bottomland, but its presence has not been recently confirmed. It is currently listed as Endangered Extirpated in Maryland, and it will automatically be considered Endangered if a viable, naturally-occurring population is located.

This site adjoins a Listed Species Habitat Protection Area in the Critical Area. Port Republic Watershed may provide additional habitat for this listed species. This site helps preserve the water quality and scenic qualities of the larger Parker Creek watershed.

The small nontidal wetlands (springs and seeps) and the clear-flowing streams in Port Republic Watershed provide excellent breeding and feeding habitat for wildlife such as amphibians and songbirds. The large size of the contiguous forest and its relative maturity make this site suitable habitat for a great diversity of forest interior breeding birds.

The research potential and educational opportunities offered by a large, forested watershed such as this one are enormous. Studies of the effects of human activities in altered ecological systems require undisturbed sites for comparison. A forest that is in the later stages of transition to an old-growth condition, such as Port Republic Watershed, serves this purpose and is a rare and invaluable resource.

Site Name: **West Governor Run Watershed**

USGS Quad: **Prince Frederick**

West Governor Run Watershed contains a mature hardwood forest, many portions of which have not been logged for 70 years or more. Older forests such as this are uncommon in the region, due to the clearing of forests for timber management, agriculture, and residential and commercial development. Old maps show that this site was one of the largest forested sites in the area in the mid-1800s, when most of coastal Calvert County had been cleared for agriculture, especially tobacco farming. A number of uncommon plants grow at this site because of its unusual geology and the deep humus and litter layers that have developed in the absence of recent soil disturbance. Underlying marl deposits from the Miocene Epoch have produced soils that are much less acidic than most Coastal Plain soils. These circumneutral soils support several plant species found more often in the mountains and Piedmont than on the Coastal Plain.

West Governor Run Watershed harbors seven rare or uncommon plant species. Three of these plants grow in the moist soils of the floodplain forest, including one species that is listed as Endangered in Maryland. It occurs in only three other sites in the State, and this is the only Calvert County population. Another floodplain species is listed a Threatened in Maryland, and is known from fewer than ten sites statewide. It is an annual species that is adapted to periodic flooding. The third floodplain species is considered uncommon in Maryland.

This forested watershed provides excellent habitat for forest interior dwelling species of breeding birds, which require large tracts of contiguous, relatively old forest. The snags, blow-downs and hollow trees characteristic of this older second growth forest provide suitable nest and den sites for many species of wildlife.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

CAROLINE COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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INTRODUCTION

This report summarizes the ecological significance of each area in Caroline County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

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CAROLINE COUNTY

Site Name: **Baltimore Corner**

USGS Quad: **Goldsboro**

Baltimore Corner is a large wetland complex that includes a series of Delmarva bays, some of which are meadow-like with few woody species, and others which are dominated by wetland shrubs, such as Buttonbush, blueberry, and Sweet Pepperbush. Two of these bays, both of which are circular and dominated by grasses and sedges with no tree overstory, harbor five rare plants, and the larger one, several acres in area, harbors a rare amphibian. The bays are unusual nontidal wetlands recharged annually by groundwater. Inundated in the winter and early spring, they provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species.

Drainage and filling for agriculture and development have destroyed many Delmarva bays. Those that remain often contain rare, disjunct, or endemic species specially adapted to the fluctuating water level.

The rare amphibian at this site, listed as In Need of Conservation, uses the large Delmarva bay as breeding habitat. An Endangered member of the Aster Family, found at only three other locations in Maryland, grows in the open depression of the smaller bay. A State Endangered carnivorous plant, also occurring at only three other locations in the State, flourishes in the deeper inundated depressions during the summer months, only appearing in the ponds during years of high precipitation. Two other State Endangered species, a grass and a sedge, inhabit these Delmarva bays. A State Rare sedge also germinates when this bay dries in the summer. This annual species is abundant in the central portion of the bay after the water recedes.

A private conservation organization owns and manages all of the wetland openings at this site, totalling 296 acres in area.

Site Name: **Bates Ditch**

USGS Quad: **Hickman**

Bates Ditch is a roadside wetland adjacent to a young Loblolly Pine Plantation. The wetland harbors a large population of a State Endangered sedge. This plant species occurs at only

five other locations in Maryland and is a potential candidate for listing under the U.S. Endangered Species Act.

This sedge species may require periodic disturbance, as well as special soil or hydrologic conditions, to reproduce and thrive. Natural disturbances that once created wetland gaps, such as flooding and fire, have been largely suppressed by man. The suppression of woody growth on roadsides with unusual soil and hydrologic conditions can sometimes mimic natural wetland openings suitable for colonization by rare species.

Site Name: **Bridgetown Ponds NRMA**

USGS Quad: **Goldsboro**

Bridgetown Ponds Natural Resources Management Area (NRMA) is a system of Delmarva bays harboring three rare plant species and two rare animal species. Delmarva bays are unusual nontidal wetlands which are recharged annually by groundwater. Filling in the winter and early spring, they provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species specially adapted to the fluctuating water levels.

Many Delmarva bays have been destroyed by drainage and filling for agriculture and development. As these bays become increasingly rare, so do the rare plant and animal species that rely on them. Existing bays often harbor rare, disjunct, or endemic species.

Owned and managed by the State, Bridgetown Ponds NRMA provides protection for three rare sedges. One species is listed as State Endangered, one is State Threatened, and the third is State Rare in Maryland. The Threatened sedge occurs at only three other known locations in Maryland.

A State Endangered amphibian, one of only five populations in Maryland, uses Bridgetown Ponds NRMA as breeding habitat in the winter and early spring. A rare amphibian listed as In Need of Conservation has also been recorded at this site.

Site Name: **Central Avenue Corner**

USGS Quad: **Denton**

Central Avenue Corner is an unusual forested wetland containing at least eleven small ponds with various hydrologic regimes. The diverse wetland types provide habitat for a great variety of plant and animal species. These wetlands are examples

of small Delmarva bays, centripetally-drained wetlands found almost exclusively on the Eastern Shore. Delmarva bays fill with water during winter and early spring, and dry out by late summer as groundwater recedes. They often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels. Seasonal ponds were once more common on the Eastern Shore, but many have been drained for agricultural use. The ponds in this protection area remain relatively undisturbed. If their hydrologic regimes are maintained in a natural condition, it is highly probable that they will continue to support rare species.

Three State Endangered species inhabit this area, emerging and flowering when the bays dry in summer. An uncommon tree species occurs on the uplands adjacent to the bays.

These nontidal wetlands provide ideal feeding and resting habitat for numerous amphibians, songbirds, and other wildlife. Additional rare species may also inhabit the Delmarva bays. The site has been surveyed in the autumn only. Because the flora and fauna of these bays vary seasonally and annually with water levels, several visits will be necessary to complete the species inventory for this protection area.

Site Name: **East Melville Pond**

USGS Quad: **Goldsboro**

East Melville Pond is an oval Delmarva bay about 1 acre in size, dominated by Buttonbush and species of beggar ticks. The bay is partially buffered by a 300 foot-wide Red Maple-Sweet Gum wooded swamp on the east side.

Delmarva bays differ from other nontidal wetlands in that their primary source of annual recharge is groundwater. Inundated in winter and early spring, they provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species specially adapted to the fluctuating water levels.

Filling and drainage for agriculture and development have destroyed many Delmarva bays. Those that remain often harbor rare, endemic, or disjunct species specially adapted to the fluctuating water levels.

Four rare plant species have been found in this bay after it dries in the fall. Three of these species, two sedges and a grass, are State Endangered. Each of the Endangered species is a candidate for listing under the U.S. Endangered Species Act. A

State Rare member of the Bluet Family also occurs in the moist depressions of the bay.

Site Name: **Floral Swale**

USGS Quad: **Goldsboro**

Floral Swale is a low-lying wetland dominated by herbaceous species within a powerline right-of-way. Wetland openings were once more common when fires and floods created natural gaps in wetlands. Since such natural disturbances have been largely suppressed by man, wetland gaps and the species that inhabit them have become increasingly rare. Powerline right-of-way maintenance keeps wetlands free of woody species, mimicking natural disturbances.

A State Endangered and nationally rare plant species, known from only three other locations in the State, grows in this swale. The population at this site is large and vigorous. The limited distribution of this species may indicate that it has highly specific soil or hydrologic requirements.

Site Name: **Greer's Pond**

USGS Quad: **Goldsboro**

A complex of shrub swamps and Delmarva bays occurs within this swamp forest. Delmarva bays dominated by herbaceous species are uncommon on Maryland's Eastern Shore; many similar ponds have been destroyed by agricultural ditching and drainage. The water level of Delmarva bays varies with groundwater fluctuations. Normally the water is deepest in early spring, then recedes, and the bay dries during the summer. Herbaceous species specially adapted to the fluctuating water levels rapidly colonize the moist depressions remaining in the pond's center.

Among these herbs is a State Rare sedge. Although this species is known from several sites in Maryland, only four of these sites are protected. In addition, two uncommon plants, a grass and a sedge, also inhabit this site.

Rare amphibian species may inhabit these bays; for example, the ponds provide ideal habitat for three State-listed amphibians. However, these species are not apparent in the early fall, when this site was surveyed. Because the flora and fauna vary seasonally and annually with water levels, several visits are required to develop a complete species list for this site.

Delmarva bays offer breeding, nesting and feeding grounds to migratory waterfowl and songbirds. The bays also provide feeding

grounds for resident waterbirds. In addition, deer frequent the ponds to feed and rest.

Site Name: **Hourglass Pond**

USGS Quad: **Goldsboro**

Within a large hardwood swamp is a two acre Delmarva bay dominated by herbaceous species. Many similar bays on the Eastern Shore have been destroyed by agricultural ditching and drainage. The abundance of herbaceous vegetation in the bay's center is maintained by the fluctuating groundwater regime. Normally, the water level is highest in spring and the bay gradually dries through the summer. This bay has an unusual hourglass shape with deep depressions at both ends. Many herbaceous species germinate in these depressions after the bay dries and complete their life cycles in the brief period before the fall frosts.

In the deepest section of the bay is a State Endangered sedge which is a candidate for listing under the U.S. Endangered Species Act. Fewer than 20 extant populations of this species are known worldwide, and twelve of these occur in Maryland. Only two of Maryland's populations are protected currently.

It is likely that rare amphibians inhabit Hourglass Pond. The bay's flora and fauna change seasonally and annually with water level. These amphibians are not apparent in early fall when the bay was surveyed. Several visits are needed to develop a complete species list for the site.

The bay provides breeding, nesting, and feeding habitat for migratory waterfowl.

Site Name: **Jackson Lane Site**

USGS Quad: **Goldsboro**

Jackson Lane Site includes a series of Delmarva bays that are predominantly herbaceous with scattered trees and shrubs. The most significant is about an acre in size. Three State Endangered plant species thrive under the unusual hydrologic regime in this bay. The hydrology of Delmarva bays depends on the levels of groundwater present in the surrounding woodlands. Recharged in the winter and early spring when groundwater levels are highest, Delmarva bays provide excellent breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remaining in the pond bottoms are rapidly colonized by herbaceous species specially adapted to the fluctuating water levels.

One of the three State Endangered plants found at Jackson Lane, a sedge species, is a candidate for listing under the U.S. Endangered Species Act. It occurs at only eleven other locations in the State. A second Endangered sedge at this site is known from only two other locations in Maryland.

The third Endangered plant species, a floating-leaved aquatic, matures through winter under standing water. Its flowers emerge above the water in spring. Only five other locations of this rare plant species have been recorded in the State.

Many Delmarva bays such as the one at Jackson Lane have been destroyed by drainage and filling for agriculture and development. As Delmarva bays have declined in number, so have the rare plant and animal species that rely on them for habitat. Existing Delmarva bays often harbor rare, disjunct, or endemic species.

A private conservation organization owns and manages much of the wetland, totalling 167 acres in area. However, only half of the significant Delmarva bay has been acquired.

Site Name: **Marvel Pond**

USGS Quad: **Goldsboro**

Marvel Pond is a small Delmarva bay dominated by Buttonbush, grasses, and sedges. A population of a State Rare member of the Bluet Family occurs in the herbaceous openings of the bay, close to its center. This species is found at fewer than fifteen locations in the State. The bay is surrounded by a narrow wooded buffer of Red Maple and Sweet Gum.

Delmarva bays are annually recharged by groundwater, so that water levels in the bay fluctuate seasonally. Inundated in the winter and early spring, Delmarva bays provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As they dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species.

Drainage and filling for agriculture and development have destroyed many Delmarva bays. Those that remain often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Marydel East**

USGS Quad: **Goldsboro**

Marydel East is a small Delmarva bay dominated by herbaceous species and containing a population of a rare amphibian listed as In Need of Conservation. Delmarva bays dominated by herbaceous species are uncommon on Maryland's Eastern Shore; many similar bays have been destroyed by agricultural ditching and drainage.

Normally, Delmarva bays are annually replenished by groundwater, filling in the winter and early spring. These inundated bays provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in summer, moist depressions remain which are rapidly colonized by herbaceous species.

As Delmarva bays become increasingly rare, so do the rare plant and animal species which rely on them for habitat. Existing Delmarva bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Mt. Zion Pothole**

Quad Name: **Goldsboro**

Mt. Zion Pothole is a shrub-dominated Delmarva bay harboring a large variety of herbaceous species. Among these herbaceous species is a State Endangered member of the Aster Family, occurring at fewer than fifteen other locations in the State. The population at this site is vigorous and fairly large. A rare amphibian listed as In Need of Conservation utilizes the bay as breeding habitat in the spring.

Delmarva bays are annually recharged by groundwater. Filling in the winter and early spring, they provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species.

Drainage and filling for agriculture and development have destroyed many Delmarva bays. As Delmarva bays become increasingly rare, so do the rare plant and animal species which rely upon them for habitat. Remaining Delmarva bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Mt. Zion South Pond**

USGS Quad: **Goldsboro**

Mt. Zion South Pond is a Delmarva bay harboring a State Endangered amphibian species. This amphibian species occurs at only five known locations in the State.

Delmarva bays differ from other nontidal wetlands in that their primary source of recharge is groundwater. Groundwater levels in surrounding woodlands fluctuate during the year, resulting in seasonally variable water levels in the bays. Filling in the winter and early spring, the bays provide ideal feeding, breeding, and resting habitat for amphibians, songbirds, and other wildlife. As the bays dry in the summer, moist depressions remaining in the wetland bottoms are rapidly colonized by herbaceous species. Future surveys at Mt. Zion South Pond during the drier months may reveal that the bay contains rare plant species in addition to the rare amphibian already mentioned.

Drainage and filling for agriculture and development have destroyed many Delmarva bays. As these bays decline in number, so do the rare plant and animal species which rely on them for habitat. Existing Delmarva bays often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Oldtown Pond**

USGS Quad: **Goldsboro**

Oldtown Pond is an unusually deep, sparsely vegetated seasonal pond. Like most other seasonal ponds, it is recharged annually by groundwater. Filling in the winter and early spring, it provides ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. It differs from other seasonal ponds in that it does not dry as completely during the summer. The center of the pond remains inundated while moist depressions at its edge may be suitable for colonization by herbaceous species.

Many seasonal ponds on Maryland's Eastern Shore have been destroyed by drainage and filling for agriculture and development. As seasonal ponds become increasingly rare, so do the rare plant and animal species which rely on them for habitat. Existing seasonal ponds often harbor rare, endangered, or disjunct species specially adapted to the fluctuating water levels.

A State Endangered sedge occurs in Oldtown Pond. This population is fairly large, consisting of several hundred fruiting plants.

Site Name: **Opossum Hill Powerline**

USGS Quad: **Hobbs**

Opossum Hill Powerline contains a bog-like wetland that includes four rare plant species. Coastal Plain bogs are nontidal wetlands that support unusual botanical communities adapted to acidic, saturated soils. The bogs are usually dominated by shrubs or herbaceous species and lack trees. Many non-tidal wetlands on the Eastern Shore, including bogs, have been destroyed by ditching and draining for agriculture and for residential and commercial development.

Powerline rights-of-way provide significant habitats for several threatened and endangered plant species. The management of woody vegetation in the rights-of-way has created habitats that are similar, although not identical, to herbaceous wetland openings created historically by fire and beaver activity. Natural forest openings have been nearly eliminated by modern fire suppression practices, and beaver populations on the Eastern Shore have declined drastically.

Three State Endangered species occur in the boggy powerline opening. One of the Endangered species, a carnivorous plant, is known from only two other sites in Maryland and is at the northern limit of its range. The two other Endangered species, a mint and a sedge, are known from fewer than seven other locations in Maryland. An uncommon sedge also occurs in the bog.

This protection area encompasses a portion of the headwaters of a stream that feeds a lake. Maintenance of the local hydrology of the wetland will aid in the preservation of water quality of this stream and the lake.

Site Name: **Pasture Pond**

USGS Quad: **Goldsboro**

Pasture Pond is a ditched and grazed Delmarva bay harboring four rare or uncommon herbaceous species. Delmarva bays dominated by herbaceous species are uncommon on Maryland's Eastern Shore; many similar bays have been completely destroyed by agricultural ditching and drainage.

Delmarva bays are annually recharged by groundwater. Filling in the winter and early spring, they provide ideal

breeding and resting habitat for amphibians, songbirds, and other wildlife. As they dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species. As Delmarva bays become increasingly rare, so do the rare plant and animal species which rely upon them for habitat. Existing Delmarva bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Of the four rare or uncommon herbaceous species occurring in Pasture Pond, three are State Endangered. A large population of a State Endangered sedge, found at only two other locations in Maryland, occurs in this pond. The other two Endangered plant species at this pond each occur at fewer than five other locations in the State. An uncommon wildflower also thrives in this Delmarva bay.

Site Name: **Persimmon East**

USGS Quad: **Goldsboro**

Persimmon East is a small sphagnous seasonal pond dominated by Red Maple and Sweet Gum containing a large population of a rare amphibian listed as In Need of Conservation. Seasonal ponds are uncommon on Maryland's Eastern Shore since many similar ponds have been destroyed by agricultural ditching and drainage.

Normally, seasonal ponds are replenished annually by groundwater, filling in the winter and early spring. These inundated ponds provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the ponds dry in summer, moist depressions remain which are rapidly colonized by herbaceous species.

As seasonal ponds become increasingly rare, so do the rare animal and plant species which rely on them for habitat. Existing seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Persimmon Preserve**

USGS Quad: **Goldsboro**

Persimmon Preserve includes an open Delmarva bay of grasses and sedges adjacent to a wetland dominated by small trees of persimmon. Grasses, sedges, and sphagnum are abundant under the persimmons. The irregularly shaped, persimmon-dominated wetland appears to have once been open and unforested, and may just be a shallow end of the bay that succeeded to young forest when droughts enabled tree seedlings to establish. The bay typically

fills with groundwater from late fall through spring and then dries in summer.

Of the five rare plant species at this site, four grow in the moist depression that remains after groundwater recedes in summer. One of these four, a State Endangered sedge, is a candidate for federal listing under the U.S. Endangered Species Act. A State Endangered grass at this site has been found at only five other locations in Maryland. The other two are State Rare species, a sedge and a member of the Bluet Family. The wetland now closing in with persimmons harbors Maryland's only known occurrence of the fifth rare species, a State Endangered grass. This species is a potential candidate for listing under the U.S. Endangered Species Act.

Delmarva bays are nontidal wetlands which are annually recharged by groundwater. Filling in the winter and early spring, these inundated ponds provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the ponds dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species.

Many Delmarva bays have been destroyed by drainage and filling for agriculture and development. As these bays become increasingly rare, so do the rare plant and animal species which rely on them. Rare, disjunct, or endemic species specially adapted to fluctuating water levels are often associated with existing Delmarva bays.

A private conservation organization owns and manages the 8-acre persimmon-dominated wetland, but the adjacent open Delmarva bay is in private ownership

Site Name: **Petroski Bog**

USGS Quad: **Goldsboro**

Petroski Bog is a sphagnous bog harboring a population of a State Endangered wildflower. This rare plant thrives in sunny wetland openings with acidic soils.

Bogs are acidic, nutrient-poor nontidal wetlands characteristically covered by thick, floating mats of sphagnum. The water in bogs is typically slow-moving or stagnant. In Maryland, these bogs were historically created by fires or beaver activity which dammed part of a free-flowing water channel. Bogs have become increasingly rare on the Eastern Shore with the decline of beaver and man's suppression of fire. Species uniquely adapted to the conditions of the bog have also become increasingly rare.

Site Name: **R & M Bay**

USGS Quad: **Goldsboro**

R & M Bay is an unusually deep and open Delmarva bay with a silty bottom. It harbors a small population of a State Endangered sedge. This sedge is a candidate for listing under the U.S. Endangered Species Act. An uncommon grass also inhabits this Delmarva bay.

Delmarva bays are nontidal wetlands which are annually recharged by groundwater. Filling in the winter and early spring, these inundated ponds provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As the ponds dry in the summer, moist depressions remain which are rapidly colonized by herbaceous species.

Many Delmarva bays have been destroyed by drainage and filling for agriculture and development. As Delmarva bays decrease in number, so do the rare plant and animal species which inhabit them. Remaining Delmarva bays often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels. Because the species composition of Delmarva bays varies seasonally, future surveys of R & M Bay at different times of the year may yield new rare species locations.

Site Name: **Red Bridges Road Crossing**

USGS Quad: **Denton**

Red Bridges Road Crossing is a swamp near the headwaters of the Choptank River. A State Threatened shrub population grows in the understory of the swamp forest along the lower banks of the river. A few scattered shrubs were observed when the population was surveyed in 1987; future surveys are needed to determine the full extent of the population.

Only one other population of this Threatened shrub occurs in Maryland. The low number of occurrences for this species may indicate that it has highly specific soil or hydrologic requirements.

Part of this swamp is owned by the county and is managed as parkland. Undisturbed swamp forests have become increasingly rare as wooded buffers are removed, allowing the invasion of exotic species, siltation, and degradation of water quality. Species associated with undisturbed swamp forests are also declining in numbers.

Site Name: **Schuyler Pond**

USGS Quad: **Goldsboro**

This 1.5 acre seasonal pond contains Maryland's only known population of a State Endangered plant species. Thought to have been extirpated from Maryland until its discovery in 1987, this plant species is also very rare in surrounding states. The population in Schuyler Pond is large and was flowering profusely at the time of the site visit, indicating that the population is well established.

The seasonal pond was deepened by excavation over 15 years ago. A dense mat of sphagnum moss occurs along the outer edge of the pond, suggesting that this region was not severely disturbed during excavation. Many similar ponds have been destroyed by agricultural ditching and drainage. In addition, trees or shrubs dominate most of the remaining seasonal ponds, while this pond is a grassy glade in late summer. Fluctuating groundwater level maintains this abundance of herbaceous vegetation. The pond's water level is highest in the spring, then recedes, and the pond dries in the summer. Rare, disjunct, or endemic species uniquely adapted to the fluctuating water levels are often found in remaining seasonal ponds.

Rare amphibians may also inhabit this site. These amphibians are not apparent in late summer, when the site was visited; however, the landowner reported observing numerous amphibians in the spring. Because the flora and fauna of the pond vary seasonally and annually with water level, several visits will be required to obtain a complete species list for the site.

Site Name: **Smithville Swamp**

USGS Quad: **Hickman**

Smithville Swamp is an extensive swamp forest, partly logged in 1983, which is located adjacent to a State Wildlife Management Area. A sphagnous seep at the edge of the swamp harbors a fairly large, vigorous population of a State Endangered sedge. This plant species occurs at only five other locations in Maryland and is a potential candidate for listing under the U.S. Endangered Species Act.

This sedge species may require periodic disturbance, as well as special hydrologic and soil conditions, to regenerate and thrive. Natural disturbances which once created wetland gaps, such as fire and flooding, have been largely suppressed by man. Today, removal of woody vegetation in wetlands with special soil

and hydrologic conditions can sometimes mimic natural wetland openings suitable for colonization by rare species.

Site Name: **South Melville Crossroads Pothole**

USGS Quad: **Goldsboro**

This pond is a nontidal wetland referred to as a Delmarva bay. The pond normally fills with water in the winter and spring and dries during the summer. Such wetlands are usually forested or dominated by shrubs. Bays dominated by emergent, herbaceous vegetation, such as the South Melville Crossroads Pond, are rare in Maryland. Many similar ponds have been destroyed by agricultural drainage and ditching. As seasonal ponds are reduced in number, so are the rare plant and animal species which rely on them for habitat. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Of the four rare species in this bay, two are Threatened and one is Highly State Rare in Maryland. In addition to the populations in this bay, only three populations of the Threatened sedge and six populations of the Threatened emergent plant species are known to occur in Maryland. Just one population of the sedge and two populations of the emergent plant are protected currently. The Highly State Rare species at this site, a sedge, thrives in the Delmarva bay after the groundwater recedes.

Seasonal ponds may be important sites of groundwater recharge and thus may be important in maintaining groundwater quality. The land surrounding the ponds may be the seepage face, where groundwater meets the soil surface. When the soil profile is saturated with water, it is likely that water drains into the ponds from the surrounding land of slightly higher elevation. Groundwater quality may also be enhanced by the filtering effects of the seasonal pond vegetation.

Seasonal ponds are feeding grounds for a variety of resident waterbirds such as herons and egrets. They also provide important resting, breeding, and feeding grounds for migratory waterfowl, shorebirds, and songbirds.

Site Name: **Tuckahoe Creek North**

USGS Quad: **Ridgely**

Tuckahoe Creek North site encompasses seasonally flooded, temporarily flooded, and saturated palustrine forests, shrub swamps, and open water ponds upstream from and adjacent to the Tuckahoe Creek North Natural Heritage Area (NHA). Preserving the

nontidal wetlands feeding into the Tuckahoe Creek North N.H.A. is essential to maintaining the hydrologic regime, water quality, species composition, and natural character of the NHA.

The nontidal wetland vegetation in this site acts as a natural filter, reducing the sediment and chemical content of surface runoff entering tidal areas. This function is especially important because Tuckahoe Creek is the main tributary of the Choptank River. In addition to reducing pollution and siltation in the NHA tidal wetlands and in the river, the nontidal wetlands serve as catchment basins for seasonally high surface runoff. Instead of flooding and increasing erosion in the tidal channel, the excess surface runoff evaporates or is slowly absorbed into the soil. Periodic freshwater discharge from the nontidal wetland increases the nutrient availability in the tidal wetlands, stimulating productivity. This freshwater influx also creates varied habitat, resulting in increased species diversity.

A large and extensive population of a State Threatened shrub species thrives in Tuckahoe Creek's riparian habitat. The nontidal wetlands and adjacent upland forests buffer this rare plant population from disturbance or nonnative weedy species invasion. Although not surveyed, Forest Interior Dwelling Birds probably breed in the site due to its large size and variety of habitats.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

CECIL COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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INTRODUCTION

This report summarizes the ecological significance of each area in Cecil County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

CECIL COUNTY

Site Name: **Bald Friar Ravine**

USGS Quad: **Conowingo Dam**

The lower slopes and stream banks of this ravine support a lush deciduous forest with an exceptionally diverse herbaceous layer. The soil is rich in nutrients and much less acidic than most soils of this county. An outstanding display of spring wildflowers thrives in this loamy, circumneutral soil. Because the slopes are extremely steep and stony, the ravine is unsuitable for cultivation and there is little evidence of recent disturbance.

An uncommon wildflower species and a rare form of a fairly common plant species grow in the luxuriant herbaceous layer of the forest. The uncommon species usually inhabits rich, cool forests in the mountains. This may be the easternmost occurrence of this species in Maryland, and it is the only reported site in Cecil County.

The rich, cool slopes of the ravine, in conjunction with the adjacent forest, provide excellent feeding and breeding habitat for migratory songbirds. The marsh and pond at the mouth of the ravine provide habitat for amphibians. Local residents fish in the pond.

Site Name: **Camp Rodney Swamp**

USGS Quad: **North East**

This freshwater wetland complex is unusual both in size and species diversity. At the center of the complex is an exceptionally large shrub swamp that is dominated by Red Maple and dotted with emergent marsh in the wettest areas. Forested wetlands radiate from the shrub swamp. Water level differs between the shrub swamp and the adjacent swamp forests. In addition, the water regimes within the swamp forests vary with elevation and soil type, ranging from semi-permanently to temporarily inundated. The great diversity of plant species within the wetland complex may be attributed to this hydrologic variation.

Sphagnum hummocks within the shrub swamp produce acidic conditions that favor the growth of unusual plants. Two unusual plant species inhabit marshy edges and openings within the swamp. This is the only known site in the State for one plant, which is listed as Endangered in Maryland. This rare plant occurs in an

emergent marsh, and is sensitive to hydrologic changes. The other species is considered uncommon in Maryland and grows at this site in herbaceous openings among the wetland shrubs.

With further survey, it is likely that other rare species will be found in these extensive wetlands.

The various types of wetlands in this protection area provide resting and feeding grounds for migratory waterfowl and songbirds and nesting habitat for resident waterbirds and songbirds.

The wetlands and adjacent upland provide an outstanding outdoor educational opportunity in conjunction with the natural history courses taught at Camp Rodney.

Site Name: **Cecil Bog**

USGS Quad: **Conowingo Dam**

The feature of greatest ecological significance at this site is an unusual nontidal wetland composed of a boggy wet meadow and a gravel seepage slope. Chrome soils and the lack of woody vegetation are the two unusual ecological features of this rare wetland habitat. Although chrome soils are scattered throughout northwestern Cecil County, they are usually well-drained and they seldom occur in wetlands.

The wet meadow lies in an actively maintained powerline right-of-way. The upper portion of the meadow is dominated by grasses and sedges, including three rare or uncommon species. The lower portion of the meadow is a mixture of open areas and shrubby areas with Meadowsweet as the dominant woody plant. Moisture is supplied continuously to both areas by groundwater seeping from the adjacent slopes. Sphagnum moss, orchids, and carnivorous plants are scattered throughout the meadow.

The gravel seepage slope adjacent to the meadow is outside the actively maintained area of the powerline. It is dominated by woody saplings and shrubs. Open areas occur along the major seepage courses where rivulets carry surface water to a small stream. The herbaceous vegetation of these open areas is very similar to the vegetation in the boggy meadow.

Historically, fire suppressed the growth of woody vegetation on dry chrome soils and in the wetlands surrounded by these dry soils. However, the modern practice of fire suppression has nearly eliminated these open, sparsely wooded habitats. Without fire, woody vegetation slowly encroaches. The rare grasses and forbs that inhabit the openings do not survive under the canopy of the invading trees and shrubs. The most open portion of Cecil

Bog occurs in a powerline right-of-way. The artificial exclusion of woody vegetation from this powerline simulates the effect of fire and maintains an unforested area similar, although not identical, to the naturally open habitats that were more common historically.

The unusual plant communities that occur on this rare habitat include one species that is Rare in Maryland, known from fewer than 20 sites in the State. Two additional species are considered uncommon in Maryland, not currently threatened but declining or restricted in the State. The populations of all three species are vigorous and include numerous flowering and fruiting individuals.

Additional rare species are likely to occur in this unusual habitat. Further survey would be required to complete a species list for the site.

Deer and other wildlife rest and feed in the wetland and surrounding forest.

Two landowners adjacent to the bog have agreed to protect the portions of their land that serve as forested buffer to the bog. They have joined The Nature Conservancy's Natural Areas Registry. For one of these properties, the Maryland Natural Heritage Program has worked with the Project Forester to draft a Forest Conservation Management Agreement that excludes from logging the registered portion of the property plus a 200 ft. buffer.

Site Name: **Charlestown West Seeps**

USGS Quads: **Havre de Grace, North East**

Charlestown West Seeps contains a small, meandering stream and its tributary which is fed by a sphagnous seepage slope. The seepage slope is dominated by sphagnum moss, Sweet Bay, and Skunk Cabbage, and supports a population of a rare plant known from only four other sites in the State. This species is listed as Endangered in Maryland, and as Threatened under the U.S. Endangered Species Act. The undisturbed, spring-fed, sphagnous wetland habitat which the rare plant requires is increasingly rare throughout its range. Urban development and agriculture have led to direct loss or alteration of this habitat due to draining, ditching, and filling of wetlands, channelization of waters for flood control, and sedimentation from building construction. Each site where this plant occurs in Maryland receives some voluntary landowner protection, but no site is adequately or completely protected.

This freshwater wetland supports a diverse array of herbaceous species, including ferns, flowering shrubs, and herbs. Surveys at various times during the growing season may reveal additional rare plant species. The permanent, spring-fed seeps and a large woodland pond on the site provide excellent habitat for amphibians. The wetlands as well as the relatively mature surrounding uplands provide suitable habitat for many wildlife species, including songbirds, waterbirds, and deer.

Site Name: **Log Cabin Sedge Meadow**

USGS Quad: **Conowingo Dam**

This unusual wet sedge meadow occurs on chrome soil and lacks woody vegetation. Wetlands such as this seldom occur on chrome soils, which are usually well-drained. Historically, fire created open, sparsely forested habitats such as this sedge meadow. However, the modern practice of fire suppression has nearly eliminated these habitats. The lack of woody vegetation in the meadow is partially maintained by groundwater seepage. Maintenance of the adjacent powerline right-of-way also eliminates woody vegetation along the edge of the sedge meadow. In addition, the shallow, chrome soil in portions of the adjacent forest inhibits the growth of trees and shrubs, and supports only a thin cover of woody vegetation.

Three unusual plant species grow among the sedges and forbs of the sedge meadow. Nearby, in seeps and along a small stream beneath the powerline, grow several smaller populations of the same plants. One species is considered Rare in Maryland and is known from fewer than 20 sites in the State. It grows abundantly at this site. The other two species are considered uncommon in Maryland--not yet threatened, but worthy of monitoring due to restricted or declining populations.

Site Name: **Octoraro Slopes**

USGS Quad: **Rising Sun**

Although much of this area is upland habitat, wetland seeps and floodplain forest form a small but important part. They contribute to habitat diversity within the area and form part of the forested buffer protecting rare plant populations.

Steep, wooded slopes and rich ravines characterize this picturesque site overlooking Octoraro Creek. Dry serpentine soils at the northern end of the area give way to rich, loamy soils near the southern end, and the corresponding change in vegetation is dramatic. The dry serpentine soil supports pine-oak woods with a sparse herbaceous layer. The moist, more

fertile soil supports a diverse deciduous woods with a lush herbaceous layer. The spring wildflower display is unusually colorful and diverse. A State Rare plant species occurs infrequently in the northern portion of the area on semi-open outcrops of serpentine soil. It is known from fewer than a dozen sites in Maryland. Numerous rock slides and talus slopes are interspersed with moist ravines and seeps. The upland hardwood forest blends into mesic deciduous woods on the lower slope near the creek. At the base of the slope, along the creek, the floodplain forest is dominated by Sycamore, Silver Maple, and Box Elder.

The moist and dry forests of the protection area provide excellent habitats for a variety of wildlife. Numerous birds, reptiles, deer, and small mammals were observed during the field survey. The scenic beauty of this slope is unmatched elsewhere along Octoraro Creek, where similar areas have been logged or developed.

Because the protection area includes a variety of habitats, it is likely that further survey will reveal other rare species at this site.

Site Name: **Plum Creek**

USGS Quad: **North East**

The Plum Creek site encompasses nontidal wetlands that are adjacent to and form the headwaters of Plum Creek Natural Heritage Area (NHA). It consists of palustrine forests, shrub swamps, and open water ponds. Preserving the nontidal wetlands upstream from Plum Creek NHA is essential if the water quality and quantity, species composition, and natural character of the NHA are to be maintained. The wetland vegetation in this site reduces pollution and flooding in the NHA by slowing water flow, filtering sediment and chemical pollutants, and utilizing nutrients. This helps preserve the habitat of the rare plant species that inhabit the NHA.

The nontidal wetlands at Plum Creek provide habitat for a variety of wildlife species such as beaver, Great Blue Heron, waterfowl, and reptiles and amphibians.

Natural Heritage Areas are communities of plants and animals that are considered to be among the best statewide examples of their kind. The Plum Creek NHA encompasses at least five types of Habitat Protection Areas recognized by Chesapeake Bay Critical Area Criteria, including Natural Heritage Area, Endangered Species, Nontidal Wetland, Riparian Forest, and Buffer. The NHA contains a variety of habitats including tidal and nontidal

marshes and swamps, tidal mudflats, open water, and forested ravines and slopes.

Among the plants growing in the tidal marshes of the NHA is an herbaceous emergent species that is listed as Threatened in Maryland. It is known from fewer than ten sites in the State. A rare species listed as Endangered in Maryland was observed growing within the NHA in recent years but the population may have been destroyed by siltation resulting from construction of a bridge. Fewer than five other populations of that species occur in Maryland, all of them in Cecil County. The NHA also supports another plant species considered uncommon in Maryland. Historically, it harbored three additional rare plants whose current status is unknown.

Site Name: **Port Deposit**

USGS Quad: **Aberdeen**

This site contains forested, scrub-shrub, and emergent wetlands along the shores of the Susquehanna River. Although generally weedy in nature, the wetland supports a population of an annual, herbaceous, plant that is considered Rare in Maryland. This annual thrives with the periodic disturbance of flooding. However, the river also acts as a corridor for the spread of non-native, weedy species that tolerate frequent flood scouring. These weedy species are displacing native species along many of Maryland's river banks and may pose a threat to the rare species in this floodplain.

Site Name: **Roaring Woods**

USGS Quad: **Conowingo Dam**

Several seeps and small streams occur on the steep to moderately steep forested slopes of this area. The seeps and streams support areas of exceptionally lush herbaceous growth. A narrow band of floodplain forest occurs along Octoraro Creek, supporting species such as River Birch and Sycamore.

The diverse herbaceous layer at this site includes a wetland wildflower that is considered uncommon in Maryland and worthy of monitoring. A State Threatened plant species, known from only six sites in Maryland, grows in the moist soils of the north-facing slopes. Collection for medicinal use is reported to have severely depleted populations of this plant throughout its range. The sites in Maryland are near the southern limit of the range of this species.

The wetlands and forested slopes at Roaring Woods aid in flood control and protect the water quality of Octoraro Creek by slowing and absorbing rainfall. The forests and floodplain along the creek provide diverse habitats for a wide variety of wildlife. Due to the unusual chrome-rich soils of this area, additional rare species are likely to occur in the vicinity.

The forested slopes, streams and seeps are extremely scenic. Much of this watershed has been cleared for farming or for residential and commercial purposes. This site is one of only a handful of picturesque forested tracts remaining along Octoraro Creek.

Site Name: **Stone Run Millpond**

USGS Quad: **Rising Sun**

Stone Run Millpond is a wetland complex of open water, emergent marsh, shrub swamp, and forested swamp. The wetlands are fed by several streams and are created by the impoundment of Stone Run. The variety of wetland habitats supports a remarkable diversity of native vegetation. Among the diverse species in the swamp forest upstream from the open marsh is a small population of a rare wildflower. This species is listed as Threatened in Maryland and is known from fewer than ten other sites in the State. It is a long-lived perennial plant that is especially rare in the eastern part of Maryland; this is the only current record of the species in Cecil County.

Historically, natural freshwater ponds and associated wetlands in this area were created almost exclusively by beaver activity. However, as a result of trapping and habitat destruction, beaver are now much less common than they were historically. The rock dam that impounds this area creates wetland habitats similar to naturally occurring habitat that is now uncommon on the Upper Coastal Plain.

The wetland complex provides ideal feeding and resting ground for resident waterbirds, songbirds, and migratory waterfowl. Many reptiles and amphibians were observed during the field survey, especially along the shoreline of the pond and in the emergent marsh.

This site occurs in close proximity to residential communities. Paths traversing the area between the wetland and the nearest housing development suggest that it is an important site for passive outdoor recreation and nature appreciation.

Site Name: **Whitaker Swamp**

USGS Quads: **Bay View, Havre de Grace, North East**

Whitaker Swamp contains a prime example of a mature, deciduous, swamp forest. Swamp forests of this size and age are rare in Maryland due to clearing and draining for development or logging. The high water quality of groundwater seeps feeding this swamp is maintained by the undisturbed, forested slopes that border the swamp. These soils are less acidic than most soils of the Upper Coastal Plain and they support a high diversity of herbaceous species. Wildflowers carpet the swamp in spring and early summer.

Two rare plants grow among the numerous herbaceous species in the swamp. One of these is a perennial species that is listed as Endangered in Maryland and as Threatened under the U.S. Endangered Species Act. It is rare throughout its range, confined to very specific types of wetlands, and it is known from only four other sites in Maryland. This population is the largest in the State and is reproducing well. This site affords the best opportunity for protection of this species in the State.

The second rare plant in the forested wetland at this site is also listed as Endangered in Maryland and is a candidate for listing under the U.S. Endangered Species Act. This is the only Cecil County population reported since 1928. A third significant plant species grows on the forested slopes above the wetland. It is considered uncommon in Maryland, not currently threatened but in need of monitoring. This population is among the largest in the State.

The large freshwater wetland at this site provides excellent feeding and nesting habitat for migratory songbirds and amphibians. In addition, large forested swamps such as this play an important role in protecting the water quality the Chesapeake Bay.

Site Name: **Wildcat Ravine**

USGS Quad: **Conowingo Dam**

Wildcat Ravine contains a small pond and emergent marsh at the bottom of a scenic, steep-sided ravine. Seeps emerge from the steep slopes and are lush with herbaceous growth. The water quality throughout the site appears to be good. The pond and marsh provide habitat for waterbirds. The lack of recent disturbance throughout most of the site is unusual, as is the large size of the trees in the ravine. The dominant species on the ravine slopes is Hemlock, which is unusual for Cecil County. The major landowner has agreed to voluntarily protect this site.

A species of fern that is listed as Endangered in Maryland was reported historically from this area. Further survey would be required to determine whether the species survives in Wildcat Ravine. Because there has been little disturbance, the fern may still grow at this site.

The scenic stream, forest and wetland provide opportunity for hiking and birding. The site provides habitat for resident and migratory songbirds.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

CHARLES COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Charles County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

CHARLES COUNTY

Site Name: **Brentland Woods**

USGS Quad: **Mathias Point**

Brentland Woods consists of an extensive bottomland forest and narrow palustrine forests in two ravines that feed into the main tract. This bottomland forest is dominated by Tulip Tree, Red Maple, and Sweet Gum; the lush understory is dominated by Spicebush, Pawpaw, and numerous herbs. Many large trees remain in the forest, especially north of the main stream.

The spring herbaceous cover is unusually lush and diverse, especially along the floodplain and on the moist lower slopes. Among the numerous wildflowers is a floodplain species that is considered Highly State Rare. None of the populations of this rare species are protected. This population appears vigorous; hundreds of flowering and fruiting plants were observed in the floodplain forest along both the main stream and its tributaries. Because the population is large, the rare species' habitat is extensive, and the watershed remains forested, Brentland Woods provides an excellent opportunity to preserve this species in Maryland.

The upland woods, dominated by oaks, Beech, and American Holly, are as fine an example of this habitat as remains in the county. Most areas of similar habitat in Charles County have been destroyed by clearing for residential and commercial development, agriculture, and silviculture.

This large, contiguous tract of forest provides excellent habitat for forest interior dwelling birds. Sightings and signs of fox, deer, woodchuck, squirrel, and owl were noted, indicating that the area is rich in wildlife.

Site Name: **Bryantown Swamp**

USGS Quad: **Hughesville**

Scattered within this wetland are large swamp forests, shrub swamps, emergent marshes, and wet, grassy meadows. The area is uncommonly diverse in its habitats and wetland plant communities. Emergent marsh borders slightly higher, drier floodplain forest; open areas dominated by herbaceous growth intermingle with wooded swamp. A rare plant species listed as Endangered in Maryland occurs in several of the more open, grassy meadows. Most of the other populations of this species known from the Upper Coastal Plain occur in vulnerable sites that will be difficult to

protect. Bryantown Swamp offers one of the best opportunities to successfully preserve this rare species on the Upper Coastal Plain.

It is likely that other rare species occur in this wetland complex. A second rare plant species, listed as Endangered Extirpated in Maryland, was reported from this area as recently as 1969, but was not observed during a field visit in 1988. It is possible that the species still exists at this site. If the species is rediscovered at this or any other site in Maryland, its status will automatically convert to Endangered in the State. Because observable plant species differ from one season to the next, several more visits to the site will be required to produce a complete species list.

This diverse wetland complex provides fine habitat for migratory and resident birds, amphibians, reptiles, deer, and other mammals.

Site Name: **Cat Pond**

USGS Quad: **La Plata**

This is the only seasonal pond dominated by herbaceous vegetation that is known on the Western Shore, and it is a superb example of this habitat. In Maryland, the majority of seasonal ponds occur on the Eastern Shore and are dominated by woody vegetation. Approximately two acres of Cat Pond are dominated by grasses, sedges, and other herbaceous plants. Shrubs and deciduous forest border this grassy area. During the fall, winter, and spring the pond fills with water. This long period of flooding discourages the growth of most woody species. In late spring, the water recedes and exposes mud flats along the pond edge. By late summer there is very little water in the pond. The exposed flats are covered by "drawdown" plants that germinate after the water recedes and complete their life cycles before the pond refills. The fluctuating water regime creates a unique habitat in which plants must endure long periods both of flooding and drought.

Although no rare species were observed during the most recent field surveys in 1988, the pond provides suitable habitat for several rare plants and amphibians. Further survey may reveal populations of these species at Cat Pond. Similar ponds on the Eastern Shore harbor a number of rare plants and three rare amphibians. Because the flora and fauna of the pond vary seasonally, several visits will be required to obtain a complete species list for the site.

Cat Pond provides excellent resting and feeding grounds for migratory waterfowl. The pond also provides habitat for amphibians.

Site Name: **County Line Trail Seep**

USGS Quad: **Brandywine**

At least three hydrologically different wetland types occur within this mature Tulip Tree-Red Maple Forest. These wetlands provide habitat for diverse vegetation. The absence of non-native species in this forest is particularly significant. Seepage from adjacent gravelly slopes raises the water level locally in small depressions. These groundwater-fed wetlands support excellent examples of a plant community that is more common in the mountains. They have received little artificial disturbance recently, and the soil is rich in nutrients.

Two unusual plant species inhabit the seepage wetlands. These are disjunct populations of both species; both plants usually occur in the mountains. This is Maryland's only known population of one these species, which is listed as State Endangered. This population appears to be stable and successfully reproducing.

The other species is considered uncommon in Maryland, not currently threatened but in need of monitoring. Hydrological change, either an increase or reduction of the water level of the swamp, would destroy the rare species habitat and alter the vegetative composition of the site. The rare and uncommon species are intolerant of extended flooding but require very wet, boggy soil. Sedimentation in the wetland would also adversely impact these species.

The forested swamp and adjacent slope provide habitat for native and migratory songbirds. The swamp also provides habitat for amphibians and reptiles. Numerous deer inhabit the forest.

Site Name: **Doncaster Forest**

USGS Quad: **Nanjemoy**

A mature bottomland forest of Sweet Gum, Tulip Tree, and Red Maple borders the stream that flows through this site. Spicebush, Pawpaw and numerous ferns and herbs grow in the rich soils of this old forest. Several trees are greater than two feet in diameter. The presence of large, well-decayed logs and the developing structure of the forest canopy also reveal the maturity of the forests. Forests of similar age lacking recent disturbance are rare on the Upper Coastal Plain. The clearing of

forests for agriculture and for commercial and residential development has nearly eliminated mature forests from this region. The uplands adjacent to this wetland site support a mature forest of oaks and hickory, with Virginia Pine dominant in two younger areas.

The mature forests in this area provide a variety of habitats that are absent from young forests. Cavity-nesting birds such as woodpeckers inhabit large, old trees. Insects thrive on the decaying logs and dead standing trees, and provide food for a variety of forest-dwelling birds. Warblers and other songbirds feed on the insects that inhabit the well-developed canopy. The decaying logs and leaf litter return nutrients to the soil. If allowed to mature further, a greater diversity of native herbaceous species, including numerous wildflowers, will grow in the developing soil of this forest than will inhabit repeatedly cleared, young forests.

The bottomland forest maintains the water quality of the stream it borders by preventing erosion and filtering sediment that might otherwise enter the stream. The mature forests provide excellent opportunities for hiking, birdwatching, and natural history education.

Site Name: **Maryland Point Swamp**

USGS Quad: **Nanjemoy**

This diverse wetland complex contains fine examples of forested swamp, shrub swamp, emergent marsh, and bottomland forest. Six rare and uncommon plant species inhabit these wetlands. Three of these species are listed as Endangered in Maryland. The dominant aquatic plant in most of the shrub swamp and emergent marsh is a State Endangered species known from no other site in the State. This population is located on the northern fringe of the species' range. The presence of numerous flowering and fruiting plants indicates that this is a thriving and viable population.

The other two Endangered plants at this site are both sedges. One of these is known from only four other sites in the State. All known populations of this sedge in Maryland are small, and although it contains fewer than one hundred fruiting stems, this population may be the largest in the State.

The fourth rare species is a wetland wildflower that is designated as State Rare and is known from fewer than six other sites in Maryland. Two additional plants are considered uncommon in the State, not currently threatened but worthy of monitoring.

This wetland is influenced by beaver activity which aids in maintaining consistent water levels throughout the growing season. Historically, beaver played an important role in the creation of freshwater wetlands required by many rare species. Unfortunately, the decline of beaver populations has resulted in the loss of many of these important habitats. Many more have been destroyed by drainage for logging, development, and agricultural purposes.

Further survey of this important wetland complex may yield records of rare amphibians. This wetland provides excellent habitat for resident and migratory waterfowl, other birds, and other wildlife.

Site Name: **Pomonkey School Stream**

USGS Quad: **Port Tobacco**

This Tulip Poplar-Red Maple bottomland forest supports a population of a wetland plant considered Highly State Rare. It is known from fewer than ten sites in Maryland. This species benefits from the relatively neutral soils at this site. Most soils on Maryland's Coastal Plain are acidic. The calcareous soils at Pomonkey School Stream are due to the presence of underlying Miocene shell deposits, brought to the surface by stream erosion. The rare species is an annual plant that is dependent on the flooding regime at this site for successful reproduction and establishment. Maryland's populations of this rare plant are located at the northeastern limit of the species' range. Outlying populations are especially important to protect because they often differ genetically from populations nearer the center of the species' range. These genetic differences can help the species survive severe environmental changes.

Site Name: **Popes Creek**

USGS Quad: **Popes Creek**

This site contains bottomland forests and forested swamps along the headwaters of Popes Creek. These nontidal wetlands are part of one of Maryland's most productive and diverse tidal/nontidal wetland complexes. The portion of the complex within the Chesapeake Bay Critical Area is designated as Popes Creek Natural Heritage Area (NHA). Preserving the nontidal wetlands upstream from the NHA is essential if the water quality and quantity, species composition, and natural character of the NHA are to be maintained. These nontidal wetlands are very important filters for upland runoff. Furthermore, they discharge freshwater into contiguous tidal marsh communities and thus contribute to their high productivity and species diversity.

These nontidal forested wetlands and surrounding uplands are also important as habitat for forest interior dwelling birds. In a recent survey of NHA forests adjacent to this site, ten forest interior dwelling bird species were recorded, including eight that may breed in the area, four that were clearly defending territory, and four that are indicative of high-quality breeding habitat. The forests in and surrounding the nontidal wetland of Special State Concern are important contiguous habitat for these forest interior birds.

Natural Heritage Areas are communities of plants and animals that are considered to be among the best statewide examples of their kind. Popes Creek NHA contains seven major wetland communities in a relatively small area. The Saltmarsh Cordgrass Community occurs closest to the Potomac River, followed in an inland direction by communities of Big Cordgrass, Swamp Rose-Mallow, a nontidal forested wetland, and finally an open water beaver pond. Deciduous upland forest surrounds the wetland complex and both are utilized by a bird species that is listed as Endangered by both Maryland and the U.S. Fish and Wildlife Service.

The Salt Marsh Cordgrass Community is one of the most productive communities worldwide. Annual primary productivity averages about 4 tons per acre, and most of this detritus becomes available to the estuarine food web by tidal flushing. This type of marsh also provides food and breeding sites for fish, muskrats, waterfowl, and other birds. The Big Cordgrass Community is second only to the Salt Marsh Community in the amount of detritus available to the aquatic food web. The Cattail Community provides habitat and food for both game and non-game wildlife. The Rose-Mallow Community is especially important as a nesting area for non-game birds. These marshes at the NHA also function as sediment traps for upland runoff and as buffers to shoreline erosion.

This site is in the vicinity of an historical record for a State Rare plant species that occurs on shorelines of tidal and nontidal wetlands. Further survey may reveal that the rare plant still grows at this site.

Site Name: **Port Tobacco Run**

USGS Quad: **Port Tobacco**

This Red Maple-River Birch floodplain forest supports a large, vigorous population of a plant species that is considered Highly State Rare. This population is one of fewer than ten known populations in Maryland, five of which occur in Charles County.

Populations of this species in Maryland represent the northeastern limit of the species' range. Because outlying populations must adapt to environmental conditions which are extreme for the species, they often differ genetically from populations near the center of species' distribution. Protection of these outlying populations maintains genetic variability, which is necessary for a species to respond to environmental change and survive.

Although this rare species population is exceptionally large, the limited number of populations in Maryland indicates that the species may have highly specific habitat requirements. It appears to thrive on the periodic flooding that occurs at this site. Since it is an annual species, the rare plant's population size and distribution within the floodplain forest may fluctuate dramatically from year to year. The best sites for seedling germination and survival may also vary with annual changes in hydrologic regime. A large continuous span of floodplain forest is important for this annual species because it allows the population to establish in the most appropriate sites.

The rare species and its codominant, Yellow Corydalis, thrive in circumneutral soils. Soils of Maryland's Coastal Plain are typically acidic. The reduced acidity of the soil at this site may be attributed to Miocene shell deposits in the substrate which are brought to the surface by stream erosion. These circumneutral soils may support other plant species uncommon to the Coastal Plain.

The floodplain forest also provides habitat for forest interior dwelling birds, amphibians, and reptiles. The Barred Owl, a forest interior dwelling bird, was heard calling in this forest during its breeding season. One of the preferred habitats of this species is mixed floodplain forest and it often nests in the cavities of maple trees.

Protection of the forested area will also buffer Port Tobacco Run from sediment and chemical runoff from upland farm fields.

Site name: **Thomas Stone National Historical Site**

USGS Quad: **Port Tobacco**

This site consists of a lush, deciduous bottomland forest along a section of Hoghole Creek and a tributary which feeds it. The circumneutral soils produced by underlying shell deposits are uncommon on Maryland's Coastal Plain. Along Hoghole Creek, an active beaver population has created a complex of open water ponds and emergent marshes dominated by Common Rush, Sallow

Sedge, and Water Purslane. The young bottomland forest is bordered by Sweet Gum and supports Ironwood, ferns, wildflowers, and sedges. The clearing of a powerline right-of-way and past logging within the bottomland have encouraged the invasion of weedy species, such as Japanese Honeysuckle and Stinging Nettle. The ravine slopes are dominated by large American Holly and adorned with several wildflowers and numerous ferns such as New York, Christmas, and Lady Fern.

Within the bottomland forest grows a dense stand of an annual plant that is listed as Threatened in Maryland. It is known from fewer than ten sites in the State. Most of Maryland's populations are quite small whereas this population consists of several hundred plants. Maryland's populations are near the northern limit of the distribution of this species. The protection of outlying populations is important because they often differ genetically from populations nearer the center of a species' range. This genetic variation may help a species survive drastic climate changes or other environmental perturbations.

A second, smaller stand of the same rare plant occurs just outside of the nontidal wetland of Special State Concern, on a small bluff near the top of the ravine.

The wetlands at this site, especially the emergent wetlands, provide important feeding and resting habitat for waterfowl, songbirds, and other wildlife.

Site Name: **Upper Nanjemoy Creek**

USGS Quad: **Nanjemoy**

This large wetland complex includes bottomland forest, shrub swamp, beaver ponds, seasonal pools, and spring-fed seepage areas. These wetlands form the headwaters of Nanjemoy Creek, a tributary of the middle reach of the Potomac River. The mature bottomland forests support the largest Great Blue Heron Rookery in Maryland. A large portion of this site is owned by a non-profit conservation organization that manages the site as a nature preserve to protect the heron rookery. The herons have been nesting at this site since 1945 and the rookery currently consists of more than 800 active nests.

Dominant trees in the bottomland forest are Tulip Poplar, Beech, and Red Maple. Many of these trees are unusually large and mature for Maryland's Coastal Plain, most of which has been heavily timbered. The herbaceous layer of the bottomland forest includes many species of ferns and wildflowers, including a number of species that are unusual for Maryland's Coastal Plain.

These plants require a rich woods habitat and are more characteristic of the Piedmont.

Among the plants in the nutrient-rich, moist woods at this site is a large colony of a perennial herb that is listed as Endangered in Maryland and is found nowhere else in the State. This site represents the northernmost occurrence of this species on the Atlantic coast. Populations at the edge of a species' range are important to protect because they often differ genetically from populations near the center of distribution. These genetic differences may help the species survive potentially catastrophic environmental changes.

There is little vegetation immediately under the streamside trees that support heron nests, because of high nitrogen levels in the soil beneath the nests. This lack of vegetation combined with the steepness of the stream banks causes streams in the heron rookery to be particularly susceptible to erosion. It is essential to preserve the forested watershed above the rookery, in order to avoid storm-related pulses in water flow that would increase erosion in the rookery and sedimentation downstream.

Upper Nanjemoy Creek provides habitat for a bird that is listed as Endangered under the U.S. Endangered Species Act as well as by the State of Maryland. The site also supports breeding populations of mink, river otter, beaver, anadromous fish, and other wildlife species.

The forests at this site form part of a very large block of contiguous forest habitat. Maryland's forests have become increasingly fragmented due to conversion for agriculture and residential and commercial development. Many forest species cannot survive in fragmented forests. At least 12 species of forest interior dwelling birds have been identified at this site. Their long-term survival in this area is dependent on the maintenance of a large, unfragmented forest.

The wetlands at this site are directly upstream from the Upper Nanjemoy Creek Natural Heritage Area (NHA). This NHA was designated for protection because it is one of the best statewide examples of a wetland complex of tidal freshwater wetlands, nontidal wetlands and upland islands. In order to maintain the water quality and quantity, species composition, and natural character of the NHA, it is essential to preserve the contiguous nontidal wetlands upstream. Vegetation and buffer of the nontidal wetland of Special State Concern reduce pollution and flooding in the NHA by slowing water flow, filtering sediment and chemical pollutants, and utilizing nutrients.

Site Name: **Zekiah Swamp**

USGS Quads: **Brandywine, Hughesville, La Plata, Popes Creek, Charlotte Hall**

Zekiah Swamp is a vast wetland complex of extensive hardwood swamp forests intermingled with smaller areas of shrub swamp, emergent marshes, mudflats, vernal pools and beaver ponds. Nearly a mile wide throughout much of its 16 mile length, Zekiah Swamp's approximately 15,000 acres make it the largest hardwood swamp on the Western Shore.

Despite major disturbances over the years, Zekiah Swamp still supports many native plants and animals, including several rare species. It provides superb wildlife habitat. The wet, organic soils and shallow, highly braided channels make the site difficult to penetrate on foot or even by canoe. The biological resources and remote, wild character of the swamp led the Smithsonian Institution to designate Zekiah as a "Primary Natural Area Recommended for Protection" in its report on ecological priorities for the Chesapeake Bay Region (1974). The swamp was also included in the Department of State Planning's "Catalog of Natural Areas in Maryland" in 1968. The Wicomico River, to which Zekiah Swamp is the largest contributor of freshwater, was designated a Maryland Scenic River in 1971.

Beginning in the mid-1970's and continuing into the mid-1980's, the State purchased land in Zekiah Swamp to establish a Natural Environmental Area (NEA) totalling approximately 400 acres. The steering committee is currently working on development of a system of trails through the NEA and is planning to build an interpretive center on the site.

Among the unusual plants in Zekiah Swamp is a sizeable population of a sedge that is listed as Endangered in Maryland. Another rare plant was known historically from the swamp. It has not been reported since 1969 and is now listed as Endangered Extirpated in the State. Further survey may reveal that this plant still occurs in Zekiah Swamp. If a viable, naturally occurring population is discovered in Maryland, the species' status will automatically convert to Endangered. A third significant plant found in Zekiah Swamp is a tree that is considered uncommon in the State, not yet threatened but worthy of monitoring. Two additional rare plants occur within Zekiah Swamp but grow in sites designated separately as small nontidal wetlands of Special State Concern. These are discussed in separate reports for Bryantown Swamp and County Line Trail Seep.

At least one bird inhabiting this site is listed as Endangered both in Maryland and under the U.S. Endangered Species Act. Zekiah Swamp is also the type locality and possibly the only known location for a globally rare stonefly.

Wildlife species using Zekiah Swamp are many and varied, and include beaver, mink, Maryland Diamondback Terrapin, Sora Rail, Osprey, waterfowl, overwintering Wilson's Snipe, and large concentrations of migrating birds. A heron rookery occurs within the swamp. The large forested area in Zekiah Swamp provides excellent habitat for forest interior dwelling birds. These are species that require large tracts of contiguous, unfragmented forest to survive. This area was recognized as early as the 1960's by Maryland's Department of Game and Inland Fish as the most important area for wildlife in Southern Maryland.

Zekiah Swamp is immediately upstream from the wetlands in Allen's Fresh Natural Heritage Area (NHA). Natural Heritage Areas are communities of plants and animals that are considered to be among the best statewide examples of their kind. Preserving the nontidal wetlands upstream from the NHA is essential if the water quality and quantity, species composition, and natural character of the NHA are to be maintained. The wetland vegetation in Zekiah Swamp reduces pollution and flooding in the NHA by slowing water flow, filtering sediment and chemical pollutants, and utilizing nutrients. This helps preserve the unique natural communities and the plant and animal habitats in the NHA.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

DORCHESTER COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Dorchester County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

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DORCHESTER COUNTY

Site Name: **Bar Neck Oxbow**

USGS Quad: **Church Creek**

The creek running through Bar Neck Oxbow feeds a 2 acre seasonally dry "oxbow" pond as well as a long, narrow artificial pond, wet year-round. Each pond contains a large population of a State Endangered aquatic plant species found at only four other locations in Maryland. Additionally, a population of an uncommon sedge occurs in the oxbow pond.

A mosaic of similar naturally-occurring ponds were once created by beaver activity in Maryland's wetlands. With the decline of beaver on the Eastern Shore, ponds which are wet year-round have become especially rare. Depending on soil and hydrologic conditions, artificial ponds may supply habitat for rare plants once found in beaver ponds.

Oxbow ponds are created as a water channel changes its course, cutting across and isolating a bend in the channel. The isolated oxbow pond is no longer primarily stream-fed, relying instead on surface runoff and groundwater for recharge. Whatever their origin, seasonally dry ponds have become increasingly rare as human activities, such as draining, filling, and intensive use during dry periods, have altered their hydrology and topography. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Big Millpond**

USGS Quad: **East New Market**

Big Millpond is a large pond created by the impoundment of the Chicamacomico River. It contains two aquatic plants which are Endangered in Maryland. One has been seen in only one other pond in Maryland. The other is a carnivorous plant known from only three other sites in the State.

This pond is unusually diverse and productive because it contains three different wetland types, all of which are extensive in size. Closest to the dam is a lacustrine zone which is only intermittently exposed and which contains broad-leaved, non-persistent vegetation. In the middle, the vegetation is composed mainly of narrow-leaved, persistent, emergent plants with some shrubs in upstream areas. The third zone consists of forested wetlands which exhibit a variety of water regimes, resulting in diversity within the forest.

Site Name: **Brookview Ponds**

USGS Quad: **Rhodesdale**

The Brookview Ponds Area includes nine, naturally-occurring, seasonal ponds, also referred to as Delmarva Bays, that provide habitat for numerous rare species. The hydrological system of these bays is linked to groundwater levels. The ponds usually fill with water in the winter and spring and dry during the summer. Many Delmarva bays have been destroyed by drainage and filling for agriculture and development. Remaining bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

The abundance of herbaceous vegetation in the Brookview Ponds is particularly unusual; most bays are shallower forested swamps or shrub swamps. Several rare plants grow in the deepest portion of the ponds. These plants germinate in summer on the exposed pond bottom and complete their life cycle in the brief period before fall arrives.

Of the thirteen rare plant species that grow here, nine are State Endangered. Of these exceptionally rare plants, six are worthy of special mention here. An Endangered member of the Gentian Family had not been seen in Maryland since the early 1940's until it was discovered at this site in 1987. Until discovered here in 1987, an Endangered sedge species had not been recorded in Maryland since 1972. Another Endangered plant species occurring in these seasonal ponds is known from only two other Maryland locations where the numbers of individuals are much lower. This population numbers in the thousands. Two Endangered grass species found in the bays are each known from only one other site in the state. Finally, this is the only known population in Maryland for a State Endangered plant species which occurs in the natural area's southeastern uplands.

An amphibian listed as In Need of Conservation relies on the bays for breeding habitat.

Delmarva bays provide breeding, nesting, and feeding grounds to migratory waterfowl and songbirds. In addition, the ponds provide ideal habitat for reptiles and amphibians, including several rare salamander and frog species.

Site Name: **Cabin Creek Seep**

USGS Quad: **East New Market**

The low-lying, sphagnous seep within the protection area supports a population of a State Endangered species known from just four other sites in the State. This species, Federally

listed as Threatened, is rare throughout its range, and is known from fewer than one hundred sites nationwide. This is the only known site for this species on the Eastern Shore of Maryland. Although the population is small, casual observations reported to the program suggest that the population may be expanding. An uncommon tree species grows on the upland forest slopes bordering the seep to the east.

The pine-hardwood swamp provides excellent habitat for birds, amphibians, and reptiles. Protection of the forested area would buffer this wetland from runoff from upland farm fields.

Site Name: **Chicone Creek**

USGS Quad: **Rhodesdale**

Chicone Creek Natural Heritage Area (NHA) abuts this Nontidal Wetland of Special State Concern and benefits from the protection of this wetland area. The nontidal wetlands consist of temporarily flooded palustrine forests, seasonally flooded or seasonally saturated palustrine forests, and temporarily flooded palustrine emergent marshes. Preserving the nontidal wetlands adjacent to Chicone Creek NHA is essential to maintaining the hydrologic regime, water quality, species composition, and natural character of the NHA.

The nontidal wetland vegetation in this site acts as a natural filter, reducing the sediment and chemical content of surface runoff. This function is especially important because Chicone Creek feeds into an extensive marsh providing prime fish and wildlife habitat along the Nanticoke River. In addition to reducing pollution and siltation of tidal wetlands in the NHA, the nontidal wetlands serve as catchment basins for seasonally high surface runoff. Instead of flooding and increasing erosion in the tidal channel, the excess surface runoff is slowly absorbed by the nontidal wetlands or evaporates from the wetland surface. Periodic freshwater discharge from the nontidal wetland increases nutrient availability, stimulating productivity in the tidal wetlands. This freshwater influx in tidal areas also creates varied habitat, resulting in increased species diversity.

The nontidal wetlands at this site are buffered by ancient sand dunes that harbor an unusual upland community. Unlike most ancient dunes, soil pH is apparently circumneutral. The cause of this anomaly is unknown, but the combination of well-drained sandy soil and high pH has resulted in a mixed deciduous community with piedmont affinities. A State Endangered plant species is associated with the upland buffer of the nontidal wetland habitat outside of the NHA. A State Threatened upland plant species and a Highly State Rare wetland shrub occur within the NHA.

At least seven species of forest interior breeding birds use this area. Two of the species, Kentucky Warbler and Worm-eating Warbler, are also indicators of high quality forest.

Site Name: **Dorchester Pond**

USGS Quad: **East New Market**
Rhodesdale

Dorchester Pond is an oval 15-acre Delmarva bay dominated by herbaceous vegetation and surrounded by a low sand rim, the largest and most species-rich pond of its kind in Maryland. This seasonally inundated wetland supports eight rare plant and two rare animal species dependent on its unique soil and hydrologic conditions.

Delmarva bays fill with water during the winter and early spring, drying by late summer as the groundwater recedes. Amphibians use these seasonal ponds as breeding habitat in the spring and herbaceous species rapidly colonize the moist depressions left in the pond after it has dried. These Delmarva bays also provide ideal feeding and resting habitat for numerous amphibians, songbirds and other wildlife. Many similar bays have been destroyed by drainage and filling for agriculture and development. Remaining ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Dorchester Pond harbors the only known population in Maryland of a State Endangered plant species. Of the other rare plant species inhabiting this Delmarva bay, six are State Endangered and one is State Threatened. Most of these listed species occur at fewer than five other locations in the state. A rare amphibian listed as In Need of Conservation utilizes the pond as breeding habitat during the spring. A State Rare bird species also inhabit the pond.

A private conservation organization owns Dorchester Pond in its entirety, totalling 52 acres in area, and manages it as a nature preserve.

Site Name: **Gales Creek**

USGS Quad: **Sharptown**

Gales Creek includes two millponds that host an exceptional number and variety of rare species. One, Irving Millpond, is no longer impounded but consists of palustrine shrub swamp with a bog at the center. There are few bogs on Maryland's Eastern

Shore, and this unique habitat supports six rare plant species. The other, Galestown Millpond, is still impounded and supports an open water habitat. On the Maryland coastal plain, such man-made ponds are the only ones which have constant freshwater inflow and outflow. Historically, beaver were responsible for creating such conditions, but these animals are now much less common on the coastal plain. Consequently, the unusual conditions provided by a large body of gently flowing fresh water provide habitat for some specialized rare plants.

The number of rare species in these millponds is at least nineteen. One, a State Endangered carnivorous plant, was discovered in 1987 and was not previously known to occur in Maryland. One rare species at this site is Nationally Rare and is listed as Endangered Extirpated in Maryland. Nine others are designated as State Endangered Species, and one is listed as State Threatened. A shrub species in this pond is listed as Highly State Rare in Maryland and is a potential candidate for listing under the U.S. Endangered Species Act. Finally, this site also supports one herbaceous species which is considered Highly State Rare and five which are uncommon.

This area is contiguous with the Upper Nanticoke River Natural Heritage Area, an area targeted by the State because it contains several State Endangered Species and is considered to be one of the best statewide examples of its kind. Because the Gales Creek area is just upstream, its water quality directly affects the species and natural communities in the Natural Heritage Area. By preserving both areas, an extensive wildlife corridor is established and provides access for the free migration of species within their natural habitat.

Site Name: **Marshyhope Seasonal Pond**

USGS Quad: **Federalsburg**

This area contains an excellent example of a large Delmarva bay dominated by herbaceous vegetation, buffered by an extensive upland mixed pine-hardwood forest. Delmarva bays are nontidal wetlands which fill with water in the winter and spring and dry in the summer as groundwater recedes. Water levels in Marshyhope Seasonal Pond vary from about 2 feet in the winter to no standing water in the summer. As the groundwater recedes, moist depressions remain which are rapidly colonized by herbaceous species. When inundated, Delmarva bays provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife.

Nontidal wetlands dominated by herbaceous vegetation are rare on the Delmarva peninsula. Many similar seasonal ponds have been destroyed by drainage and filling for agriculture and

development. Remaining Delmarva bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Two rare species inhabit this Delmarva bay. An amphibian listed as In Need of Conservation inhabits the pond, and a State Rare sedge grows near the center of the pond. Additional rare species of plants and animals may be found if this area is explored further. Because flora and fauna vary seasonally and annually with water levels, several visits will be required to develop a complete species inventory of this site.

Site Name: **Messick Pond**

USGS Quad: **East New Market**

Messick Pond is a nontidal wetland referred to as a Delmarva bay. These Delmarva bays are centripetally-drained and range in size from one to 15 acres and may hold up to 4 ft. of water in the spring. They often contain rare, disjunct or endemic species specially adapted to the fluctuating water levels, and are considered unique natural communities because they are among the few remaining naturally open, freshwater wetlands on the coastal plain. Many similar ponds have been drained for agricultural use.

Five plant species considered rare in Maryland are found here. A State Endangered sedge growing in this pond is known from only two other sites in the state. Also listed as State Endangered, a member of the Yellow-eyed Grass Family occurring here is known from four additional locations. A State Threatened carnivorous plant in this pond occurs at only four known sites in Maryland. Another carnivorous plant, known from only three other sites in Maryland, is listed as Endangered in Maryland. A Highly State Rare sedge also inhabits this seasonal pond.

Numerous species of amphibians and waterfowl have been recorded here, indicating that the pond provides important habitat for wildlife. It is highly likely that rare amphibians breed here.

Site Name: **Ocean Gateway Pond**

USGS Quad: **Rhodesdale**

Ocean Gateway Pond, a Delmarva bay, harbors three rare or uncommon plant species, two of which are State Endangered. These Delmarva bays are centripetally-drained wetlands ranging in size from one to 15 acres and may hold up to 4 ft. of water in the spring. As the bay dries in the summer, moist depressions

remaining in the center are rapidly colonized by herbaceous species. Delmarva bays often contain rare, disjunct or endemic species specially adapted to the fluctuating water levels, and are considered unique natural communities because they are among the few remaining naturally open freshwater wetlands on the coastal plain. Each of the Endangered plants present in this pond occurs at fewer than five other locations in Maryland. An uncommon sedge also grows in this pond.

Delmarva bays and the species that inhabit them have become increasingly rare as wetlands have been drained, filled, and otherwise altered for development and agriculture.

Site Name: **Rhodesdale Powerline**

USGS Quad: **Rhodesdale**

Rhodesdale Powerline harbors a large, exceptionally vigorous population of a State Endangered plant species. Occurring at only five other locations in the state, this species requires unforested wetland openings for its survival. Natural disturbances such as floods and fires once created such gaps in wetland forests. With the suppression of these natural forces by man, wetland gaps and the species they harbor have become increasingly rare. Powerline right-of-way maintenance keeps wetlands free of large trees, providing habitat for wetland gap species. Because this rare species occurs in so few natural or artificial wetland gaps, it probably requires unusual soil or hydrologic conditions.

Site Name: **Rhodesdale Powerline SE**

USGS Quad: **Rhodesdale**

Rhodesdale Powerline SE harbors a population of a State Endangered grass species. One of only two known occurrences in Maryland, this population thrives in a seasonal pond, or Delmarva bay, in the powerline right-of-way. The hydrologic regime of Delmarva bays are very different from most other nontidal wetlands, since their main source of recharge is groundwater. Inundated during the winter and early spring, they provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. They dry during the summer, leaving moist depressions for herbaceous species to colonize.

Many Delmarva bays have been destroyed by filling and drainage for development and agriculture. Those that remain often contain rare, disjunct, or endemic plant and animal species specially adapted to the fluctuating water levels.

Before their suppression by man, fire and flooding once created natural gaps in the wetland canopy coverage, allowing herbaceous species to flourish. Powerline right-of-way maintenance in wetlands can mimic natural forces by keeping the wetlands free of woody species.

Site Name: **Savanna Lake**

USGS Quad: **Chicamacomico**
Mardela Springs

The Savanna Lake site encompasses seasonally inundated and seasonally saturated palustrine forests adjacent to the Savanna Lake Natural Heritage Area (NHA). Preserving these nontidal wetlands is essential to preserving the hydrologic regime, water quality, species composition, and natural character of the adjacent NHA.

The wetland vegetation in this site acts as a natural filter, reducing the sediment and chemical content of surface runoff entering the tidal wetland. In addition to reducing pollution and siltation in the tidal areas, the nontidal wetlands serve as catchment basins for seasonally high surface runoff. Instead of flooding and increasing erosion in the tidal channel, excess surface runoff evaporates or is slowly absorbed into the soil. Periodic freshwater discharge from the nontidal wetlands increases nutrient availability in the tidal wetlands, stimulating productivity. This freshwater influx in tidal areas also creates varied habitat, resulting in increased species diversity.

This site provides important wetland buffer for the assemblage of Delmarva bays occurring in the NHA. Located close to one another and aligned parallel to the prevailing salinity gradient, these bays exhibit significant variability in topographic relief, salinity, and vegetation type. Three bird species listed as In Need of Conservation and one bird species listed as State Rare utilize the diverse wetland habitat at this site. A rare amphibian listed as In Need of Conservation was reported from one of the Delmarva bays between 1975 and 1984 and may still inhabit the area.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

HARFORD COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Harford County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

HARFORD COUNTY

Site Name: **Bynum Run**

USGS Quad: **Bel Air**

This area harbors one of Maryland's largest populations of a State Threatened wildflower species. The wildflower grows in an extensive meadow bisected by a stream, kept free of woody species by periodic mowing. Wetland openings such as these were historically maintained by fire and flooding. These natural disturbances have been largely excluded from natural areas by human intervention. Artificial disturbances such as mowing can create wetland gaps which closely mimic naturally occurring wet meadows. Mowing must be timed seasonally so as to allow the rare meadow species to complete their life cycle.

The meadow in which the rare wildflower species occurs also provides a natural stream buffer, filtering surface runoff from upland sources.

Site Name: **Deer Creek Serpentine Barren**

USGS Quad: **Delta**

This site encompasses one of the largest and most ecologically significant serpentine areas in Maryland. Historically, serpentine areas supported a mosaic of prairie-like grasslands and rocky openings harboring species uniquely adapted to the dry, nutrient-poor soils. These diverse habitat types were kept relatively free of woody species by Native American fire-hunting. Since European civilization, Virginia Pine (Pinus virginiana), Eastern Red Cedar (Juniperus virginiana), and Common Greenbriar (Smilax rotundifolia) have overgrown many of the prairie-like grasslands.

At Deer Creek, the two most extensive grassland areas persist on steep, south-facing slopes. Downslope from these grasslands are mesic ravines. This habitat supports a vigorous population of a State Threatened wildflower which occurs at only four other sites in Maryland. An uncommon wildflower species also grows in the ravine areas, while two other uncommon plant species occur in the savanna-ravine ecotone.

The serpentine grasslands and ravines are surrounded by a fairly large tract of forest. Although predominantly comprised of Virginia Pine woodlands, late successional stands of mixed mesophytic species and bottomland hardwoods are also present. These diverse forest types provide habitat for some bird,

wildlife, and plant species requiring extensive forest interior.

The preserve concurrently protects a portion of the Deer Creek watershed which contains the world's only population of the a Federally Endangered fish species.

Site Name: **Harford Glen**

USGS Quad: **Edgewood**

Harford Glen is a shallow seep draining into a man-made lake. Two juveniles of an uncommon amphipod species were found in this seep under decaying wood. This amphipod species appears to require clear, flowing seepage areas and its presence may be indicative of good groundwater quality.

The range of this amphipod species is restricted to a few Piedmont and Coastal Plain localities in the mid-Atlantic states. It is not abundant at any location outside the greater Washington, D.C area. Extensive development in the vicinity of the amphipod's greatest population concentration has reduced the availability of suitable seepage habitat.

Site Name: **Hess Pond**

USGS Quad: **Phoenix**

Hess Pond is a seasonal pond occurring along a stream. This seasonal pond borders a small stream and is part of a broad wetland complex of emergent marsh, shrub swamp, and floodplain forest. The marsh harbors a population of a State Threatened sedge known from only four other known locations in Maryland.

Seasonal wetlands along tributaries were historically created by fire and beaver activity, the fallen timber restricting channel flow and inundating portions of the stream. Natural disturbances such as these have been largely suppressed by man.

Many of the remaining seasonally inundated wetlands have been drained or filled for agriculture and development. As their habitat has been eliminated, the animal and plant species relying on seasonally inundated wetlands have become increasingly rare.

Site Name: **Little Gunpowder Falls**

USGS Quad: **White Marsh**

Moderately sloping to steeply sloping hills and cool, narrow

ravines border Little Gunpowder Falls in the vicinity of this site. These hills and ravines drain southward into a narrow floodplain, and eventually into the Gunpowder River.

Natural canopy gaps within the mature alluvial oak-Beech-Tulip Poplar forest and a powerline right-of-way harbor two populations of a State Threatened wildflower species. Growing on steep, south-facing slopes of the ravine, the populations at this site represent the only occurrence for the species in the county. This species has been observed at only six other known locations in Maryland. The populations at this site are fairly large and vigorous. A State Rare Sedge species and four uncommon plant species also occur at this site.

Powerline maintenance sometimes mimics natural disturbances, such as flooding and fire, which once maintained open habitats. Since these natural disturbances have been largely suppressed by man, plant and animal species relying on canopy gaps have dwindled in numbers.

The mature forest which occupies the hillsides and floodplain of the site provides an excellent natural buffer to the Little Gunpowder River. Forest interior breeding birds inhabiting the extensive contiguous forest that borders the river include the Red-eyed Vireo (Vireo olivaceus), Acadian Flycatcher (Empidonax virescens), Ovenbird (Seiurus aurocapillus), Louisiana Waterthrush (Seiurus motacilla), and Hairy Woodpecker (Picoides villosus).

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

KENT COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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INTRODUCTION

This report summarizes the ecological significance of each area in Kent County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

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KENT COUNTY

Site Name: **Big Marsh**

USGS Quad: **Betterton**

Big Marsh is a large, freshwater, coastal plain emergent/scrub marsh covering several hundred acres. The marsh is a mosaic of sedge tussocks, standing water, and alder thickets. Steep upland slopes support an oak-beech forest.

Maryland's only population of an aquatic member of the Buttercup Family inhabits the nontidal portion of the marsh. This species is vulnerable to hydrologic change and sedimentation. It is currently listed as an Endangered species in Maryland. The size of the population at this site is unknown, since the plant was completely submerged at the time of the survey.

Relatively undisturbed marshes as large as Big Marsh have become increasingly rare due to drainage and filling for development and agriculture. Existing marshes are often negatively affected by sediment runoff, chemical contamination, and exotic species invasion from upland sources. Maintaining woodland buffers adjacent to marshes contributes to maintenance of water quality and quantity, as well as the integrity of the plant community.

Site Name: **Black Bottom Ponds**

USGS Quad: **Millington**

This nontidal wetland complex includes several Delmarva bays which harbor five State Endangered Species plus a State Rare Species. The natural dominance of herbaceous species within the bays is unusual. Most of Maryland's nontidal wetlands are dominated by shrubs or trees. Many herbaceous, emergent wetlands have been drained for agriculture. The herbaceous communities within these Delmarva bays are maintained by fluctuating groundwater levels. The bays normally fill in the fall, winter and spring, and dry in the summer. Most of the rare herbaceous species germinate and mature in the summer on exposed mudflats. The exception is an Endangered floating-leaved aquatic which appears to mature through winter under standing water; its flowers emerge above the water surface in spring. These rare species are unique in their ability to endure seasonal extremes of drought and flooding.

An exceptional variety of rare plant species inhabits these bays. Large stands of a State Endangered sedge occur in three Delmarva bays in the area. This species is a candidate for listing under the U.S. Endangered Species Act. Fewer than 20 extant populations of this Endangered sedge have been reported worldwide; twelve of those occur on Maryland's Eastern Shore, but only one of the Maryland sites is protected.

Delmarva bays provide ideal habitat for amphibians, including several rare species. The ponds also provide feeding grounds for resident waterbirds, and offer nesting, feeding and breeding grounds for migratory waterfowl and songbirds. Numerous tracks through the ponds reveal that deer frequent these sites.

Site Name: **Browns Pond**

USGS Quad: **Millington**

Browns Pond is a seasonal pond dominated by a variety of herbaceous species along its perimeter and by Buttonbush at its center. It is usually inundated in the winter and early spring, annually recharged by groundwater influx, and then dries at the pond's center as the summer progresses. In summer, the moist depression is rapidly colonized by herbaceous species. When inundated, the pond serves as suitable breeding grounds for amphibians.

Many similar ponds on the Eastern Shore have been destroyed by agricultural ditching and drainage. As seasonal ponds have decreased in number, so have the rare plant and animal species which rely on them for habitat. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

A State Endangered amphibian, one of only five populations in the state, uses Browns Pond as breeding habitat in the winter and early spring. A rare, spring-blooming member of the Buttercup Family, Endangered in Maryland, flourishes in the rich, mucky bottom of the pond, its leaves suspended below the surface. This plant species is known from only two other locations in the state.

A third State Endangered species, a floating-leaved aquatic plant, grows among the Buttonbush at the pond's center. Known from only five other sites in Maryland, this species matures in winter under standing water, its flowers emerging above the water surface in spring.

Site Name: **Cypress Branch Pond**

USGS Quad: **Millington**

Cypress Branch Pond, a Delmarva bay within a powerline right-of-way, harbors a population of a State Endangered amphibian species. This amphibian species is known from only four other locations in the state. Delmarva bays, typically recharged annually by groundwater sources in the winter and early spring, are ideal breeding grounds for amphibians. In Delmarva bays, herbaceous species typically colonize the moist depressions present after the pond has dried in the summer. At this site, powerline right-of-way maintenance aids herbaceous species establishment by keeping the pond free of woody species. Rare, disjunct, or endemic plant and animal species specially adapted to fluctuating water levels are often associated with seasonal or semi-permanent ponds because this wetland type has been reduced by agricultural ditching and drainage. Future surveys at different times of the year may reveal additional rare plant or animal populations.

Site Name: **Golts Pond West**

USGS Quad: **Millington**

Golts Pond West is a shallow semi-permanent freshwater pond dominated by herbaceous species. The pond is annually recharged from groundwater influx in the late winter and early spring. It may dry during the summer, leaving moist depressions suitable for colonization by herbaceous species. When it is inundated, this pond provides important breeding habitat for amphibians.

Many similar ponds on the Eastern Shore have been destroyed by agricultural ditching and drainage. As seasonal ponds have decreased in number, so have the rare plant and animal species relying on their unique soil and hydrologic conditions. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to fluctuating water levels.

At least one rare amphibian, listed as State Endangered and found at only four other locations in Maryland, uses Golts Pond West as breeding habitat. Although no egg masses were seen at the time of the survey, both swollen males and spent females were observed, probably indicating a reproducing population. A small population of an uncommon sedge also grows at the muddy edge of the pond.

Site Name: **Golts Ponds**

USGS Quad: **Millington**

This protection area contains two Delmarva bays, unique nontidal wetland ecosystems restricted to five counties on the Eastern Shore. These ponds are centripetally-drained basins which range in size from one to fifteen acres and which hold up to 4 ft. of water in the spring. They often contain rare, disjunct, or endemic species and are considered unique because they are among the few remaining naturally open freshwater wetlands on the coastal plain. Many similar ponds have been drained and filled for agricultural and development.

Three rare or uncommon plant species and a State Endangered amphibian inhabit Golts Ponds. One plant, a State Endangered sedge, is a Federal candidate for listing under the U.S. Endangered Species Act. The Golts Ponds population is the northernmost occurrence of this sedge. These ponds also harbor another Endangered sedge occurring at its northern limit and an uncommon plant species.

Site Name: **Golts Railway Pond**

USGS Quad: **Millington**

This nontidal wetland is unique in the abundance and variety of herbaceous vegetation at the pond's center. Among these species is a State Endangered floating-leaved aquatic species. Five additional populations of this species are known in Maryland, but only one population is protected. The life cycle of this aquatic herb is closely linked to the seasonal water level fluctuations of the pond. As the pond water level drops in the summer, its seeds germinate on exposed mud. The seedlings mature under water as the pond level rises through fall and winter. The flowers of this plant emerge from the standing water in spring.

Many seasonal ponds have been destroyed by drainage and filling for agriculture and development. As these unique wetland habitats are reduced in number, so are the rare plant and animal species which rely on them for habitat. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

South of the pond along the sandy upland forest border is a small population of a State Endangered legume. Just three other populations of this species are known to occur in Maryland and only one population is protected.

Rare amphibians may also occur in this pond. Because the flora and fauna of ponds vary both seasonally and annually with changes in pond water level, several visits will be necessary to develop a complete species list for the site.

When standing water is present, the pond provides feeding and resting grounds for resident waterbirds. Also, the pond offers nesting, feeding and breeding grounds for migratory waterfowl and songbirds. Deer frequent the pond and surrounding woods.

Site Name: **Lovers Lane**

USGS Quad: **Chestertown**

Lovers Lane is a small tributary draining into the east fork of Langford Creek. The humus-rich, acidic soil along its banks supports a State Threatened fern species, growing among dense alder thickets. Found at only six other locations in the state, this fern is the only species of its genus occurring this far north; most if its close relatives inhabit tropical forests. It is rare throughout its range in the eastern United States, which may indicate highly specific soil or hydrologic requirements.

Site Name: **Massey Pond**

USGS Quad: **Millington**

Massey Pond is a shallow, permanent, excavated pond dominated by herbaceous species. The pond is annually recharged from groundwater sources in the late winter and early spring. It gradually dries during the summer, leaving moist depressions at its perimeter suitable for colonization by herbaceous species. When inundated, such ponds provide important breeding habitat for amphibians. Many similar ponds on the Eastern Shore have been destroyed by agricultural ditching and drainage. As ponds like these have decreased in number, so have the rare plant and animal species requiring their unique soil and hydrologic conditions. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Massey Pond harbors a population of a State Endangered amphibian, recorded at only four other locations in Maryland. Both adult and larval forms have been observed using the pond over a period of several years, indicating a stable, reproducing population.

The pond has only been surveyed in the wet months. Future surveys of the pond after it has dried in the late summer and

early fall may reveal the presence of rare herbaceous species as well.

Site Name: **Millington WMA Ponds**

USGS Quad: **Millington**

A shrub swamp and an excavated pond contain the unique elements of this protection area. The shrub swamp appears undisturbed and represents a habitat that is dwindling on Maryland's Eastern Shore due to agricultural ditching and drainage. An uncommon aquatic plant species inhabits the southern edge of this swamp. Southeast of the shrub swamp is an excavated pond that appears to be permanently flooded.

Among the herbs that dominate the exposed mud banks are large populations of a State Endangered sedge and a State Endangered member of the Aster Family. The sedge is known from fewer than 20 extant sites worldwide, twelve of which occur in Maryland. This species is a candidate for listing under the U.S. Endangered Species Act. Only two of the populations in Maryland are protected. The Endangered aster species occurs at thirteen extant sites in Maryland, only one of which is protected. A small population of another State Endangered sedge grows along the banks of the pond. Nine extant populations of this rare sedge occur in Maryland, only one of which is protected.

Rare amphibians may also occur in the pond and shrub swamp. The flora and fauna of the pond and swamp vary seasonally and annually with water level. The rare amphibians are not apparent in late summer and early fall when the pond was surveyed. Several visits are necessary to develop a complete species list for the site. The excavated pond and shrub swamp offer ideal breeding, nesting and feeding grounds to migratory waterfowl and songbirds, and feeding grounds to resident waterbirds. In addition, deer frequent these areas to feed and rest.

Site Name: **Morgan Creek**

USGS Quad: **Galena**

Morgan Creek is a diverse swamp forest containing dense alder thickets and emergent marshes, bordered by an upland mixed hardwood-pine forest. Close to the mouth of one of the tributaries feeding the creek, a population of a State Rare plant species grows in the swamp's muddy banks. Only four occurrences of this plant species have been documented in Maryland. Its limited distribution may indicate highly specific soil or hydrologic requirements.

Undisturbed swamp forests have become increasingly rare as wooded buffers are removed, allowing the invasion of exotic species, siltation, and degradation of water quality. Species associated with undisturbed swamp forests are also in decline.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

PRINCE GEORGES COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

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INTRODUCTION

This report summarizes the ecological significance of each area in Prince Georges County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

PRINCE GEORGE'S COUNTY

Site Name: **Beck Woods**

USGS Quad: **Laurel**

This site contains a wetland complex consisting of bottomland forest, Red Maple and alder swamp, shallow open water pools, sedge-dominated herbaceous wetland openings, and an impounded lake. The diversity of native plants in these wetlands is high. Occasional lowering of the water level in the lake has revealed the presence of a species of sedge that is considered uncommon in Maryland--not currently threatened, but in need of monitoring due to declining populations. The uncommon sedge grows in the wet, organic soils that are exposed when the lake is drained.

Two rare wetland plant species are known to have occurred historically in the general vicinity of Beck Woods. With further survey, these species may be found to grow here still. Surveys at various times during the growing season may reveal the presence of additional rare species at this site.

Together with adjacent pine-oak forest, the forested wetlands at this site form a Research Forest designated for protection and research by the Beltsville Agricultural Research Center (BARC). In annual breeding bird censuses conducted throughout the mid-Atlantic region, this forest is consistently the location of one of the highest densities of Neotropical migrants. Many of these species are forest interior breeding birds which require large tracts of mature, well-stratified, unfragmented forest for breeding success. This site is important because it is one component of a very large, relatively contiguous forest comprising lands under the jurisdiction of several federal agencies. Agriculture and residential and commercial development have made such large forest systems very rare in the Piedmont and Coastal Plain of the mid-Atlantic states.

Recent Smithsonian Institution surveys of the dragonfly fauna at BARC have determined that the wetlands at this site also support an unusually high diversity of dragonfly species, including at least one species known from nowhere else in the State.

The extensive, high quality wetlands at Beck Woods provide feeding and breeding habitat for amphibians, migratory songbirds, waterfowl, and other wildlife. Such wetlands are very important for their role in maintaining the quality of the rivers they feed and, ultimately, the Chesapeake Bay.

Site Name: **Belt Woods**

USGS Quad: **Lanham**

The nontidal wetlands at the Belt Woods site are bottomland forests along streams. The primary reason for their designation is that they serve as essential corridors connecting the rich mesic forest of the Belt Woods Natural Environmental Area (NEA) to other nearby forested areas. The ecological importance of Belt Woods NEA is so great that the small site has been designated as a State Wildland. The forested corridors in the Belt Woods area have been documented in the scientific literature as essential components in a system of interrelated forest fragments. Together these fragments are able to support many species usually absent from forest patches of such small size. Although too narrow to provide permanent or breeding habitat for forest interior species, the corridors provide cover for individuals moving between forest blocks. These bottomland forests are composed primarily of Sweet Gum, Pin Oak and Tulip Tree. In addition to their role as corridors, these wetlands offer habitat to edge-tolerant wildlife species. They also control pollution, sedimentation and erosion of the streams they border.

The NEA served by the wetland corridors contains an old-growth, mesic, upland forest which may never have been logged. The relative lack of disturbance is evidenced by such factors as the large diameter of many trees, light gaps, snags, standing dead and fallen timber, and well-stratified forest layers. The soil has a well-developed organic layer and is less acidic than most soils of the Coastal Plain, due to underlying Miocene shell deposits. The nutrient-rich, circumneutral soils and lack of recent disturbance have resulted in very high diversity of species in a relatively small acreage. These include unusually high densities of neotropical migrant birds, a group experiencing serious decline throughout their U.S. range. The age and ecological significance of Belt Woods has been well-documented in the scientific literature.

Two rare plants occur among the diverse herbaceous species carpeting the forest floor in the NEA. One is a wildflower that is listed as Endangered in Maryland and is known from only one other site in the State. The second species, listed as Threatened in Maryland, is known from fewer than a dozen other sites statewide, including only one other site in Prince George's County.

The diversity and lack of disturbance in the NEA make it a very important habitat for many wildlife species. Standing dead timber provides sites for cavity nesting birds, and both standing and fallen logs offer den sites for small mammals. The site supports an extremely high density of forest interior dwelling

birds, as measured in censuses of breeding birds throughout the State.

Site Name: **Beltsville Airport Bog**

USGS Quad: **Laurel**

This site contains a large wetland complex with an open canopy. The complex includes a wet meadow, an emergent marsh, and a large shrub bog with narrow open water channels that wind between hummocks of sphagnum moss, sedges, and shrubs. This wetland is remarkably diverse and includes unusual species such as Poison Sumac. Large, unforested nontidal wetlands such as this are uncommon in Maryland, particularly near the Piedmont/Coastal Plain interface. Many of our nontidal wetlands have been lost due to draining and filling for agriculture and urban development. Such wetlands are increasingly valued for their important role in maintaining the quality of the rivers they feed and, ultimately, the Chesapeake Bay.

Two unusual plant species inhabit the bog. One is a sedge that is listed as Threatened in Maryland and is known from fewer than ten sites in the State. The other is a small herbaceous species found only in swamps and bogs and considered uncommon in Maryland.

The wet meadow at one end of this site supports Maryland's only population of a rare species of leafhopper. The exact status of this rare insect species has not yet been determined.

Two additional rare plant species were reported historically from the vicinity of Beltsville Airport Bog and may still grow at this site. Portions of the bog are virtually impenetrable and may harbor additional rare species that were not observed during the field survey.

Dense, shrub-dominated and forested nontidal wetlands provide excellent habitat for birds and other wildlife. The freshwater, emergent marsh upstream from the bog provides important amphibian habitat. The entire ecosystem is significant not only for its unusual habitats, but also because it is part of a large, contiguous forest that provides habitat for species intolerant of forest fragmentation.

Site Name: **Beltsville Bottomland Forest**

USGS Quads: **Beltsville, Laurel**

This site is an important example of a bottomland deciduous forest large enough to support the entire array of native

bottomland bird species expected in this type of habitat. Smaller tracts of similar habitat usually harbor far fewer species of breeding birds. Several species that breed at this site, such as the Kentucky Warbler, Louisiana Waterthrush, and Barred Owl, are forest interior breeding birds. These species require large tracts of forest and, in some cases, relatively mature trees in order to successfully reproduce. Numerous other neotropical migrant birds use this forest during spring migration for feeding and nesting habitat.

A large portion of this area is designated by the Beltsville Agricultural Research Center as a Research Forest. This site is especially important because it is part of a very large, relatively contiguous forest in the Beltsville-Laurel area, comprising lands owned by several federal agencies. Such large forest systems have become extremely rare in central Maryland due to forest conversion for agriculture and residential and commercial purposes.

A broad floodplain forest borders a wetter hardwood swamp forest at one end of the site. These wetlands provide important breeding sites for amphibians and reptiles. In addition, such nontidal wetlands are increasingly valued for their important role in maintaining the health of the rivers they feed and, ultimately, the Chesapeake Bay.

Site Name: **Beltsville Forest and Meadow**

USGS Quad: **Laurel**

The nontidal wetlands at this site are important habitat for unusual plants, forest interior breeding birds, and other wildlife, and they provide valuable sites for ecological research. Most of the wetland consists of bottomland forest dominated by Red Maple, with Sweet Bay, Black Gum and Spicebush in the understory. Wetland ferns and sedges, such as Cinnamon Fern and Long Sedge, are abundant in the wet organic soils of the forest floor. The bottomland forest grades into a shrub swamp of Sweet Pepperbush and Greenbrier.

Two boggy, sphagnous openings occur where a powerline right-of-way crosses the wetland forest. In one of these the soil has not been disturbed for many years. A small pool is surrounded by a tiny bog with sphagnum moss, wetland wildflowers, and a bog plant considered uncommon in Maryland. This species is not currently thought to be threatened, but is considered worthy of monitoring.

Another rare plant species is known to have occurred in wetlands in the vicinity of this site. With additional surveys, this species may be found still growing here.

Several factors make these wetlands and the adjacent deciduous upland forests very important as habitat for forest interior breeding birds. As one of the largest forested tracts at the Beltsville Agricultural Research Center (BARC), this area is an essential part of a large, interconnected forest comprising lands owned by several federal agencies. Forest interior breeding birds require relatively large, unfragmented forests for successful reproduction. Many are neotropical migrants, which form a majority of the territorial bird species in large eastern forests but decrease dramatically when forest stands are reduced to small, isolated woodlots. Small forest patches have a high ratio of edge to interior, and edge effects, including trampling, nest predation, and brood parasitism impact neotropical migrant species disproportionately for several reasons. Many migrant species place their nests on or near the ground. In addition, these birds have a relatively low reproductive rate, typically producing just one small brood per year. The large, contiguous forests that neotropical migrants require have become increasingly rare on the Upper Coastal Plain of Maryland due to clearing for agriculture and for residential and commercial development.

This area has been selected for a number of significant ecological research projects. The forest was censused for a major study which documented the importance of large forest size and the value of forested corridors to neotropical migrant bird species. It is also the site of long-term gypsy moth research. Most of the area has been designated by BARC as a Research Forest. The Research Forest provides a laboratory for studies of plants and animals in their natural habitats.

This site provides excellent habitat not only for birds, but for many types of wildlife such as insects, amphibians, and large mammals. In addition, these wetlands maintain water quantity and quality of the rivers they feed and, ultimately, the Chesapeake Bay.

Site Name: **Beltsville Seasonal Ponds**

USGS Quad: **Laurel**

Two small, centripetally-drained seasonal ponds are the focus of this site. No streams feed or drain the ponds. The ponds fill with water during the winter and early spring, and gradually dry during the summer.

This habitat is uncommon in Maryland; many such ponds have been destroyed by draining, ditching, or filling for agriculture or development. Seasonal ponds are especially rare in the Upper Coastal Plain, occurring more commonly on the Eastern Shore. They provide ideal habitat for an unusual group of plants known

as "drawdown" species, which flourish in the moist soil exposed when the water recedes in late summer.

A rare herbaceous drawdown species is abundant in one of these ponds. This species is listed as Endangered in Maryland and is known from fewer than ten sites in the State. At this site it grows under a canopy of Buttonbush, which dominates the center of the pond, and in several openings between shrubs.

Between the two ponds is a forested wetland of Red Maple and Pin Oak, with an open understory. East of the ponds, a stream flows through a small swamp dominated by Red Maple, with Southern Arrowwood, greenbrier, and sedges in the understory.

The seasonal ponds and surrounding wetlands offer feeding and breeding habitat for migratory songbirds and for amphibians. The ponds are the site of ecological studies of large, unusual salamanders that breed here.

Additional rare plant species may occur at this site. The flora and fauna of seasonal ponds vary seasonally and annually with water level. Several visits are required to develop a complete list of species which inhabit this site.

Site Name: **Buck Lodge Road Bog**

USGS Quad: **Beltsville**

Buck Lodge Road Bog is a sphagnous seep occurring within a powerline right-of-way. Naturally-occurring sphagnous seeps were once kept free of woody species by sporadic floods or fires. Since these natural disturbances are now suppressed by man, many of the species associated with sphagnous seeps have become increasingly rare. Powerline right-of-way maintenance prevents woody plant invasion at this site, keeping the sphagnous seep open and allowing rare species to flourish.

Buck Lodge Road Bog, dominated by Roemer's Rush, grasses, and an uncommon orchid, harbors populations of two State Endangered and one State Threatened species. Each of the Endangered species is known from fewer than four sites in Maryland. For one of these species, a rare sedge, this is the only known Maryland population outside of the Eastern Shore. The species listed as Threatened in Maryland is known from fewer than ten sites in the State.

This sphagnous seep is a habitat generally unfavorable to plant growth. Due to the high clay content of the soil at this seep, any moisture accumulating from precipitation or seepage tends to remain on the surface. The acidic soil is relatively poor in nutrients and highly erodible. The rare species that

inhabit this area have adapted to these severe conditions. These species are seldom found in more favorable environments because they cannot compete with other, more common species.

This unusual wetland may provide suitable habitat for colonization by other bog species. The dense thickets of Naked Withe-rod and Red Chokeberry to the east of the seep, bordering the stream, provide food and nesting habitat for birds. The stream and adjacent upland White Oak-Chestnut Oak-Black Huckleberry woods provide habitat for birds, amphibians, and reptiles.

Site Name: **Chews Lake**

USGS Quad: **Bristol**

The mature bottomland forest that borders Chews Lake is composed of species that usually dominate riparian floodplain forests along rivers much larger than the streams that flow through this area. Sycamore, American Elm, and Box Elder dominate the forest canopy. The herbaceous layer is lush and includes many spring wildflowers. A long beaver dam maintains the water level in the lake. Other than beaver activity and a horse trail, there has been minimal recent disturbance to this forest.

Two rare plant species inhabit this unusual bottomland forest. Both are listed as Endangered in Maryland. This is the only known site in Maryland for one of these species. Further survey is needed to determine the size and vigor of this population. The other Endangered species is known from only one other site in the State. The population at Chews Lake is much larger than the other known population of this species; thousands of flowering plants carpet the floodplain. Because the potential habitat for these rare species is extensive and of high quality, this site offers an excellent opportunity to preserve these species in Maryland.

The floodplain and adjacent upland forest provide habitat for deer, beaver, and forest interior dwelling birds. The lake provides habitat for water dependent species of birds, amphibians, and reptiles. In addition, the broad floodplain forest absorbs floodwaters, thus reducing potential flooding and pollution downstream.

Site Name: **Fort Ravine**

USGS Quad: **Mount Vernon**

This site contains a narrow band of palustrine forest bordered by mesic deciduous forest on the slopes of a steep, narrow ravine. Together, these forests provide an exceptional example of a mature, deciduous forest. Due to the clearing of land for agriculture, silviculture, and housing development, forests of similar age are extremely rare on the Upper Coastal Plain. Trees greater than two ft. in diameter are scattered along the stream, and decaying, moss-covered logs straddle the ravine. The forest understory and herbaceous cover are well-developed. Spring wildflowers line the stream banks.

The bottomland forest is dominated by Tulip Tree and Sycamore, with Pawpaw and Spicebush in the understory and patches of Nettle and Jewelweed on the forest floor. Along the stream banks and lower slopes are scattered patches of a rare plant species known from fewer than a dozen other sites in Maryland. This State Threatened plant requires the deep shade and organic soils of a mature forest. The species is found more commonly in the Piedmont and mountains, with few populations reported from the Coastal Plain in surrounding states.

The mature forest provides feeding and nesting habitat for migrating songbirds. A trail near the mouth of the stream provides access for hikers, birdwatchers, and nature photographers.

Name: **Huntington Park Woods**

USGS Quad: **Laurel**

This site contains a Red Maple bottomland forest, a shrub swamp dominated by Sweet Pepperbush, and small seepage areas with dense vegetation dominated by Sweet Bay. These wetlands are composed primarily of native plant species with only minor evidence of invasion by weedy, non-native species.

One of the dominant species on the wetland forest floor is a rare plant which is known from fewer than 10 other sites in the State, and no other sites in Prince George's County. This species is listed as Threatened in Maryland. This is one of the largest populations of this plant in the State, and it appears to be reproducing successfully.

This area offers nature study opportunities to a rapidly developing, suburban community.

The surrounding uplands consist of mature pine-oak forest. Forests of this age are becoming increasingly rare as residential and commercial development expand. The mature forest provides habitat for many woodland plant and wildlife species, including standing dead trees for cavity-nesting birds.

Site Name: **Johnson's Gully**

USGS Quad: **Mount Vernon**

This steep ravine supports a narrow band of bottomland forest and a mesic, deciduous forest. These forests are more characteristic of the Piedmont than the Upper Coastal Plain. A great diversity of herbaceous species, including numerous wildflowers, carpet the lower slopes and stream banks. This well-developed herbaceous cover, the presence of large, well-decayed logs, and the complex structure of the canopy indicate that the forest is mature. Due to clearing for commercial and residential development and agriculture, few mature forests exist on the Upper Coastal Plain. If left undisturbed, this will be an excellent example of an old growth forest.

Along the lower slope of the ravine grows a rare plant species that is listed as Threatened in Maryland. This species more commonly inhabits the cooler forests of the mountains and Piedmont. The steep slopes of the ravine and the dense canopy produce a cool, shady habitat for this plant, far from its normal range. The undisturbed bottomland forest prevents soil erosion and sedimentation that would be detrimental to the rare species.

The small stream and adjacent moist banks provide excellent habitat for invertebrates and amphibians. The mature forest provides feeding and nesting habitat for migratory songbirds. In addition, fossils have been found in the streambed, suggesting that this ravine may be important in revealing the biological history of this area.

Site Name: **Patuxent Maple Swamp**

USGS Quad: **Bowie**

This site is an excellent example of a palustrine floodplain forest. Red Maple dominates this section of the Patuxent River floodplain, which supports a variety of bottomland hardwood species, including Sweet Gum, River Birch, Sycamore, Ironwood, and ash. Occasional scouring by floodwater of the Patuxent River maintains an open understory. Patches of shrubs occur on slightly elevated areas and herbaceous openings form in the depressions and channels that retain floodwaters longer. These natural herbaceous openings are unique to floodplain forests;

they do not occur in other palustrine, nontidal wetlands of the Upper Coastal Plain.

Among the unusual herbaceous species that inhabit these openings are two species that are rare in Maryland. One species is known from just two other sites in the State and is listed as Endangered in Maryland. The other species is considered Highly State Rare and is known from only one other location in the State.

At the west end of the wetland complex, temporary pools and saturated soils of the Red Maple-Sweet Gum Forest provide habitat for an uncommon crustacean. This species is declining and worthy of monitoring in Maryland. These small creatures are predominantly subterranean and only occasionally appear in surface waters. The bulk of the population lives in saturated soils well shaded by the deciduous bottomland forest.

The various types of forested wetlands along this section of the Patuxent River provide excellent habitat for resident and migratory songbirds. In addition, several woodpeckers were observed during both visits to this area. The natural herbaceous openings attract deer and other wildlife.

The forested wetlands along the Patuxent River absorb floodwater during storms and thus reduce the impacts of flooding downstream.

Site Name: **Patuxent Wildlife Research Center**

USGS Quad: **Laurel**

The Research Center includes over 3000 acres of nearly contiguous forest. These forests include approximately 700 acres of mature bottomland forest bordering the Patuxent River. The Society of American Foresters identified the Research Center's bottomland forest as one of nearly 400 natural areas in their national inventory of mature forests. The Society's inventory of natural areas was initiated because these relatively undisturbed forests provide a vital educational resource. The extensive tracts of forest provide a laboratory for studies of plants and animals in their natural habitats and for studies of the ecological processes that sustain the forests. The forest ecosystems remain essentially intact; for example, they include species of forest interior dwelling birds such as neotropical migratory species that are unable to survive in smaller forests. Only by understanding the natural processes that sustain these extensive, relatively undisturbed forests, can scientists assess the effects of human-induced changes to forests of this region.

At least two rare plant species inhabit the wetland. One rare species, a sedge, is known from only four additional sites in the State and is listed as Threatened in Maryland. The other is a State Threatened wildflower. There are several historical reports of additional rare species at the Wildlife Research Center. The forests were not searched for these species during the field surveys conducted for this report. However, it is likely that the rare species survive because there has been very little disturbance to the habitats from which they were reported. Further survey of the forest is needed to confirm the presence of these rare species.

Most of the forested acreage at the Research Center, both upland and bottomland, has been designated by the U.S. Fish and Wildlife Service as Research Natural Areas. These forests, in association with adjacent forests on Fort Meade, the U.S. Department of Agriculture Research Center, and other federally-owned lands, constitute one of the largest remaining contiguous tracts of forest in the Baltimore-Washington metropolitan area. As commercial and residential development merge formerly distinct metropolitan areas of the mid-Atlantic states, the forests that remain are usually small, isolated patches. These small patches cannot support many of the plants and animals native to this region that require extensive forests or are intolerant of frequent disturbance. The forests of the Wildlife Research Center and adjacent Federal properties offer the best available opportunity to conserve the native plants and wildlife of this region that will not survive in small, isolated forests.

Site Name: **Route I-95 Bog**

USGS Quad: **Beltsville**

The unusually sandy, acidic soil within this powerline right-of-way supports rare plant communities in sphagnous, low elevation bogs. Several similar bogs, historically referred to as powder mill bogs, were reported from Prince George's County in the early 1900's. The flora reported for these bogs is remarkably similar to that of bogs in the pinelands of southern New Jersey. This site may be a remnant of such a bog. With the exception of a portion of Suitland Bog, none of the bogs historically reported in this region is known to exist today. All have apparently been drained or filled during the commercial and residential development of this suburban area.

Two rare plant species grow in or along the edge of bogs in this right-of-way. Both species are near the limits of their ranges. One species is listed as Threatened in Maryland and is known from just five other sites in the State. This population is large and the plants flower profusely. This is the larger of

the two known Maryland populations of the other rare bog species, which is listed as Endangered in Maryland.

Due to the loss of natural habitat, powerline rights-of-way have become increasingly important habitat for some rare species. Where rights-of-way cross certain wetlands, the removal of woody plants during powerline construction and maintenance mimics the natural disturbances that create and maintain Coastal Plain bogs. Further survey may reveal additional rare species in this site.

Two additional significant plants grow in nearby uplands within the powerline right-of-way. One is a State Endangered species known from only three other Maryland sites. The other species is uncommon and declining in the State.

Site Name: **Southwest Branch Bottomland Forest**

USGS Quad: **Lanham, Upper Marlboro**

The rich soil along the banks of Southwest Branch supports a bottomland forest dominated by large Tulip Trees. Box Elder and River Birch are common, and Spicebush is abundant in the understory. The forest sustains an unusually luxuriant cover of spring wildflowers. Within this diverse herbaceous layer is a vigorous population of a wildflower listed as Endangered in Maryland and known from just two other sites in the State. In Maryland, all of the known sites for this species are in Prince George's County. This species is also rare in adjacent states.

Mature bottomland forests are uncommon within this rapidly urbanizing area. This site offers local residents outstanding recreational and educational opportunities such as hiking, birdwatching, and nature study.

This forest maintains the water quality and flow-level of Southwest Branch by filtering runoff from adjacent uplands and by absorbing floodwaters.

Site Name: **Suitland Bog**

USGS Quad: **Anacostia**

Suitland Bog contains a wetland complex that includes palustrine forest, emergent marsh, magnolia swamp and seepage slopes. The focal point of the site is a two-acre sphagnum bog occurring on a west-facing seepage slope. This bog is the last relatively undisturbed example of more than ten Coastal Plain bogs reported historically in Prince George's County. Commercial and residential development have destroyed or drastically altered

all but this bog. Bogs are now rare throughout the Coastal Plain of Maryland.

The saturated, acidic soil characteristic of sphagnum bogs is unfavorable to the growth of most plants. A few plant species have adapted to this harsh environment, including several rare species. Within Suitland Bog, open areas lacking woody vegetation harbor three State Endangered, two State Threatened, and two State Rare plants. One of these species is known from just one other site in Maryland, one occurs in two other sites, and for one species Suitland Bog is the only known population in Maryland. In addition, ten plant species considered uncommon in the State inhabit the bog. These plants are not yet thought to be threatened in the State, but are worthy of monitoring due to declining or restricted populations.

Below the bog is a small stream that flows through a swamp dominated by Sweet Bay. Several small, partially open seeps occur along the east side of this stream a short distance south of the main bog. Several rare plant species occur in these seeps.

Suitland Bog is a potential site for a rare crustacean that lives in saturated wetland soils. Hybrids of this federally listed species have been reported historically from "near Suitland". Therefore, the parent species could potentially inhabit Suitland Bog.

At least 13 other rare and uncommon plant species were reported historically from Suitland Bog but have not been seen recently.

The proximity of this bog to urban residential areas makes it an important educational site. County park staff members lead numerous interpretive programs for local residents.

Site Name: **Watkins Regional Park**

USGS Quad: **Lanham**

This bottomland forest along Western Branch and the mesic forest that buffers it are outstanding examples of the Tulip Tree-dominated forests characteristic of the stream valleys of this county. Much of the forest in this area shows little sign of recent disturbance, and large sections of the forest are old. Forested areas of similar age are rare on the Upper Coastal Plain.

Two plants listed as Endangered in Maryland grow in the older sections of the bottomland forest. One is an annual species that contributes to the impressive display of spring

wildflowers carpeting the forest floor. Known from only two other sites in the State, this plant is very abundant at this site. The other is a rare sedge known from only three other sites in the State. A third rare plant species grows along a hiking trail in the bottomland forest. Fewer than ten other sites of this State Threatened spring wildflower are known in the State. Just a few individuals were observed at this site.

Within the mesic forest buffer adjacent to the wetland grows a State Endangered wildflower known from only two other sites in the State. Scientists believe that this species relies on a soil fungus in order to absorb water and nutrients. However, the fungus only grows in undisturbed, loamy soils with a well-developed organic layer. The rarity of this plant species, with its associated fungus, is attributed to the scarcity of mature, undisturbed forests on the Upper Coastal Plain.

The well-stratified canopy of the old forest provides excellent habitat for a variety of forest interior dwelling birds. Studies of the bird populations conducted by staff of the U.S. Fish and Wildlife Service have documented several forest interior species breeding in this forest. Clearing for residential and commercial development and for agriculture has severely fragmented the forests of Prince George's County, eliminating most of the available habitat for these species. This is one of the few large tracts of forest remaining in the area.

Its proximity to the urban and suburban communities bordering Washington, D.C. enhances the value of this area for passive recreational uses such as hiking, birdwatching, and other types of nature study. The regional park's nature center is near the site and provides excellent opportunities for environmental education related to the wetland and the old forest. Students have the chance to see the vegetation and the animals associated with these habitats, and to observe the natural ecological processes that maintain the forest.

Site Name: **Zekiah Swamp**

USGS Quads: **Brandywine, Hughesville, La Plata, Popes Creek, Charlotte Hall**

Zekiah Swamp is a vast wetland complex of extensive hardwood swamp forests intermingled with smaller areas of shrub swamp, emergent marshes, mudflats, vernal pools and beaver ponds. Nearly a mile wide throughout much of its 16 mile length, Zekiah Swamp's approximately 15,000 acres make it the largest hardwood swamp on the Western Shore.

Despite major disturbances over the years, Zekiah Swamp still supports many native plants and animals, including several rare species. It provides superb wildlife habitat. The wet, organic soils and shallow, highly braided channels make the site difficult to penetrate on foot or even by canoe. The biological resources and remote, wild character of the swamp led the Smithsonian Institution to designate Zekiah as a "Primary Natural Area Recommended for Protection" in its report on ecological priorities for the Chesapeake Bay Region (1974). The swamp was also included in the Department of State Planning's "Catalog of Natural Areas in Maryland" in 1968. The Wicomico River, to which Zekiah Swamp is the largest contributor of freshwater, was designated a Maryland Scenic River in 1971.

Beginning in the mid-1970's and continuing into the mid-1980's, the State purchased land in Zekiah Swamp to establish a Natural Environmental Area (NEA) totalling approximately 400 acres. The steering committee is currently working on development of a system of trails through the NEA and is planning to build an interpretive center on the site.

Among the unusual plants in Zekiah Swamp is a sizeable population of a sedge that is listed as Endangered in Maryland. Another rare plant was known historically from the swamp. It has not been reported since 1969 and is now listed as Endangered Extirpated in the State. Further survey may reveal that this plant still occurs in Zekiah Swamp. If a viable, naturally occurring population is discovered in Maryland, the species' status will automatically convert to Endangered. A third significant plant found in Zekiah Swamp is a tree that is considered uncommon in the State, not yet threatened but worthy of monitoring. Two additional rare plants occur within Zekiah Swamp but grow in sites designated separately as small nontidal wetlands of Special State Concern. These are discussed in separate reports for Bryantown Swamp and County Line Trail Seep.

At least one bird inhabiting this site is listed as Endangered both in Maryland and under the U.S. Endangered Species Act. Zekiah Swamp is also the type locality and possibly the only known location for a globally rare stonefly.

Wildlife species using Zekiah Swamp are many and varied, and include beaver, mink, Maryland Diamondback Terrapin, Sora Rail, Osprey, waterfowl, overwintering Wilson's Snipe, and large concentrations of migrating birds. A heron rookery occurs within the swamp. The large forested area in Zekiah Swamp provides excellent habitat for forest interior dwelling birds. These are species that require large tracts of contiguous, unfragmented forest to survive. This area was recognized as early as the 1960's by Maryland's Department of Game and Inland Fish as the most important area for wildlife in Southern Maryland.

Zekiah Swamp is immediately upstream from the wetlands in Allen's Fresh Natural Heritage Area (NHA). Natural Heritage Areas are communities of plants and animals that are considered to be among the best statewide examples of their kind. Preserving the nontidal wetlands upstream from the NHA is essential if the water quality and quantity, species composition, and natural character of the NHA are to be maintained. The wetland vegetation in Zekiah Swamp reduces pollution and flooding in the NHA by slowing water flow, filtering sediment and chemical pollutants, and utilizing nutrients. This helps preserve the unique natural communities and the plant and animal habitats in the NHA.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

QUEEN ANNES COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

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INTRODUCTION

This report summarizes the ecological significance of each area in Queen Annes County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

QUEEN ANNES COUNTY

Site Name: **Andover Flatwoods**

County: **Queen Annes**

This nontidal wetlands complex includes two Delmarva bays that harbor five rare plant species. Many seasonal ponds dominated by herbaceous vegetation have been destroyed by drainage and filling for agriculture and development.

Delmarva bays usually fill with water in the winter and early spring, gradually drying through the summer. The presence of standing water throughout much of the year inhibits the growth of trees. However, certain herbaceous plants germinate when the water recedes in summer and are able to flower and fruit before fall frost. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

All five rare plants occurring at this site are State Endangered species and one is a candidate for Federal listing. This site harbors the largest populations in Maryland of two of these rare plants.

Delmarva bays often provide habitat for rare amphibians. Further survey in spring is needed to inventory the species of amphibians using the area. The bays also offer breeding, nesting, and feeding grounds to migratory waterfowl and songbirds. Deer frequent this area to feed and rest.

Site Name: **Cleaves Fork**

USGS Quad: **Sudlersville**

Cleaves Fork is a Delmarva bay harboring a population of a State Endangered amphibian. This amphibian species uses the bay when it is fully inundated in the winter and early spring as breeding habitat. Only four other populations of this species are known in Maryland.

As this Delmarva bay dries in summer, remaining moist depressions in the soil are quickly colonized by herbaceous species. Future surveys during the dry months may reveal the presence of rare plant species in this Delmarva bay.

Many similar wetlands on the Eastern Shore have been destroyed by agricultural ditching and drainage. As Delmarva

bays have decreased in number, so have the rare plant and animal species which rely on them for habitat. Those that remain often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Site Name: **Kane Crossroads Pond**

USGS Quad: **Goldsboro**

Although most Delmarva bays are forested or dominated by shrubs, this pond, surrounded by swamp forest, is dominated by herbaceous vegetation. Fluctuations in groundwater level produce seasonal and annual fluctuations in the pond's water level. Normally the Delmarva bay fills in the winter and early spring, and dries in the summer. Many similar bays on Maryland's Eastern Shore have been destroyed by drainage or filling for agriculture or development. As Delmarva bays decline in numbers, so do the plant and animal species which rely on them for habitat. Remaining bays often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

Most of the rare or uncommon species inhabiting this pond germinate after the pond has dried and complete their life cycles before fall frost. The populations of these species and the dominant herbaceous species are maintained by the fluctuating groundwater regime.

An unusual variety of rare species inhabit the pond center at this site, including a State Endangered sedge. Known from fewer than 20 sites worldwide, this species is a candidate for listing under the U.S. Endangered Species Act. Twelve extant populations of this species are known from Maryland, but only one is protected. Two State Rare species, a sedge and a member of the Bluet Family, occurring in the pond are each known from fewer than twenty extant sites in Maryland. An amphibian listed as In Need of Conservation and an uncommon grass species also inhabit this pond.

Other rare amphibians may also occur at this site. The flora and fauna of Delmarva bays varies seasonally and annually with the pond's water level, and several visits will be needed to complete a thorough survey.

Site Name: **Prices Chapel Ponds**

USGS Quad: **Sudlersville**

Prices Chapel Ponds includes three seasonal ponds, one of which is undisturbed by logging activities. The undisturbed pond is dominated by common sedges and surrounded by a wooded buffer.

Two small, sphagnous openings in the sedge cover support a small population of a State Endangered sedge occurring at twelve other locations in the state. This sedge species is a candidate for listing under the U.S. Endangered Species Act.

Seasonal ponds are nontidal wetlands which fill with water in the winter and the spring and dry in the summer as the groundwater recedes. Moist depressions remaining after the pond dries are rapidly colonized by herbaceous species. Seasonal ponds such as these have become increasingly rare due to drainage and filling for development and agriculture. Those that remain often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels. These nontidal wetlands also provide ideal feeding and resting habitat for numerous amphibians, songbirds, and other wildlife.

Site Name: **Pristine Pines**

USGS Quad: **Sudlersville**

Pristine Pines is a Delmarva bay of approximately 2 acres in size, dominated by sedges and grasses with scattered Red Maple and Sweet Gum trees. This bay harbors five rare plant and one rare animal species. A population of a nationally rare plant species, listed as Endangered in Maryland, grows in this Delmarva bay at the northern extreme of its range. Since this is Maryland's only population and the number of individuals within the population is small, its continued existence in the state is very tenuous. Research is currently being conducted to determine whether seedlings of this population can be propagated under greenhouse conditions. The seedlings may then be planted in this site to replenish the diminishing population.

Two State Endangered and a State Threatened plant species occurring in this Delmarva bay are each known from fewer than five other sites in the state. A rare amphibian In Need of Conservation utilizes this bay as breeding habitat. Finally, a State Rare sedge also thrives in this wetland.

Delmarva bays are nontidal wetlands which fill with water in the winter and early spring. During these inundated periods, they provide ideal feeding and resting habitat for numerous amphibians, songbirds, and other wildlife. These seasonal ponds dry during the summer as the groundwater recedes, leaving moist, often sphagnous depressions which are rapidly colonized by herbaceous species. Many ponds of this type have been destroyed by drainage and filling for agriculture and development. Those that remain often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

The Nature Conservancy, a private conservation organization, owns and manages this wetland opening in its entirety, a total of 30 acres in area.

Site Name: **Pristine Pines South**

USGS Quad: **Sudlersville**

A population of an amphibian listed as In Need of Conservation occurs in this wetland. Rare amphibians often rely on seasonal ponds as breeding habitat during the winter and spring when the ponds are inundated. Seasonal ponds dry during summer as groundwater levels recede, leaving moist depressions which are rapidly colonized by herbaceous species. Many ponds of this type have been destroyed by drainage and filling for agriculture and development. As seasonal ponds become increasingly rare, so do the rare plant and animal species which rely on them for habitat. Rare, endemic, or disjunct species specially adapted to the fluctuating water levels are often associated with the few remaining seasonal ponds.

Site Name: **Starr Ponds**

USGS Quad: **Wye Mills**

Two small Delmarva bays are the focus of this natural area. Delmarva bays are centripetally-drained wetlands which, in Maryland, are virtually unique to the Eastern Shore and often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels. While most Delmarva bays have been drained and converted to agricultural land, the two bays in this protection area remain relatively undisturbed and, if maintained, can continue to support rare plant species.

These two wetlands are flooded early in the spring, and water levels recede during the summer, leaving moist depressions at the wetland's center. Three State Endangered herbaceous plant species inhabit these moist depressions. The Endangered grass species is known from only five other sites in Maryland and is at the northeastern limit of its range.

Other rare species may inhabit these bays. Because flora and fauna vary seasonally and annually with water levels, several visits would be required to develop a complete species inventory for this site.

Delmarva bays offer breeding, nesting, and feeding habitat for many birds and amphibians. In addition, deer and other wildlife frequent the ponds to feed and rest.

Site Name: **Teats Branch**

USGS Quad: **Sudlersville**

Amidst hardwood forests and cultivated fields lies a large seasonal pond dominated by shrubs and herbaceous vegetation. Many similar ponds have been destroyed by drainage and filling for agriculture and development. As these seasonal ponds decline in number, so do the plant and animal species which rely on them for habitat. Remaining seasonal ponds often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

The abundance of herbs within this pond is unusual. Many seasonal ponds are dominated by trees and shrubs. A fluctuating groundwater regime maintains this herbaceous cover. The pond water level is highest in early spring, then recedes, and the pond normally dries during the summer. Species inhabiting the pond must endure long periods of both drought and flooding.

These extreme conditions provide habitat for one State Endangered grass species and one uncommon grass species. The Endangered species is known from just five other sites in Maryland, only one of which is protected in this State.

In addition, this area borders The Nature Conservancy's Pristine Pines Preserve and will provide further protection to the five state-listed species inhabiting that preserve. This habitat is vulnerable to hydrologic alterations caused by ditching or drainage of surrounding lands. Protection of both the Teats Branch wetlands and Pristine Pines will eliminate the potential for drainage within a broader area.

Rare amphibians may also occur in the Teats Branch Pond. The pond's flora and fauna vary both seasonally and annually with water level, and the amphibians are usually not apparent in late summer when this site was surveyed. Several visits will be necessary to obtain a complete species list for the site.

Seasonal ponds provide excellent feeding, breeding, and nesting grounds for migratory waterfowl and offer feeding habitat to resident waterbirds. As shoreline habitat is lost to development, these inland wetlands become increasingly important resources for migratory and resident birds.

Numerous tracks were observed in the pond, revealing that this site is a resting and feeding area for deer.

Site Name: **Templeville Ponds**

USGS Quad: **Sudlersville**

Templeville Ponds are two separate Delmarva bays dominated by herbaceous vegetation within an extensive oak-pine forest. Delmarva bays are nontidal wetlands which fill with water in the winter and spring and dry in the summer as groundwater recedes. Nontidal wetlands dominated by herbaceous species have become increasingly rare due to drainage and filling for development and agriculture. Those that remain often contain rare, disjunct, or endemic species specially adapted to the fluctuating water levels. These nontidal wetlands also provide ideal feeding and resting habitat for numerous amphibians, songbirds and other wildlife.

Two rare or uncommon plant species grow in this Delmarva bay system dominated by sedges and Buttonbush. A small population of a State Endangered sedge, found at twelve other locations in the state, inhabits the ponds. This sedge species is a candidate for listing under the U.S. Endangered Species Act. These wetlands also harbor an uncommon grass species. Future surveys at different times of the year may reveal that other rare plant and animal species rely on these bays for habitat.

Site Name: **Tuckahoe Creek North**

USGS Quad: **Ridgely**

Tuckahoe Creek North site encompasses seasonally flooded, temporarily flooded, and saturated palustrine forests, shrub swamps, and open water ponds upstream from and adjacent to the Tuckahoe Creek North Natural Heritage Area (NHA). Preserving the nontidal wetlands feeding into the Tuckahoe Creek North N.H.A. is essential to maintaining the hydrologic regime, water quality, species composition, and natural character of the NHA.

The nontidal wetland vegetation in this site acts as a natural filter, reducing the sediment and chemical content of surface runoff entering tidal areas. This function is especially important because Tuckahoe Creek is the main tributary of the Choptank River. In addition to reducing pollution and siltation in the NHA tidal wetlands and in the river, the nontidal wetlands serve as catchment basins for seasonally high surface runoff. Instead of flooding and increasing erosion in the tidal channel, the excess surface runoff evaporates or is slowly absorbed into the soil. Periodic freshwater discharge from the nontidal wetland increases the nutrient availability in the tidal wetlands, stimulating productivity. This freshwater influx also creates varied habitat, resulting in increased species diversity.

A large and extensive population of a State Threatened shrub species thrives in Tuckahoe Creek's riparian habitat. The nontidal wetlands and adjacent upland forests buffer this rare plant population from disturbance or nonnative weedy species invasion. Although not surveyed, Forest Interior Dwelling Birds probably breed in the site due to its large size and variety of habitats.

Site Name: **Unicorn Millpond**

USGS Quad: **Sudlersville**

Unicorn Millpond was created by the damming of Unicorn Branch, a tributary to the Chester River. Permanent, freshwater lakes do not occur naturally on the Eastern Shore, but similar habitat has been created by beaver dams. Due to trapping and habitat destruction, few beaver survive in this region. Thus, Unicorn Lake represents a vanishing habitat.

The lake and adjacent wetlands support six rare or uncommon plant species. Two State Endangered submergent species inhabiting the lake are each known from only one or two other extant locations in the State. This is the only known occurrence in Maryland for a Highly State Rare submergent species. Three uncommon plant species also rely on the high water quality of this lacustrine habitat.

Unicorn Lake offers ideal nesting, feeding, and breeding grounds for resident and migratory waterbirds, waterfowl, and songbirds. Herons, egrets and ducks frequent the lake. The lake provides high quality fish habitat and supports extensive Submerged Aquatic Vegetation. Reptiles and amphibians are common in the water and in the shallow marshes along the perimeter.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

ST MARY'S COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in St. Marys County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

ST. MARY'S COUNTY

Site Name: **Church Swamp**

USGS Quad: **Rock Point**

This large wetland includes a swamp forest and a well-drained, bottomland forest. Areas that remain saturated throughout the year are intermixed with areas that are only seasonally flooded. When the site was visited in 1988, isolated stands of mature hardwood forest, with scattered large, old trees, were present in several locations throughout the swamp. Due to drainage, logging, and development, mature, undisturbed bottomland forests are uncommon on the Western Shore.

Five rare and uncommon plant species occur in relative abundance in the extensive wetlands at this site. Two of these are sedges that are listed as Endangered in Maryland. One of the Endangered sedges is known from only four other sites in the State. All known populations are small and the species is extremely sensitive to habitat disturbance. Another sedge at the site is listed as Threatened in Maryland. It is known from only five additional sites in the State, three of which are threatened with imminent habitat destruction. Another State Endangered plant is a wildflower that occurs in only three other sites in Maryland. Church Swamp is the only Maryland site for this species west of the Chesapeake Bay. The fifth species of concern is a sedge that is considered uncommon in Maryland, not currently threatened but worthy of monitoring.

The rare species at this site are all sensitive to changes in water quality or quantity in their wetland habitat. Any hydrological disturbance, whether from logging, ditching, road construction, or other activities, would be deleterious to the swamp forest and its rare species. The wetland is relatively flat, and hydrological changes in the surrounding groundwater recharge areas influence the hydrology of this swamp. Hydrological changes that alter the length of flooding would change the composition of the swamp forest and could eliminate the rare plants. The invasion of weedy non-native species that typically follows logging may also threaten rare species populations. Upstream disturbance could cause excessive siltation and reduce the water quality in the swamp. Unfortunately, at the time of the most recent site visit, extensive logging was taking place within the wetland. The resulting effects of this disturbance on the rare species populations are unknown.

The deciduous swamp and bottomland hardwood forests provide excellent habitat for forest interior dwelling birds, reptiles, and amphibians.

Site Name: **Mill Creek Pond**

USGS Quad: **Hollywood**

Mill Creek Pond is a large millpond created by the damming of Mill Creek. A rare aquatic plant species that is listed as Endangered in Maryland is abundant in the pond. This plant is known from only three other sites in the State. A second State Endangered plant, known from only one other site in Maryland, grows in the organic soils at the edge of the open water. This is the only known site on the Upper Coastal Plain for both of these Endangered species. A great diversity of more common wetland plants occurs along the shoreline and in emergent marsh areas where two feeder streams enter the pond. Water quality at this site remains high because the upstream watershed is forested and relatively undisturbed. Development proposed upstream may alter the hydrology of this site and may degrade the rare species habitat.

Abandoned millponds have become an increasingly important artificial habitat for numerous rare and uncommon plant species. Historically, beaver activity created many freshwater ponds. Beaver populations have been reduced because beaver are often perceived as a nuisance. Where soils and hydrologic conditions are suitable, abandoned millponds simulate a natural habitat that has become increasingly uncommon on the Western Shore.

Additional survey of this pond, particularly in the emergent marsh areas, would be likely to yield more records of rare plant species and possibly rare amphibians. The pond offers superb habitat for reptiles, amphibians, and resident and migratory waterfowl. The forested watershed provides habitat for forest interior dwelling birds.

Site Name: **Miski Run Woods**

USGS Quad: **Leonardtown**

Miski Run Woods contains a large, unusually diverse bottomland forest with many species that are typically found in the mountains and Piedmont, but are uncommon on the Coastal Plain. The soils at this site are calcareous, due to shell deposits in the underlying Choptank geological formation. Circumneutral soils are uncommon on the Coastal Plain, which is typically characterized by more acidic soils. The nutrient-rich

floodplain is carpeted with wildflowers in the spring, and is flanked by steep, north-facing slopes. The clear stream which flows through the site supports insect larvae characteristic of unpolluted waters. Abundant mosses and liverworts grow on its uneroded banks.

Three unusual plants grow in the bottomland forest at this site. A dense population of an attractive wildflower that is listed as Threatened in Maryland carpets the lower end of the protection area along Miski Run. It grows in only four other locations in the State. A small population of another State Threatened species grows in the damp soil near the stream. This plant is known from only six other sites in Maryland, and all known populations are small. Large portions of the floodplain forest floor are covered in the spring with a plant that is considered uncommon in Maryland--not yet Threatened but worthy of monitoring.

Site Name: **St. Mary's River Bottomland**

USGS Quad: **Hollywood**

This site is a very wet, heavily wooded floodplain. Red Maple, River Birch and Sweet Gum dominate the forest canopy, with alder, Sweet Bay, Pawpaw, Spicebush, and Sweet Pepperbush in the understory. The floodplain forest harbors a population of a State Endangered amphibian that lives under the bark of fallen logs and breeds in vernal pools. This species is known from fewer than three other sites in the State.

Although logged in the past, this bottomland forest shows few signs of recent disturbance. The woodland floor is littered with decaying logs that provide excellent habitat for the rare species. Portions of the site are very wet and provide breeding sites even in relatively dry years. As winter approaches, the frogs move up out of the area with potential for flooding to higher ground, where they overwinter in burrows.

Site Name: **West California Swamp**

USGS Quad: **Hollywood**

This site contains a wetland complex composed of a seepage shrub swamp with herbaceous openings and long open marshes. The shrub swamp, dominated by alder and Sweet Bay Magnolia, is characterized by a well-developed vegetation structure and a rich, diverse flora. Its many berry-producing shrubs provide excellent food sources and habitats for many birds and other wildlife species.

West California Swamp supports a large population of a sedge that is listed as Endangered in Maryland. This species is known from fewer than five sites in Maryland. At this site it occurs in a large patch of approximately 1000 sq. ft. as well as several scattered smaller patches. The site has been searched only briefly and should be further inventoried for additional rare species. Construction was occurring within 1000 ft. from the site and may threaten the rare species population with sedimentation.

ECOLOGICAL SIGNIFICANCE OF NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

SOMERSET COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
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Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Somerset County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

SOMERSET COUNTY

Site Name: **Dublin Swamp**

USGS Quad: **Princess Anne**
Dividing Creek

Dublin Swamp includes a densely forested swamp within the Wellington Wildlife Management Area and naturally regenerating swamp forest on private land harvested about six years ago. The removal of canopy cover on private land has created a wetland opening, naturally regenerating in sedges, grasses, and Red Maple. In some respects, this artificial opening mimics wetland gaps created by fire and flooding before these natural disturbances were suppressed by man.

A moderately large and widespread population of a State Threatened sedge grows in the wetland opening. Only two other occurrences of this sedge are known within the state. Its very limited distribution indicates that its rarity may be due to highly specific soil or hydrologic requirements.

Site Name: **Eden Swamp and Powerline**

USGS Quad: **Eden**

This swamp forest/emergent marsh complex hosts an extraordinary variety of rare species. Few nontidal, emergent marshes remain on the Eastern Shore due to ditching and drainage for agriculture and development. Although artificially maintained, the marsh in the powerline right-of-way is representative of a natural habitat once much more common. Three State Endangered and one State Threatened plant species inhabit this marsh. In the adjacent swamp forest, natural canopy gaps provide habitat for a fourth State Endangered Species and additional habitat for a State Endangered Species that also grows in the right-of-way.

Due to fire suppression, natural canopy openings are now uncommon. Artificial canopy gaps, such as those produced by logging, are usually accompanied by extensive disturbance to the surrounding environment that does not occur in natural openings. Weedy or non-native species often colonize these artificial openings.

The State Endangered and Threatened Species that inhabit this site are each known from fewer than ten extant sites in

Maryland. At the most, just one population of each of these species is currently protected.

The marsh and adjacent upland and swamp forests provide feeding, breeding and nesting habitat for resident and migratory songbirds, and feeding grounds for waterfowl.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

TALBOT COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
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INTRODUCTION

This report summarizes the ecological significance of each area in Talbot County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

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TALBOT COUNTY

Site Name: **Geib Fairview Ponds**

USGS Quad: **Fowling Creek**

Buffered by an upland hardwood forest are palustrine swamp forests, shrub swamps and seasonal ponds dominated by Buttonbush and various herbaceous species, including three State Endangered Species. Once abundant on the Eastern Shore, seasonal ponds are now uncommon due to drainage and filling for agriculture and development. As seasonal ponds decline in number, so do the plant and animal species which rely on them for habitat. Remaining seasonal ponds often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

These ponds normally fill in the winter and early spring, and dry in the summer. This fluctuating groundwater regime maintains an unusual abundance of herbaceous growth in one seasonal pond at this site. Three State Endangered plant species occur among this herbaceous vegetation in the deepest section of this pond. Two of the Endangered plants, one a member of the Aster Family and the other a grass, complete their life cycles in the brief period after this deep portion of the pond dries in summer and before fall frosts. The third Endangered species, a floating-leaved aquatic, overwinters under water and flowers and fruits in spring before the pond dries.

Seasonal ponds provide ideal habitat for a variety of wildlife. Tracks throughout the ponds indicate that deer frequent this site. The ponds offer nesting, feeding and breeding grounds to migratory waterfowl and songbirds. Resident waterbirds also feed in the ponds. Rare amphibians may inhabit these ponds. Pond flora and fauna vary with water level, so several visits will be necessary to develop a complete species list for the site.

Site Name: **The Mill Creek Wildlife Sanctuary**

USGS Quad: **Wye Mills**

The Mill Creek Wildlife Sanctuary, a 160 acre forest preserved by the Maryland Ornithological Society, harbors seven rare plant species within its upland beech-oak forests and Red Maple swamp forests. The extensive woodlands and wetlands also provide prime habitat for forest interior dwelling birds.

Two State Endangered ferns occur adjacent to a portion of the stream valley dammed by beavers. Each of these Endangered plants occurs at fewer than four other sites in Maryland. A Federally Endangered mammal inhabits the upland forested buffer of the wildlife sanctuary. A State Rare plant species found beside this swamp also relies on this flooding regime for its survival.

A large population of a State Threatened plant species, known from only four sites in Maryland, thrives along the steep north-facing bluffs above the swamp. A State Endangered member of the Aster Family occurs further downstream along one of the creek's tributaries and is known from only five sites in the state. A Highly State Rare plant and a rare member of the Grape Family whose status has not yet been determined also grow in the vicinity.

Site Name: **Seth Pond**

USGS Quad: **Trappe**

The deep detritus layer at the bottom of Seth Pond, a pond within a state demonstration forest, provides excellent habitat for saprophytic diving beetles. In 1973, a rare aquatic beetle, formerly believed to be extirpated in the state, was observed in both adult and larval forms in the pond. In 1978, a species of scavenger beetle new to science and known nowhere else in the world was discovered in the pond. Since that date, the pond was altered, apparently to make it more suitable as waterfowl habitat. Recent surveys have failed to turn up individuals of either diving beetle species, so that both are believed to be extirpated. Future surveys will be needed to determine whether either of these rare diving beetles has survived the disruption of its habitat.

Seasonal ponds are now the only natural, herbaceous, non-riverine, freshwater wetlands left on the coastal plain. Because they are hydrologically recharged by groundwater, water levels vary both seasonally and annually, causing fluctuations in plant species and cover. When inundated in the winter and early spring, these ponds provide ideal breeding and resting habitat for amphibians, songbirds, and other wildlife. As they dry in the summer, remaining moist depressions are rapidly colonized by herbaceous species. Many ponds like these have been filled or drained for development and agriculture. Those that remain often harbor rare, disjunct, or endemic species specially adapted to the fluctuating water levels.

ECOLOGICAL SIGNIFICANCE OF

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN

WICOMICO COUNTY

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Maryland Natural Heritage Program
Department of Natural Resources
Tawes State Office Building, E1
Annapolis, Maryland 21401

September 30, 1991

Preparation of this report was partially funded by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration

INTRODUCTION

This report summarizes the ecological significance of each area in Wicomico County that is designated as a nontidal wetland of Special State Concern under the State Nontidal Wetlands Regulations (COMAR 08.05.04). Similar reports were prepared for each of Maryland's 16 coastal counties. Most of the designated nontidal wetlands provide habitat or ecologically important buffers for habitat for plant and animal species identified as rare, threatened, or endangered by the Department of Natural Resources, Natural Heritage Program. Other designated nontidal wetlands are unique natural areas or harbor unusual natural communities.

The identification and designation of these areas was a cooperative effort between three agencies within the Department of Natural Resources: the Natural Heritage Program, Nontidal Wetlands Division, and Coastal Resources Division. As the State's lead agency for the identification and protection of rare species and natural communities, the Natural Heritage Program continually updates the ecological information for these areas. For the most recent information on a particular site, please consult the program's office in Annapolis.

In the following summaries the status of rare species follows the Natural Heritage Program's Rare, Threatened and Endangered Animals of Maryland and Rare, Threatened and Endangered Plants of Maryland as revised February 1991. While the names of rare species occurring within each area are not provided, the status is given in order to convey the ecological significance of the areas. Common names are used for characteristic species in descriptions of the vegetation except when no common name is available. These common names generally follow those found in Fernald's Gray's Manual of Botany, 8th Edition (1950). When a specific species is named, the common name is capitalized. Common names referring to a genus or family are not capitalized.

WICOMICO COUNTY

Site Name: **Barren Creek**

USGS Quad: **Hebron, Mardela Springs**

This site encompasses the wetlands along the upstream portion of Barren Creek, a tributary of the Nanticoke River, from the headwaters of the creek's main branch to the boundary of the Chesapeake Bay Critical Area. The site contains at least four former millponds, one of which remains an open-water pond with a mature hardwood swamp along its fringe. Several other ponds have been partially drained due to destruction of their dams. Old millponds mimic a habitat that was once more common on the Eastern Shore. In the past, old beaver ponds created wetlands with an open, treeless canopy that supported successional plant communities. Beaver have been greatly reduced in number and with them this habitat type has diminished. Many of the plant species associated with this habitat are now rare in Maryland.

All four ponds at the Barren Creek site support a rare woody species along their banks or in the moist, exposed soils of the formerly flooded ponds. This State Rare species is found in only two geographic areas worldwide -- on the Delmarva peninsula and in two counties in Oklahoma. In Maryland, it is limited to the upper reaches and tributaries of three rivers: the Nanticoke, Pocomoke, and Wicomico. The population along Barren Creek is extensive and includes young shrubs as well as mature, fruiting individuals, indicating that the population is reproducing successfully.

The unique distribution of this rare woody species poses questions about its evolution and biogeography. If several populations can be protected, genetic and ecological research may be conducted to clarify the reasons for its disjunct and narrowly limited range. A study examining the effect of increasing canopy closure on the rare species (in the ponds where natural succession is occurring due to destruction of the old millpond dams) might provide insights concerning the limited distribution of the species.

Two significant herbaceous plants occur in the high-quality, freshwater seeps at the southeastern edge of one of the formerly flooded millponds. One species is known from fewer than a dozen other locations in Maryland and is considered State Rare. The other species is considered uncommon in Maryland, not currently threatened but in need of monitoring. The sphagnous seeps also support diverse vegetation including grasses, sedges, club moss, orchids, carnivorous plants, and young alder trees.

The large, open-water ponds within this site provide excellent resting, feeding, and breeding habitat for numerous birds and amphibians.

The area immediately downstream from this site has been designated as a Habitat Protection Area for Locally Significant Habitat (#WI 0-4) in the Chesapeake Bay Critical Area Program. Protection of the upper portion of Barren Creek will help to maintain water quantity and quality in the adjacent Critical Area site. The Habitat Protection Area supports a continuation of the population of the rare woody species found in the nontidal wetland of Special State Concern.

Site Name: **Campbell Powerline**

USGS Quad: **Pittsville**

Campbell Powerline contains extensive wet sphagnous meadows dominated by Loose-headed Beakrush and Virginia Meadow-beauty. A large, vigorous population of a State Endangered species occurs in the wet sphagnous meadows and, to a lesser extent, in contiguous grassy upland habitat. Half of the six Maryland populations of this species are located in Wicomico County. A plant considered uncommon in Maryland is a codominant in these wet meadows.

Naturally-occurring forest openings, created by flood or fire, once provided habitat for wet meadow species. Since these natural disturbances are now suppressed by man, species associated with wet meadows have become increasingly uncommon. The removal of woody vegetation for right-of-way maintenance to some degree mimics the natural disturbances and provides an open canopy habitat for meadow species.

The low-lying, poorly drained soils at this site are often flooded or saturated. The rare and uncommon species that inhabit the meadows are uniquely adapted to this standing acidic water. Many non-native weeds can not invade these meadows because they can not tolerate acidic conditions.

Wet sphagnous meadows are valuable as breeding grounds for amphibians and provide forage for birds. Pine-hardwood forests to the southeast and northwest of the meadows also provide rich habitat for wildlife.

Site Name: **Horsebridge Creek Bog**

USGS: **Wango**

The Horsebridge Creek Bog is an open sphagnous wetland of emergent vegetation. Removal of woody species for maintenance of a powerline right-of-way maintains the open canopy at this site. During pre-settlement history, fires and floods created and maintained similar habitats. Now that these natural phenomena have been artificially suppressed, powerline rights-of-way provide important habitat for species which require open, early successional conditions.

The wet, acidic, nutrient-poor habitat is not conducive to the growth of most plants. However, an unusual group of plants specially adapted to these conditions thrives in this wetland. Among them are sizeable populations of four rare species. One of these is listed as Endangered in Maryland, two are listed as Threatened, and one is State Rare. A fifth species is considered uncommon in Maryland.

In the early 1980's four additional rare species were reported from this site. Although they were not observed in 1987, all of these species may persist at the site.

This area provides an opportunity to research the effects of an active drainage ditch that artificially lowers the water table in an ecologically significant wetland.

Site Name: **Johnson Pond**

USGS Quad: **Delmar**

The Johnson Pond Protection Area contains a large Atlantic White Cedar swamp. The swamp is a mixture of cedar, Red Maple, Black Gum, oaks, and Sweet Gum. Cedar Swamps are becoming increasingly rare on the Delmarva peninsula and areas this large are particularly unusual.

A vigorous population of an herbaceous, wetland plant that is listed as Endangered in Maryland grows in the swamp. Several subpopulations occur in different sections of the braided river channels. This species is known from only four other sites in Maryland and is rare in surrounding states as well.

Two additional rare species occur in the mesic upland habitat adjacent to the swamp. One is Maryland's only population of a tree species that is listed as Endangered in the State. Maryland is near the northeastern limit of this species' range. The other is a small population of a State Rare wildflower that grows in grassy upland clearings.

Additional rare plants may be found if this area is further explored. Atlantic White Cedar Swamps frequently contain unusual sedges and carnivorous plants.

Site Name: **Lawes Ditch**

USGS Quad: **Wango**

Lawes Ditch site contains nontidal wetlands associated with two tributaries of Nassawango Creek: Beech Island Creek and Lawes Ditch. These wetlands form part of the Nassawango swamp forest, an area of regional and perhaps national ecological significance. Nassawango swamp represents the northern limit of distribution for many species and supports a dense concentration of rare species.

Lawes Ditch harbors the northernmost breeding population of a songbird listed as In Need of Conservation in Maryland. In our State, this species is known only from the Pocomoke-Nassawango swamp ecosystem. This swamp forest also provides excellent habitat for many other wildlife species.

A butterfly listed as In Need of Conservation in Maryland, and known from fewer than 5 sites statewide, also occurs within wetlands at this site. It is found in conjunction with its larval food plant, a shrub considered State Rare. Both butterfly and shrub are predominately southern species and the shrub is known in Maryland only from the Nassawango area.

A rare fern listed as Threatened in Maryland and known from fewer than ten sites in the State is found in two locations at Lawes Ditch site. It grows in the damp soil associated with spring-fed seeps. A woody plant considered uncommon in Maryland, not currently threatened but in need of monitoring, grows in the forested swamp at this site.

In the nearby uplands are three additional rare species. A large colony of an attractive wildflower listed as Endangered in Maryland grows along the sandy roadsides. It is known from only one Maryland site outside of the Nassawango swamp area. A State Endangered butterfly and its State Threatened food plant also inhabit the sandy roadsides.

Site Name: **Litsea Pond**

USGS Quad: **Wetipquin**

PLEASE SEE SUMMARY UNDER SITE NAME "WETIPQUIN POND"; LITSEA POND IS AN INCORRECT NAME AND SITE HAS BEEN RENAMED WETIPQUIN POND.

Site Name: **Middle Plum Creek**

USGS Quad: **Sharptown**

This wetland complex contains a fine example of an Atlantic White Cedar swamp surrounded by a drier swamp forest of Red Maple and Sweet Gum. Cedar swamps are becomingly increasingly uncommon on the Delmarva peninsula. The forest canopy in the wettest areas of this site is composed of virtually 100% cedar.

Within the cedar swamp grow five plant species that are rare or uncommon in Maryland. A rare wildflower listed as State Threatened is widely distributed along the edges of the cedar swamp. A tiny State Rare plant grows abundantly in the wet peaty soils over more than one acre of the swamp. Three other plants in the cedar swamp are considered uncommon in Maryland, not yet threatened but worthy of monitoring due to declining or restricted populations.

Site Name: **Mockingbird Pond**

USGS Quad: **Hebron**

PLEASE SEE SUMMARY UNDER SITE NAME "BARREN CREEK"; MOCKINGBIRD POND HAS BEEN DELETED AS A SEPARATE SITE NAME AND INCLUDED AS PART OF BARREN CREEK.

Site Name: **Nassawango Creek**

USGS Quad: **Wango, Snow Hill**

The mature Bald Cypress-Black Gum swamp bordering Nassawango Creek is widely recognized by scientific and environmental organizations, including as the Smithsonian Institution, as one of the most important natural areas in Maryland. Much of the site is protected as a nature preserve by a non-profit conservation organization. These wetlands form a major portion of the Pocomoke-Nassawango cypress swamp ecosystem, the best representative of the cypress-gum swamp community north of Virginia. This swamp is one of the northernmost examples of this southern swamp type in the nation. The wetland communities along Nassawango Creek represent the northern limit of distribution for many species. They contain an unusual number of rare species occurrences per unit area.

More than 30 State Rare, Threatened or Endangered species have been documented within this site. Some of these grow within the Bald Cypress swamp and others occupy contiguous habitats. At

least 30 additional uncommon species inhabit the swamp and adjacent upland. Coastal Plain bogs, emergent marshes, shrub swamps and Atlantic White Cedar swamp all form part of the wetland complex along Nassawango Creek, and each supports native plant communities that include rare species. The large number of rare species reflects the unique plant and animal assemblages at this unusual site. Many species here are more characteristic of cypress swamps of the deep South. Others are nationally rare, including at least two species listed as Endangered under the U.S. Endangered Species Act.

Many of the cypress trees at Nassawango are ancient, reaching heights of 125 ft. and more, with circumferences up to 25 ft. These mature trees offer superb nesting sites for cavity-nesting birds, including Wood Duck, owls and forest interior breeding birds such as Pileated Woodpecker. The swamp is reported to have the greatest diversity of nesting warblers on the Atlantic Coastal Plain. It supports breeding populations of at least 14 warblers, including one species listed In Need of Conservation in Maryland. In our state this species is known only from the Nassawango-Pocomoke swamp system.

This wild, remote, and extensive swamp offers excellent habitat for many other wildlife species, such as river otter, raccoon, mink, gray fox, weasel, and flying squirrel.

That portion of the Nassawango Creek ecosystem within the Chesapeake Bay Critical Area has been designated as Lower Nassawango Creek Natural Heritage Area (NHA). Natural Heritage Areas are communities of plants and animals that are considered to be among the best statewide examples of their kind. Lower Nassawango Creek NHA was designated because it is a diverse and relatively undisturbed segment of the unique Pocomoke-Nassawango Swamp ecosystem. Preservation of the Nassawango Creek nontidal wetland of Special State Concern protects not only the habitats within its boundaries, but also the habitats within the NHA.

Historical reports suggest that more than 25 rare and uncommon species, including 7 State Endangered plants and one candidate for federal listing, are likely to occur in Lower Nassawango Creek NHA. Limited recent surveys have confirmed the presence of three State Endangered species. Two of these are plants of the intertidal zone, while habitat for the third species is provided by contiguous palustrine forest. Two State Rare plants and two plants considered uncommon but not yet threatened, have also been confirmed in the extensive complex of tidal and nontidal wetlands in the NHA.

Preserving the nontidal wetlands upstream from the NHA is essential if the water quality and quantity, species composition, and natural character of the NHA are to be maintained. The wetland vegetation upstream from the NHA reduces pollution and

flooding in the NHA by slowing water flow, filtering sediment and chemical pollutants, and utilizing nutrients. The upstream wetlands thus help maintain the natural environmental conditions that support significant plant and animal habitats within the NHA.

Site Name: **Parker Pond**

USGS Quad: **Salisbury**

Parker Pond is an old millpond/shrub swamp complex surrounded by a forest buffer and low-density residential development. A State Rare woody species grows along the banks of the former millpond, especially on the dike that separates it from the shrub swamp. This species is found in only two geographic areas worldwide -- on the Delmarva peninsula and in two counties in Oklahoma. In Maryland, it is limited to the upper reaches and tributaries of three rivers: the Nanticoke, Pocomoke, and Wicomico.

Two unusual herbaceous species grow in the wet soils and shallow waters at this site. Both are considered uncommon in Maryland, not currently threatened but worthy of monitoring due to declining or restricted populations.

Site Name: **Plum Creek Bog**

USGS Quad: **Sharptown**

Plum Creek Bog is a high quality sphagnum bog exhibiting a diverse flora, including five plant species that are rare or uncommon in the State. One of these is known from only one other site in Maryland and is listed as State Endangered. A particularly large population of one uncommon species blankets the bog in late June.

Sphagnum bogs are uncommon on the Eastern Shore, and most remaining bogs occur in powerline rights-of-way. Powerline maintenance sustains an open canopy at these sites. Many wetland plants are shade intolerant and thrive in these open rights-of-way. Historically, fire and beaver were largely responsible for the creation and maintenance of inland freshwater emergent wetlands. Current fire suppression practices and the decimation of beaver have eliminated similar habitat on the Eastern Shore.

Sphagnum bogs are wet, acidic, nutrient-poor habitats that are inhospitable to most plants. Instead, they harbor a group of interesting, peculiar plant species that are especially adapted to these harsh conditions. These often include rare species, carnivorous plants, and showy orchids. Many of these specially

adapted species have provided insights into the study of evolutionary processes.

Site Name: **Schumaker Pond**

USGS Quad: **Salisbury**

This old millpond along Beaverdam Creek is forested on one side and supports populations of three rare species. Design plans for a museum on the south shore of the pond were altered to provide a protective undeveloped buffer around the rarest species, a State Endangered sedge.

A few individuals of a State Rare tree grow along the wetland shoreline of the pond. This species is known from only two localities worldwide--the Delmarva peninsula and two counties in Oklahoma. In Maryland, it is limited to the upper reaches and tributaries of three rivers: the Nanticoke, Pocomoke, and Wicomico.

The center of the pond is inhabited by Southern Pond Lily, Waterweed (an invasive, non-native species), and a small, State Rare aquatic species. This plant is known from only two other locations in the State.

Site Name: **Sharptown Bog**

USGS Quads: **Sharptown, Hebron**

This floristically diverse sphagnum bog was surveyed in the summer of 1987 and was found to support at least thirteen plants considered rare or uncommon in Maryland. Large populations and the presence of both flowering plants and immature plants indicated that most of these species were represented by stable, successfully reproducing populations. Eight of the rare species are listed as Endangered in Maryland. For one of these species this is the only known population in the State. Three others are each known from just one other site in the State.

Sphagnum bogs support interesting, peculiar plant species. They often harbor several types of carnivorous plants as well as showy orchids. These species are especially adapted to the wet, highly acidic environment and have provided insight into the study of evolutionary processes.

Bogs are rare habitats on Maryland's lower Coastal Plain. Most of the remaining Eastern Shore bogs occur in powerline rights-of-way, where the removal of woody species for right-of-way maintenance sustains an open canopy. Many wetland plants are shade intolerant and thrive in these open habitats.

Historically, fire and beaver were largely responsible for the creation and maintenance of inland freshwater emergent wetlands. Current fire suppression practices and the decimation of beaver have eliminated much similar habitat on the Eastern Shore.

As of September 10, 1987 much of the powerline bog at this site was destroyed. Clearcutting of forest land upstream was initiated in late summer and timber was dragged through the powerline opening. The soil was rutted and 80% of the bog vegetation was destroyed. Large ruts remained in all wetland areas and the majority of the forested canopy upstream was removed.

In spite of this large-scale disturbance, one section of the bog remains and individuals (or plants) of nine of the thirteen rare and uncommon species survived. In most cases, population sizes were vastly reduced, but viable seed sources may remain and some species may recover.

Nevertheless, the logging operation caused extensive damage and continues to pose considerable threat. The loss of forest canopy upstream from the bog and heavy mechanical disturbance allows increased sedimentation in the bog and may change the hydrologic character of the site. In addition, weedy species are more likely to invade from open areas upstream. Therefore, the future of the rare plants is uncertain. Monitoring of the rare species and protection of their remaining habitat is now more imperative than ever.

Site Name: **Spearin Road Powerline**

USGS Quad: **Salisbury**

The Spearin Road Powerline site is traversed by a right-of-way which is kept free of woody species through active management. This open habitat contains emergent wetlands with sandy soils where six rare and uncommon species occur. In pre-settlement history, fires and floods created and maintained herbaceous wetland communities. Since these natural forces of disturbance are now artificially suppressed, one of the only remaining suitable habitats for species which require these open conditions is in and along powerline rights-of-way.

Four plants listed as Endangered in Maryland grow in the open wetlands at this site. All four are known from fewer than six other sites in Maryland. Two are sedges that occur over a five to ten acre area of the wetland. Another is an attractive wildflower that grows with one of the rare sedges and is known from just three other sites in Maryland. In addition, two herbaceous plants considered uncommon in Maryland and worthy of monitoring also grow in the sandy wetlands.

Adjacent upland meadows support a population of an Endangered wildflower. This population is vigorous, extensive, and reproducing successfully. More than 2,000 plants occur in an area of more than 20 acres. Two additional rare species were reported from this powerline in the early 1980's, but were not observed in 1987. This is the only recent sighting of one species on the Delmarva Peninsula, and one of two recent Delmarva sightings of the other species. Further survey may reveal that these two species still grow at the site.

Additional investigations of this area may also provide records of rare moths and the butterflies that favor the specialized plants growing in the unusual, open habitats maintained in the powerline rights-of-way.

Site Name: **Wetipquin Pond** **NOTE: THIS IS A CORRECTION FOR THE INCORRECTLY NAMED "LITSEA POND"**

USGS Quad: **Wetipquin**

This wetland is a Delmarva Bay with a surrounding strip of shrub swamp and a temporarily wet, narrow, outer ring of Red Maple Swamp forest. Most of the pond is dominated by Walter's Sedge with a dense understory of sphagnum moss. Delmarva Bays are shallow, centripetally-drained ponds or "bays" that are seasonally flooded during the winter and spring. By late summer, the bays dry out and a number of rare species grow in the exposed soils. Once common on the Eastern Shore, many Delmarva Bays have been ditched and drained for agriculture and have lost their characteristic native plant species. This site is one of the best statewide examples of a relatively undisturbed Delmarva Bay. Although the forest around the pond was logged approximately 10 years ago, an uncut forested buffer remained around the pond.

In the wettest areas of Wetipquin Pond grows a State Endangered shrub that is a candidate for listing under the U.S. Endangered Species Act. This is the only known location in Maryland for this species. The population at Wetipquin Pond is sizeable and vigorous, containing 20-30 nature shrubs plus numerous seedlings. A small population of a second State Endangered plant also occurs in the pond. This species is known from only five other sites Statewide.

Site Name: **Widow Swamp**

USGS Quad: **Salisbury**

This site is a small, wet, sedge meadow along a roadside. Naturally-occurring forest openings, created by flood and fire, once provided habitat for wet meadow species. Since these

natural disturbances have been largely suppressed by man, many species associated with wet meadows have become increasingly rare. The removal of woody vegetation in rights-of-way for roads and powerlines to some degree mimics the natural disturbances that were once more common. Where soil and hydrologic conditions happen to be just right, the open canopy habitat created by these artificial disturbances mimics natural habitats closely enough to support rare wet meadow species.

Three State Endangered plant species grow in the wet meadow at Widow Swamp. None of these species is known from more than five sites in Maryland, and one is nationally rare. Populations of all three are limited in number and extent at this site; fewer than 50 individuals of each species grow in an area smaller than 100 sq. ft. These rare plant populations are extremely vulnerable. They could be easily destroyed by local change such as ditching of the nearby stream, widening of the road, or detrimental changes in roadside maintenance techniques.

Site Name: **Williams Pond**

USGS Quad: **Delmarva**

This site contains a large, very wet swamp forest with a small open water pond. A deep pool in the swamp provides habitat for what has been reported to be the State's best population of a fish listed as In Need of Conservation in Maryland. This fish is restricted to acidic pools and other quiet, dark waters, usually near dense vegetation. Maryland is near the northern edge of the distribution of this species, which is more common in the southeastern states. Populations near the edge of a species' range are important to protect because they often differ genetically from more centrally-located populations. The genetic differences may help the species survive potential environmental changes such as climate changes due to global warming.

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Tawes State Office Building, E1
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WORCESTER COUNTY

Site Name: **Burbage Crossing Swamp**

USGS Quad: **Ninepin Branch**

Burbage Crossing Swamp is a diverse cypress swamp in the Pocomoke River floodplain. This old, high quality bottomland hardwood forest is dominated by Bald Cypress and old Red Oak trees. Examples of a mature community of this type are rare in Maryland. The forest's diversity of plant species and of age classes within species provides excellent habitat for a variety of wildlife species. The Pocomoke River swamp system is remote and extensive, and therefore supports species not found in more developed areas of the state.

Three rare or uncommon sedges grow in the moist forest floor of this protection area. Two of the sedges, listed as State Endangered, are each known from only three other sites in Maryland; none of the sites is protected. Another sedge growing in this swamp forest is uncommon in the state.

The Pocomoke River has been designated a Maryland Scenic River, and as a result already receives some protection. The protection of contiguous lands such as Burbage Crossing Swamp will contribute to the maintenance of the river's water quality, scenic beauty, and value as habitat for both plants and animals.

Site Name: **Campground Branch**

USGS Quad: **Public Landing**

This bottomland hardwood forest contains two State Endangered plant species and an uncommon tree species. The populations of all three rare species are large and widespread within the forest.

In addition, there is little evidence of recent, unnatural disturbance of the habitat. This swamp forest, dominated by oaks and Red Maple, is an excellent example of the now uncommon mature bottomland hardwood forest.

Many of the maples and oaks inhabiting the forest are quite large. Because such trees are usually harvested before they reach this size, old forest communities are becoming increasingly difficult to find in Maryland. Old forests provide habitat for specialized birds and insects which require dead or aging trees for food and shelter.

Because the forest is old and the only recent disturbance has been natural blowdown, the trees are well spaced. The blowdowns create sunny canopy gaps in a number of places which, along with a fairly open understory, makes it an unusual habitat. The two State Endangered plants, both sedge species, occur within these natural canopy gaps.

Site Name: **Colbourne Powerline**

USGS Quad: **Wango**

The Colbourne Powerline right-of-way supports three plant species which are rare or uncommon in Maryland, two of which are State Endangered.

Powerline right-of-ways have become significant habitat for a large number of threatened and endangered plant species. Powerline maintenance practices keep the right-of-way relatively free of woody species. In right-of-ways containing special soil types or hydrologic conditions, artificially maintained openings may mimic natural gaps. Historically, the major sources of natural canopy openings were forest fire and beaver activity. However, modern fire suppression practices, and the decline of beaver on the Eastern Shore, have nearly eliminated these natural forces.

Site Name: **Delaware Wildlands**

USGS Quad: **Whaleysville**

Delaware Wildlands, a 500 acre wooded wetland, harbors three rare animal species In Need Of Conservation and a State Rare shrub. One of the animal species, a rare interior-dwelling bird, requires large contiguous tracts of deciduous floodplain and swamp forests. It occurs at only three other locations in the state.

The rare shrub occurring in the understory of the swamp forest serves as the food plant for a rare insect species. This insect occurs at only three other sites in Maryland.

The third rare animal species, an amphibian, inhabits seasonally inundated wetland openings within the swamp and occurs at seven other locations in the state.

Site Name: **Dividing Creek Ponds**

USGS Quad: **Dividing Creek**

Dividing Creek Ponds Protection Area contains two Delmarva bays. Delmarva bays are now the only natural, herbaceous, non-riverine, freshwater wetlands left on the coastal plain. Because they are hydrologically connected to the groundwater, water levels vary both seasonally and annually, causing fluctuations in plant species and cover.

Once quite abundant on the Delmarva peninsula, many similar ponds have been destroyed by drainage and filling for agriculture and development. As Delmarva bays decline in number, so do the plant and animal species which rely on them for habitat. Remaining bays often harbor rare, disjunct, or endemic species specially adapted to fluctuating water levels.

One of the Delmarva bays is unusually large, about 3 acres in area. Late in the growing season when the bay has dried, six rare or uncommon herbaceous plants can be seen, four of which are State Endangered. For two of the Endangered species, a sedge and a grass, these are the only known populations in Maryland. One Endangered wildflower occurring at this site is known from only two other locations in the state.

One rare species was observed in a second smaller bay located to the north of the first. Further surveys may reveal the presence of other rare species.

The forested wetlands surrounded by mature pine forest provide essential habitat for forest interior breeding birds. Old forest conditions are rare in Maryland and have a multitude of values for wildlife.

The presence of two hydrologically different seasonal ponds, in close proximity, which harbor similar rare plants, makes this protection area a good site for ecological research pertaining to the rare species.

Site Name: **Furnace Road Powerlines**

USGS Quad: **Dividing Creek**

The Furnace Road Powerline is kept free of woody species through active management. This open habitat has boggy emergent wetlands and upland meadows inhabited by sixteen rare species. Four of the rare species are State Endangered. One of the Endangered species, a member of the Legume Family, occurs at only one other site in Maryland. A State Endangered sedge here has been found at only four other sites in the state.

In pre-settlement history, fires and floods created and maintained these communities. Since natural causes have been artificially suppressed, powerline right-of-ways provide some of the only habitat for species that require open conditions.

In a dry, forested area adjacent to the powerlines, small fires have eliminated shrubs and thinned trees so that much light reaches the forest floor. Two rare species occur here. This habitat type is now rare due to active fire suppression.

Within this large, unbroken, forested tract, woodland openings with herbaceous growth provide ideal feeding and resting grounds for deer, bobwhite, and numerous non-game species.

Site Name: **Hancock Creek Swamp**

USGS Quad: **Girdletree**

This large, mature, deciduous forest and swamp contains two rare plant species. One, a State Threatened wildflower, is known from fewer than fifty sites worldwide and is a candidate for listing under the U.S. Endangered Species Act. In Maryland, all of the known populations occur in Worcester County, which may be indicative of highly specific soil and hydrologic requirements. The population at this site is very large and appears to be reproducing successfully. The second rare plant species is an uncommon member of the Lily Family. The forest is also inhabited by many other species which are otherwise very uncommon on the lower Delmarva peninsula.

The upland hardwood forest and deciduous swamp forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

Site Name: **Ironshire Swamp**

USGS Quad: **Berlin**

Ironshire Swamp at its edge harbors a large and healthy population of a State Rare shrub, apparently a Delmarva Peninsula endemic. The low seed germination rate and poor seedling survival rate of existing populations of this species probably results from hydrologic alteration and sediment loading along the fresh intertidal estuarine shores where it grows. Of the five known occurrences of this species in Maryland, most are in Wicomico County, which may indicate highly specific soil and hydrologic requirements. This shrub species is a potential candidate for listing under the U.S. Endangered Species Act because of its extremely limited distribution.

Site Name: **Little Mill Run**

USGS Quad: **Girdletree**

This area includes Little Mill Run and its tributaries and a large millpond (Big Millpond). Within its diverse habitats, the area supports five rare plant species. A State Endangered fern species occurring along the stream is at the northeastern limit of its range and is known from only three other sites in the State. A State Threatened wildflower also grows along the stream. This plant species is known from fewer than fifty sites worldwide and is a candidate for listing under the U.S. Endangered Species Act. In Maryland, all of the known populations of this species occur in Worcester County, which may be indicative of highly specific soil and hydrologic requirements.

Two Highly State Rare and one State Rare aquatic plant species at this site all occur in the large millpond, relying on its still and pure water supply for their survival. One of these was last seen in 1978, the only recent record for this plant in the State. When it is present, it forms large spreading mats. Since this species appears irregularly, there is a good chance that it still exists in the pond. A second rare aquatic plant species here also represents Maryland's only record for the species. The third rare plant species reported from the large millpond also appears irregularly. It is known from only two other sites in Maryland.

This wetland complex contains a diversity of wetland types including forested swamp, shrub swamp, zones of emergent vegetation, aquatic bed and open water. The millpond is large (approximately 60 acres in size) and supports healthy Bald Cypress, both in the water and on land. This tree approaches its northern limit of distribution in Worcester County.

These diverse wetlands offer ideal nesting, feeding, and breeding grounds for resident and migratory waterfowl and songbirds. Fish and birds feed on the extensive Submerged Aquatic Vegetation in the millpond. Reptiles and amphibians inhabit the shallow marshes along the perimeter.

Site Name: **Longridge Powerlines**

USGS Quad: **Salisbury**

The bog-like wetlands within this right-of-way support five rare plant species and represent a habitat that is now rare in Maryland. The management of woody vegetation in the right-of-way has created a habitat that is similar, although not identical, to the herbaceous wetland openings historically created by fire and

beaver activity. The modern practice of fire suppression and the drastic decline of beaver populations have nearly eliminated this type of habitat on the Eastern Shore.

The rare species grow in the organic, saturated soil of the wetlands. This is the only known site in Maryland for one of the rare plants, a State Endangered sedge. This species varies greatly in abundance from year to year; hundreds of plants are present in some years. A State Endangered carnivorous aquatic plant species growing in this bog occurs at only three other locations in the state. A rare wildflower growing in this bog is listed as a State Threatened species.

Site Name: **Lower Sturges Creek Bog**

USGS Quad: **Wango**

The Lower Sturges Creek Bog contains a great variety of habitats and diversity of rare plant species. The sandy wetland and upland soils fall under an array of management practices creating a variety of habitats, including seasonal pools, wet meadows, sphagnous seepage areas, bogs, sandy grasslands, deciduous swamp forest, and deciduous and upland pine forest. Of the sixteen rare or uncommon plant species found in this great diversity of habitats, eight are State Endangered and one is State Threatened. Three of the Endangered Species, two wildflowers and a sedge, occur in only one other location in Maryland.

Many rare native plants that require wet, sandy, open habitats have been extirpated from Maryland. Preservation of this habitat type would help to prevent the further loss of species. Additionally, this area provides a variety of suitable habitats for recolonization. The variety of habitats also increases the value of the area to many animal species.

Site Name: **Mt. Olive Church Pond**

USGS Quad: **Wango**

This nontidal wetland complex includes a sphagnum bog which supports healthy populations of four rare or uncommon plant species, three of which are Endangered in Maryland. Two of these Endangered species are known from fewer than five other sites in Maryland. The populations here are, by far, the most vigorous in the State.

Sphagnum bogs are uncommon in Maryland, particularly on the Lower Coastal Plain. The plants inhabiting bogs are often peculiar and fascinating in their adaptations to the highly

acidic environment. For example, the Spatulate-leaved Sundew is a carnivorous plant that occurs in this bog. Insects trapped by the plant's sugary secretions provide nutrients to the plants.

Site Name: **Oak Hall Road Powerline**

USGS Quad: **Dividing Creek**

This powerline right-of-way contains two rare or uncommon plant species, one of which is State Endangered. Thought to have been extirpated from Maryland, three populations of the Endangered species have been found since 1987. None of these populations is protected. This population appears vigorous; seedlings as well as mature, fruiting plants were observed. An uncommon sedge also occurs at this site.

Many rare plant habitats on the coastal plain are in powerline right-of-ways. This is probably because powerline maintenance sustains an open canopy. Many wetland plants are shade intolerant and thrive in these open right-of-ways. Historically, the major natural forces responsible for the creation of open freshwater wetlands were fire and beaver activity. Forest fire suppression and the decline of beaver on the lower Eastern Shore have all but eliminated these habitats.

Site Name: **Pawpaw Creek**

USGS Quad: **Public Landing**

A steep, north-facing bluff adjacent to Pawpaw Creek supports a vigorous population of a rare plant species. Threatened in Maryland, this plant is found at only four other sites in Maryland, and is at the northeastern limit of its range. The State Rare sedge at this site inhabits low areas bordering a nearby pine forest. In addition, the aspect and steepness of the bluff along the creek provide habitat for other species that are uncommon on the Delmarva Peninsula.

Bluffs as high as 25 ft. line the creek, exhibiting a degree of topographic relief unusual for the Lower Coastal Plain. Several seeps are present and these, as well as the steep slopes, support vegetation more characteristic of the Piedmont. A diversity of wildflowers carpet the forest in spring.

Site Name: **Pikes Creek**

USGS Quad: **Girdletree**

The bottomland hardwood forest supports one of Maryland's few known populations of a rare wildflower. This plant species is Threatened in Maryland, is known from fewer than fifty sites worldwide, and is a candidate for listing under the U.S. Endangered Species Act. All of Maryland's populations occur on streambanks in Worcester County, which may be indicative of highly specific soil and hydrologic requirements. The population at this site is large and extends over 5 acres of the forest. The forest also contains many species which are typical of the Piedmont, but otherwise very uncommon on the lower Delmarva peninsula. Due to drainage and clearing, mature bottomland hardwood forests are increasingly uncommon on the Eastern Shore.

This hardwood swamp forest provides habitat for forest interior dwelling birds, amphibians, and reptiles.

Site Name: **Pocomoke Oxbow**

USGS Quad: **Ninepin Branch**

Pocomoke Oxbow is a 1/4 mile long meander of the Pocomoke River that is permanently isolated from the main branch as a result of river channelization in the 1940's. The oxbow now receives only periodic flooding of the Pocomoke River at times of high winter or spring flow.

The hardwood swamp forest adjacent to the oxbow is old and diverse. Portions of the forest have not been cut for approximately 70 years or more and therefore support large trees (especially cypress, Willow Oak, and maple). Except in areas which have been opened up naturally as a result of windthrow, there are few weedy species. Old forests provide specialized habitat for many animals, such as forest interior breeding birds. Such forests are becoming increasingly rare due to timber management practices in the region.

Two State Endangered species grow in the floodplain forest east of the oxbow. One is known from only three other locations in Maryland and the other occurs here at the northeastern limit of its range.

An outcrop of ferric rock forms a ridge running parallel to the stream channel about 100 yds. east of the oxbow. It is similar to the ferric material smelted in the old Nassawango iron furnaces and may represent one of the few remaining natural outcrops in the area that has not been mined.

The old oxbow functions as a pond which provides feeding, resting and breeding habitat for a variety of wildlife species, especially amphibians.

Site Name: **Porter Neck Bog**

USGS Quad: **Berlin**

Porter Neck Bog is a densely forested wetland which, at its margins and in slightly wetter areas, contains three species of rare plants. One, a State Endangered member of the Evening Primrose Family, is known from only one other site in Maryland. Another wildflower, listed as State Threatened, is an especially showy plant in the bog. An uncommon wildflower species has also been recorded at this site.

This pine-hardwood swamp forest provides high-quality habitat for amphibians, reptiles, and forest interior dwelling birds.

Site Name: **Powell Creek**

USGS Quad: **Girdletree**

The Powell Creek area contains a mature deciduous forest and swamp with one of Maryland's seven known populations of a rare wildflower. This plant species is Threatened in Maryland, is known from fewer than fifty sites worldwide, and is a candidate for listing under the U.S. Endangered Species Act. All known populations of this species in Maryland occur in Worcester County, which may be indicative of highly specific soil and hydrologic requirements.

Like other areas with this species, the forested area has many species which are otherwise very uncommon on the lower Delmarva peninsula.

The hardwood swamp forest and adjacent upland forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

Site Name: **Riley Creek Swamp**

USGS Quad: **Girdletree**

Riley Creek Swamp harbors a small population of a State Threatened plant species. This plant species is known from fewer than fifty sites worldwide and is a candidate for listing under

the U.S. Endangered Species Act. The seven known populations of this species occurring in Maryland are all located in Worcester County, which may be indicative of highly specific soil and hydrologic requirements.

Like other protection areas with this species, this forest harbors many species which are otherwise very uncommon on the lower Delmarva peninsula. The hardwood swamp forest and adjacent uplands also provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

Site Name: **Scarboro Creek Woods**

USGS Quad: **Girdletree**

The Scarboro Creek Woods area contains a large, mature, deciduous forest and swamp with one of Maryland's seven populations of a rare plant species. This State Threatened wildflower is known from fewer than fifty sites worldwide and is a candidate under the U.S. Endangered Species Act. All of the known populations in Maryland occur in Worcester County, which may be indicative of highly specific soil and hydrologic requirements. This population is large and widespread through the swamp. The presence of immature plants as well as mature, flowering plants indicates that the population is stable. The forest also supports many species which are typical of the Piedmont but very uncommon on the lower Delmarva peninsula.

The old upland pine-hardwood forest and adjacent bottomland hardwood forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

Site Name: **Scotts Landing Pond**

USGS Quad: **Boxiron**

Scotts Landing Pond is a one-acre seasonal pond. Seasonal ponds are centripetally-drained, nontidal wetlands and are considered unique natural communities because they are the only remaining naturally open freshwater wetlands on the interior of the Coastal Plain. These ponds are highly threatened because they are easily affected by agricultural drainage or other hydrological disturbances. This seasonal pond is unusual in that it very rarely dries. As a result, it is used as a year-round feeding site by many types of birds and other forms of wildlife.

Three rare herbaceous plant species inhabit this protection area. A State Threatened wildflower and a second rare species grow in the Red Maple-Loblolly Pine swamp adjacent to the

seasonal pond. A third rare species grows at the edges of the pond.

The pond also supports a variety of reptiles and amphibians. One of these is the Red-spotted Newt (Notophthalmus viridescens viridescens). The form found here is unusual in that it does not pass through the land stage (red eft) but remains aquatic throughout its life cycle, becoming sexually mature in the larval stage.

The salt marsh on the eastern side of the protection area provides nutrients for large numbers of invertebrates which form the basis of aquatic food chains.

Site Name: **Spearin Road Powerline Site**

USGS Quad: **Salisbury**

The Spearin Road Powerline Site is traversed by a right-of-way which is kept free of woody species through active management. This open habitat contains emergent wetlands with sandy soils where six rare and uncommon species occur. In pre-settlement history, fires and floods created and maintained herbaceous wetland communities. Since these natural forces of disturbance are now artificially suppressed, one of the only remaining suitable habitats for species which require these open conditions is in and along powerline rights-of-way.

Four plants listed as Endangered in Maryland grow in the open wetlands at this site. All four are known from fewer than six other sites in Maryland. Two are sedges that occur over a five to ten acre area of the wetland. Another is an attractive wildflower that grows with one of the rare sedges and is known from just three other sites in Maryland. In addition, two herbaceous plants considered uncommon in Maryland and worthy of monitoring also grow in the sandy wetlands.

Adjacent upland meadows support a population of an Endangered wildflower. This population is vigorous, extensive, and reproducing successfully. More than 2,000 plants occur in an area of more than 20 acres. Two additional rare species were reported from this powerline in the early 1980's, but were not observed in 1987. This is the only recent sighting of one species on the Delmarva Peninsula, and one of two recent Delmarva sightings of the other species. Further survey may reveal that these two species still grow at the site.

Additional investigations of this area may also provide recordes of rare moths and the butterflies that favor the specialized plants growing in the unusual, open habitats maintained in the powerline right-of-ways.

Site Name: **Stockton Powerlines**

USGS Quad: **Girdletree**

The open, bog-like wetlands within the Stockton Powerline right-of-way represent a habitat that was historically more common on the Eastern Shore when fire and beaver activity created openings with few trees or shrubs. The modern practice of fire suppression and the drastic decline of beaver populations have nearly eliminated these natural forces. The removal of woody vegetation in the right-of-way has created a habitat that is similar to, although not identical to, the herbaceous openings historically created by fire and beaver.

Four rare species of plants grow in the unusual wetlands of this right-of-way, three of which are State Endangered. This is the only site known in Maryland for an Endangered sedge that occurs here.

These wetlands are part of the headwaters of a creek that flows directly into the Chincoteague Bay. Protection of the wetlands and the adjacent uplands that flow into them will contribute to the maintenance of water quality in the bay.

Site Name: **Tanhouse Creek**

USGS Quad: **Public Landing**

The upland oak-Tulip Poplar forest and Red Maple-Sweet Gum swamp include many species that are characteristic of Piedmont forests but rare on the coastal plain. These species, including Bloodroot, Showy Orchis, and Cut-leaved Toothwort, are indicative of soils that are much less acidic than typical coastal plain soils. The high degree of relief along Tanhouse Creek is also unusual for this region and provides a variety of habitats along the elevation gradient.

Included in this atypical flora are seven rare or uncommon plant species. An extensive population of a State Threatened member of the Lily Family thrives along Tanhouse Creek's banks, one of only seven known occurrences in the state. This plant species is known from fewer than fifty sites worldwide and is a candidate for listing under the U.S. Endangered Species Act. All known populations of this wildflower in Maryland occur in Worcester County, which may be indicative of highly specific soil and hydrologic requirements.

The woods along Tanhouse Creek also harbor Maryland's only known population of another member of the Lily family. This Highly State Rare wildlflower occurs here at the northern extreme of its range. Protecting populations at the edge of a species'

range preserves the species' genetic variability and its ability to respond to environmental changes.

Five uncommon plant species inhabit this site. These species are not yet believed to be threatened, but are worthy of monitoring.

Any disturbance of the forest canopy cover at this site or in upland buffer areas would encourage the invasion of non-native weedy species. Maintenance of upland wooded buffer is also essential to preserving the hydrologic regime and water quality of the wetlands.

Site Name: **West Ocean City Pond**

USGS Quad: **Ocean City**

This large but shallow freshwater pond contains four rare or uncommon aquatic plants, two of which are State Endangered, among its beds of submerged and emergent aquatic vegetation. This pond is the only location for an Endangered emergent plant species which occurs as a dominant here.

In addition to providing habitat for the rare plant species, the West Ocean City Pond is a well-known stop-over for migrating and wintering waterfowl. The pond also provides feeding grounds for resident herons, egrets, ibis, gulls, and terns. Waterfowl and fish find a rich food supply in the large aquatic plant beds.

Further investigation of the pond's rich aquatic flora may yield the discovery of additional rare species, particularly during years of extremely low or high water levels. In addition, the pond is frequently used by birdwatchers who recognize the area as a good location to regularly find coastal resident species as well as unusual vagrants.