MARYLAND
NATURAL
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PROGRAM

MANAGEMENT PLANS FOR SIGNIFICANT PLANT AND WILDLIFE HABITAT AREAS OF MARYLAND'S WESTERN SHORE: ANNE ARUNDEL COUNTY

Prepared by

Katharine A. McCarthy
Judith L. Robertson
Richard H. Wiegand
J. Christopher Ludwig

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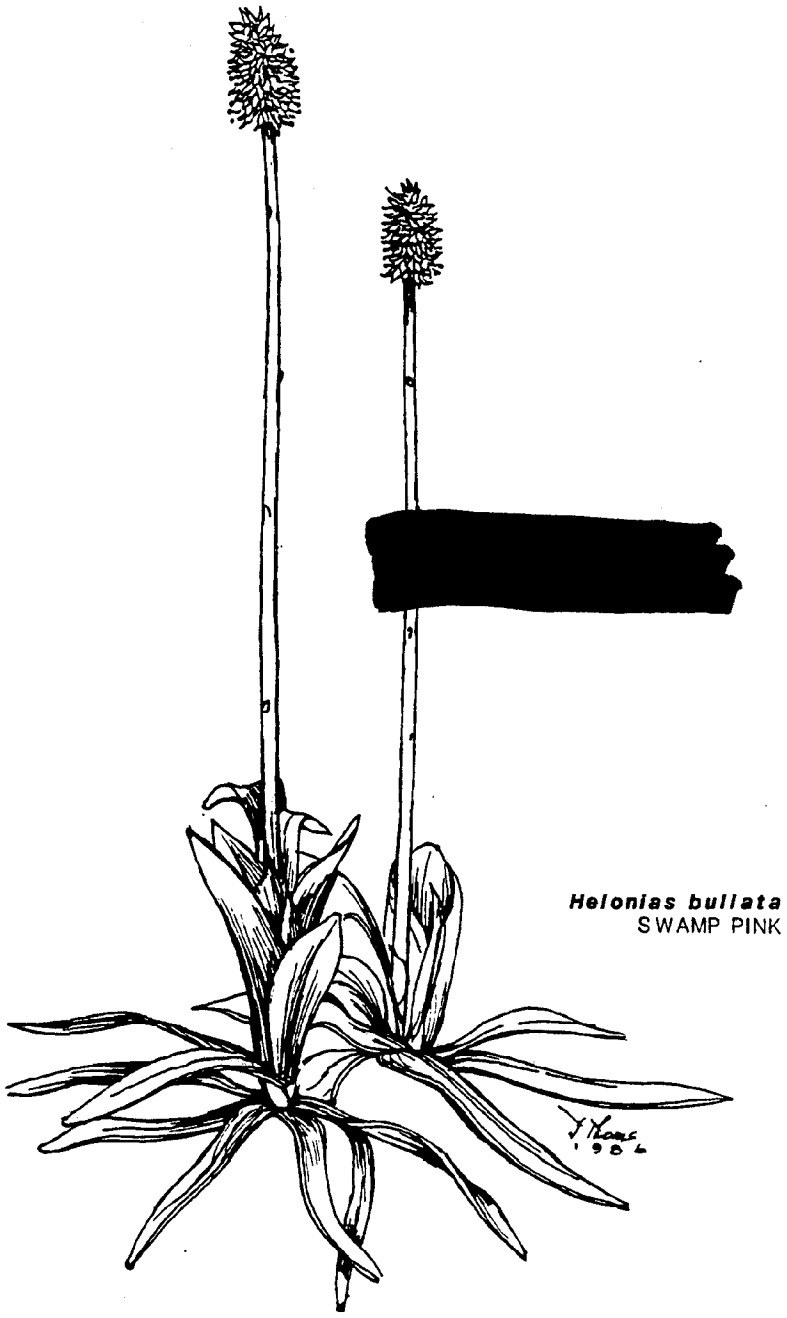

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FINAL REPORT

SUBMITTED TO:

Coastal Resources Division
Tidewater Administration

SUBMITTED BY:

Katharine A. McCarthy
Judith L. Robertson
Richard H. Wiegand
J. Christopher Ludwig

Maryland Natural Heritage Program
Forest, Park and Wildlife Service
Department of Natural Resources

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INTRODUCTION

In 1986 this project was initiated by the Coastal Resources Division of the Department of Natural Resources' Tidewater Administration. The task was designed to develop the information base and to determine the management mechanisms needed to implement an alternative approach to the State Critical Area Program for addressing the Federal Coastal Zone Management Act's requirement to designate Geographic Areas of Particular Concern (GAPC) and Areas for Preservation and Restoration (APR). Under the GAPC requirements, coastal states are to inventory and develop management measures to protect the integrity of "areas of unique, scarce, fragile or vulnerable natural habitat" and "areas of high natural productivity or essential habitat for living resources, including fish, wildlife, and endangered species and the various trophic levels in the food web critical to their well-being." Under the APR requirement, coastal states are to include in their Coastal Zone Management Programs "provisions for procedures whereby specific areas may be designated for the purpose of preserving or restoring them for their conservation, recreational, ecological or aesthetic values." This project covers the Coastal Plain Counties of Maryland excluding land within the Chesapeake Bay Critical Area.

To accomplish this task, a contract was awarded to the Maryland Natural Heritage Program, a division of the Forest, Park and Wildlife Service. The mission of the Natural Heritage Program is to identify and help preserve the biological and ecological diversity of Maryland. Since 1979, this program has been devoted to the collection of information about the State's rare, threatened, and endangered species and habitats. The program's extensive data base provided the basis for the identification of outstanding habitat examples on Maryland's Eastern and Western Shores.

By January 1987, the Coastal Resources Division and the Maryland Natural Heritage Program established specific objectives to accomplish the first phase of this project. These objectives were:

1. identify criteria for the selection of significant plant and wildlife habitat areas;

2. undertake field inventory of areas identified in existing studies and data files of the Maryland Natural Heritage Program that are likely to be of ecological significance, in order to identify species and habitats

associated with each site;

3. undertake field inventory of potentially significant habitats not previously identified in the database of the Maryland Natural Heritage Program in order to determine if rare species or habitats are associated with these sites;

4. determine threats to each area and determine management mechanisms for protecting the integrity of these areas;

5. determine protection boundaries for each site including needed buffer areas; and

6. collect other locational information needed in order to implement management mechanisms for each site.

These objectives combine to produce a protection package in which significant habitats (referred to as areas or sites) are assigned management mechanisms within a designated boundary. In accordance with the Natural Heritage Program's methodology, this area is then labeled a protection area.

In December 1987, the Natural Heritage Program reported on protection areas identified on Maryland's Eastern Shore from Kent County south. With financial assistance from the Coastal Resources Division, Baltimore and Harford Counties hired personnel in 1987 and 1988 to identify protection areas in their counties. In 1988, Prince Georges County funded a staff member (with financial assistance from the Coastal Resources Division) to identify protection areas on private property. Therefore, the Natural Heritage Program did not include Baltimore and Harford Counties in its survey and report of protection areas on the Western Shore, and focused only on public land in Prince Georges County.

Section 1 of this report provides a detailed description of the project methodology, scope of work, and the long-term framework established through the project. Section 2 provides Protection Area Summaries for significant habitat areas which have been identified. The Protection Area Summary contains information needed for site protection. A selection of applicable references follows Section 2. Appendix A contains a copy of the Department of Natural Resource's Regulations [COMAR 08.03.08] concerning the State's Threatened and Endangered Species.

SECTION 1

Procedures of Site Selection, Methods of Protection Implementation, and the Long-term Framework Established by this Project

INTRODUCTION:

This section provides all technical information on the project procedures from the planning stages, when habitat areas were selected for field survey, through the site visit, to the selection of the site for protection. Following this information, the report presents methods of implementing protection for selected sites. Finally, the long-term framework established by this project is discussed.

SITE IDENTIFICATION:

Sites identified for inventory were located throughout the Coastal Plain Counties excluding the Chesapeake Bay Critical Area. Significant plant and wildlife habitats were identified from the following categories of sites employing the methods described for each type.

1. Sites potentially inhabited by State Endangered or Threatened Species.

   Methods: Data concerning the habitat, phenology, and taxonomy of each listed species were gathered from regional floristic surveys and scientific literature. Sites were located by using the habitat data in conjunction with National Wetland Inventory maps, aerial infrared photographs, and county soil surveys. These sites were surveyed when the rare species potentially inhabiting the sites could be identified accurately.

2. Sites with historical occurrences (reported prior to 1980) of species determined to be rare by the Natural Heritage Program and found in their publication, Threatened and Endangered Plants and Animals of Maryland (Norden et al., 1984).

   Methods: For each species, data were gathered concerning habitat, phenology, and taxonomy. Many of the historical records provided only general locations for rare species. For these records,

more specific locations for survey were selected based upon habitat data supplemented by National Wetland Inventory maps, aerial infrared photographs, and county soil surveys. The field staff surveyed sites when the rare species could be accurately identified if found.

3. Non-tidal wetlands.

Methods: National Wetland Inventory maps and aerial infrared photographs were used to locate non-tidal wetlands. Particular attention was given to wetlands in State Parks, Forests and Wildlife Management Areas. Based upon the findings of "The Functional Assessment of Non-tidal Wetlands," a report completed for the Coastal Resources Division by the Maryland Natural Heritage Program (Bartgis 1986), these wetlands were assigned priorities for survey. High and intermediate priority wetlands listed below were candidates for intensive survey.

a. Non-tidal Wetland Complex, i.e., two or more contiguous wetland communities with one of the following traits:

   i. For complexes under 10 acres, presence of at least two wetland communities;

   ii. For 10- to 100-acre complexes, presence of at least four wetland communities; or

   iii. For complexes greater than 100 acres, presence of at least six communities.

b. Seasonal Ponds: wetlands occurring mainly on Pocomoke soils in centripetally-drained, seasonally flooded basins dominated by Walter's Sedge or Twigrush.

c. Bogs: highly acidic wetlands characterized by highly organic soils and/or sphagnum.

d. Palustrine Forested Deciduous Wetlands (PFO1) with at least one of the following characteristics:

   i. Seeps

   ii. Vernal pools

   iii. Well-developed stratification

e. Palustrine Forested Evergreen Wetlands (PFO4) dominated by Bald Cypress or Atlantic White Cedar.

FIELD INVENTORY:

Observations and data were collected in the field concerning the general character of each site, the degree of unnatural disturbance, and, if present, the condition of the rare species populations. Prior to surveying sites on private land, permission was obtained from landowners.

First, the natural features of each site were described, noting the dominant vegetation, aquatic features, physical relief, and natural disturbances (such as insect defoliation or trees felled by high winds). A list of the common plant species was developed and unique communities were identified and mapped.

When rare species were found, the size and extent of their populations were estimated. Staff members also estimated the proportion of the population that was flowering and fruiting, and marked the population on the general map of the site. The microhabitats of the rare species were described. If a population was large, voucher specimens of the rare species were collected and deposited with the Natural Heritage Program. Small populations of rare species were photographed for verification. If rare species were absent from historical locations, the habitat was assessed to determine if it could still support the species or if the habitat had been altered such that the species could no longer survive.

Finally, the habitat integrity of each site was assessed. Staff members recorded unnatural disturbances and their current and potential future effects on the habitat. For example, the presence of ditches in non-tidal wetlands was reported, and the effects of the ditches on wetland hydrology and vegetation were reviewed. Threats to the integrity of the habitat were discussed. Current and potential future uses of surrounding land were considered. In light of these threats, staff members recommended management activities intended to maintain the habitat and sustain the populations of rare species.

STRATEGY FOR SELECTING SIGNIFICANT SITES:

The selection of ecologically significant sites for protection was based on the following criteria which were assessed during the field inventory:

1. Site contains species that are considered by the Maryland Natural Heritage Program as Rare, Threatened or Endangered in Maryland (see Norden, et al, 1984). Many of these species are listed in the revised Department of Natural Resource's Regulations under COMAR 08.03.08.

2. Site contains one or more rare or ecologically unique natural communities.

3. Overall ecologic integrity of the site is high. Unnatural disturbances must be minimal or must be such that their effects simulate natural forces of disturbance.

4. Human-induced threats which could lead to the loss of the rare species or habitat(s) must be minimal.

5. Regulation and monitoring must be feasible so that activities (both on-site and nearby) can be limited to those that do not negatively impact the rare species and natural habitat(s). Required buffer zones must be available to ensure site protection.

6. Ecologic, scenic, or historic values other than those related to rare species and habitat protection may be present.

SITE PROTECTION IMPLEMENTATION METHODS:

Protection may be implemented in a variety of ways depending upon ecological significance of the site, type of ownership (public vs. private), seriousness of threats, degree of management required, and landowner preference. The various options confer varying degrees of protection security and of landowner control. They range from designations that afford no legal protection to acquisition by a conservation organization. The following list describes the available options and the degree of protection that they provide. Because the significance and consequences of each mechanism vary, some sites may be protected by a combination of methods.

Natural area protection may be accomplished by several types of organizations. Federal, State, and local governments (at the County as well as the municipal levels) have specific tools and mechanisms by which they may set aside or regulate land for conservation purposes. In addition, there are private organizations that can either protect lands on their own or

facilitate the efforts of the public sector. Many of the protection mechanisms listed below may be implemented by any of the aforementioned conservation organizations, while others may only be available to certain agencies or organizations.

The following methods afford protection to rare species habitat by outlining and assigning management responsibilities to a particular party:

1. Voluntary management agreement - landowner informally agrees to protect the rare species and habitat by not disturbing the site.

2. Registration - landowner signs a written, nonbinding agreement with the State's Department of Natural Resources, a county government, The Nature Conservancy, or another private conservation organization, officially recognizing the ecological significance of the site. Management needs are outlined and the landowner agrees to perform specified tasks to protect rare species and habitat.

3. Legally binding protection agreement - landowner enters a legally binding management agreement or leases the land to a conservation organization for management purposes. Conservation easements granted by the Maryland Environmental Trust, local government, and other private trusts (including The Nature Conservancy) impose certain land-use restrictions while conferring tax benefits to the landowner.

4. Zoning - the site may be zoned or rezoned as a conservation area in which land-use is restricted. Development may be highly regulated or prohibited. Such protection is usually accomplished on a county level through local ordinances.

5. Bequest or Right of First Refusal - landowner agrees to will land or give right of first refusal for acquisition to a State, county, or private conservation organization at some undetermined time in the future.

6. Acquisition - landowner conveys property to a conservation organization or public agency. The transfer may be a donation, a bargain sale (i.e., below market value) or a fee simple (i.e., full market value) transaction. The first two types of transaction confer tax benefits to the landowner. All rights to the land belong to the buyer and

management is directed toward the protection of rare species and habitat(s). In some cases, acquisition may occur with the retention of a life estate for the owner. This allows the landowner to continue to live on and have restricted use of the property until death, at which time the buyer obtains full control.

The following methods are designations which afford no current protection but which serve to acknowledge the ecological significance of a site and which may be used to stimulate further protection efforts:

1. National Registry of Natural Landmarks - land which is determined to be a nationally significant example of the Nation's natural heritage may be designated a National Natural Landmark by the Secretary of the Interior.

2. Sensitive Management Areas - land within the State Park System which is considered in need of special protection because of its unique and fragile physiography, flora, and fauna may be designated a "Sensitive Management Area" and is reserved for only those activities compatible with preservation.

3. Maryland Wildlands Preservation System - land which has retained its wilderness character or which has rare species or similar features of interest worthy of preservation for use of present and future residents of the State may be termed "wildland."

4. Natural Heritage Area - land which meets all three of the criteria listed in the revised Regulations under COMAR 08.03.08 Threatened and Endangered Species may be designated a Natural Heritage Area subject to the approval of the Secretary of Natural Resources.

Information provided in the Protection Area Summaries of this report is used to assess the degree of protection needed.

LONG-TERM FRAMEWORK:

This project provides a foundation for tasks to begin in 1989. These tasks, described below, involve the further identification and protection of significant habitats within the coastal zone.

In 1989 the focus of this project will be the protection of significant habitats identified in 1987 and 1988. Efforts were initiated in 1988 to protect significant habitats imminently threatened by development or other human-induced habitat alterations. These efforts will be expanded in 1989 to include additional significant habitats of highest priority for protection. Substantial effort will be required to protect each site, and this task should continue into the 1990s.

Next year the methodology developed in this project will be used to continue to identify significant plant and wildlife habitats in the Coastal Plain of Maryland. Protection Area Summaries identical in format to those prepared in 1987 and 1988 will be completed for significant habitats. These sites will be candidates for protection within the framework of this project.

SECTION 2

Protection Area Summaries

INTRODUCTION:

The remainder of this report contains site-specific protection information for all selected areas. Each of these areas is reviewed in a Protection Area Summary (PAS) that describes the protection area, its values, and its protection needs. The PAS is composed of several parts, each of which is discussed below. Format and content are best understood with the insight provided in this section.

Protection Area Name - An identifying name has been assigned to each protection area. This is usually based on the site's location and/or habitat type.

County - The county in which the protection area is located is given.

USGS Quad(s) - Identifies the United States Geological Survey topographic map(s) on which the protection area occurs.

SUMMARY OF ECOLOGICAL SIGNIFICANCE - States the major reasons for protecting the site. The features of greatest ecological significance are described, such as the presence of rare species or unique habitat.

OTHER SIGNIFICANCE AND VALUES - This section describes other important aspects of the protection area.

The value of the protection area to wildlife and for ecosystem maintenance may be discussed. In setting aside rare species habitat (which includes additional buffer land), a safe haven is provided for wildlife and for the perpetuation of the natural processes that sustain the ecosystem.

Many of the proposed protection areas are adjacent to or part of designated management areas. They may overlap with or abut State Forests or Parks, State Scenic Rivers, Natural Heritage Areas or Nature Conservancy preserves. By increasing the size and/or protection of these areas, their ecologic and scenic values may be enhanced.

THREATS AND MANAGEMENT NEEDS - Both potential and current threats to the rare species or to the natural habitat are described. These are generally related to human-induced habitat alterations, such as forest cutting, hydrologic alteration, vehicular traffic, or powerline maintenance practices. In some cases, however,

there are natural threats such as insect infestation or natural succession.

Specific management recommendations are then given. Voluntary management agreements are often suggested. In some cases, monitoring of rare species populations is recommended. Such studies are needed in order to learn more about the demographics and ecological requirements of the rare plants and to provide warnings of serious population declines.

BOUNDARY RECOMMENDATIONS - The proposed protection area is delineated by a line termed the protection area boundary. The habitats to be included within this boundary are described and the reasons for their inclusion are given. Within this boundary the threats listed in the previous section should be avoided to protect the significant habitat and rare species. Land within the Chesapeake Bay Critical Area is not included within the boundaries of the protection areas.

Within the protection area boundary, a buffer has been placed around the core rare species habitat. This zone consists of adjacent land needed to protect the critical habitat from the impacts of land use in surrounding areas. When the critical habitat is a wetland, lands which drain into it are included as buffer. Surrounding forest may be designated for many reasons. These include maintaining canopy cover to prevent the invasion of weedy or non-native species, stabilizing soils to prevent sedimentation of waterways, filtering out chemicals or excess nutrients, and maintaining hydrology.

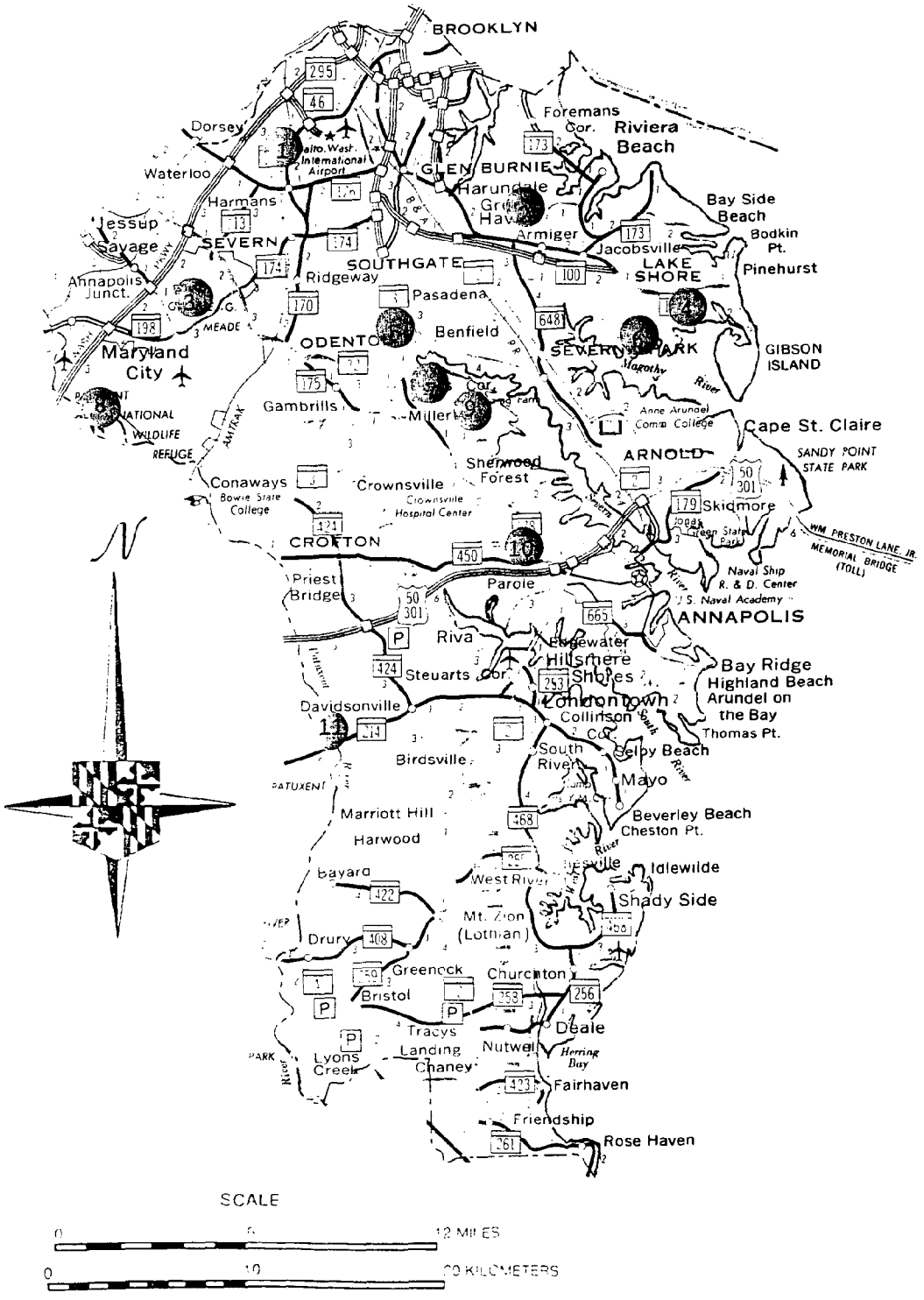
The delineation of buffers varies depending on the type of habitat, surrounding land use, habitat requirements of the rare species, local hydrology, and possible future threats. Reasonable and effective buffers were determined after careful consideration of these factors.

Maps (with a scale of 1:24000) and additional information concerning boundary locations are available from the Natural Heritage Program.

SITE DESCRIPTION SUMMARY - Finally, a general description of the protection area is given. Each natural community is discussed and its relationship to surrounding communities is described. Often the hydrologic regime of the community and the range of seasonal variability of water table depth are provided. Dominant trees, shrubs, and herbaceous plants are listed.

Note: Common names for species are used throughout the Protection Area Summary except when no common name is available. When a specific species is named, the common name is capitalized.

ANNE ARUNDEL COUNTY



= Locations of Protection Areas of significant habitat. Sites are numbered in order from north to south. (See page 13 for Protection Area names corresponding to numbers given above.)

ANNE ARUNDEL COUNTY: Protection Area Locations

Protection Area	Site # on County Map
Benfield Bottomland	5
Fort George G. Meade	3
Freetown Swamp	2
Gumbottom Wetland	9
John Wesley Church	7
North Gray's Bog	4
Patuxent Maple Swamp	11
Patuxent Wildlife Research Center	8
Shady Pond	6
Stony Run	1
Watershed Woods	10

Site # on County Map	Protection Area
1	Stony Run
2	Freetown Swamp
3	Fort George G. Meade
4	North Gray's Bog
5	Benfield Bottomland
6	Shady Pond
7	John Wesley Church
8	Patuxent Wildlife Research Center
9	Gumbottom Wetland
10	Watershed Woods
11	Patuxent Maple Swamp

PROTECTION AREA SUMMARY

Protection Area Name: Benfield Bottomland

County: Anne Arundel USGS Quad: Odenton

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Excellent examples of deciduous and mixed pine-deciduous bottomland forests border the streams that flow through this protection area. 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 more common on the Eastern Shore.

In the dense cover of shrubs, vines, and herbaceous species that borders the main stream grows a rare plant that is known from only four other sites in Maryland. The population along this stream is extensive. Patches of the rare species dot one mile of the stream's eastern bank. More than one thousand plants occur within the protection area. 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 rare species grows in the semi-permanently flooded bottomland forest downstream from the other rare species. This species is known from just seven other sites in the State.

OTHER VALUES AND SIGNIFICANCE:

The large, contiguous forest within this protection 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.

THREATS AND MANAGEMENT NEEDS:

Threats

The rare plants are intermittently flooded by the main stream and a decline in the water quality or flow rate of this stream may be detrimental to these species.

The cutting of trees within and near the protection area may cause erosion and sedimentation of the bottomland. Non-native, weedy species may invade the openings created by cutting trees. Already Japanese Honeysuckle grows in a few areas near the stream and may exclude the rare plants from these areas.

Management Needs

Activities that would alter the quantity of water flowing through the protection area should not be permitted. In addition, activities that would reduce the water quality of the main stream or its tributaries should not be permitted.

The cutting of trees should not occur within the bottomland of the protection area and on the adjacent slopes unless required for safety along the county roads that bisect the protection area. Plans to clear land adjacent to the protection area should be reviewed for potential effects on the rare species' habitat.

The size and reproductive success of the rare species populations should be monitored. The size of populations of non-native species should be monitored. If the non-native species appear to threaten the rare species, steps should be taken to control the growth of non-native species.

BOUNDARY RECOMMENDATIONS:

The protection boundary incorporates the rare species bottomland habitat and adjacent forested slopes that drain into the bottomland.

SITE DESCRIPTION SUMMARY:

Sweet Gum, Red Maple, and Greenbrier dominate the bottomland of this 540 acre protection area. Grasses are also abundant. Where the bottomland is narrowest and the adjacent slopes are steep, Loblolly Pine is abundant. A rare species grows along one mile of the stream channel, both near the stream and near the upland. The sandy uplands support a forest of Chestnut Oak, Southern Red Oak, White Oak, Pitch Pine, and Virginia Pine.

Mountain Laurel and blueberry are common in some sections but the herbaceous cover is sparse.

Businesses and private homes nearly surround the protection area. Roads bisect the protection area near the southern and western borders. A large powerline crosses the western end of Benfield Bottomland.

Prepared by: Katharine A. McCarthy

Date: December 1988

PROTECTION AREA SUMMARY

Protection Area Name: Fort George G. Meade

County: Anne Arundel

USGS Quads: Laurel, Odenton

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Over 6900 acres of nearly contiguous forest occur on Fort George G. Meade south of Route 198. Approximately 1200 acres of this area is old bottomland and swamp forest within the 100 year floodplains of the Patuxent and Little Patuxent Rivers. 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 forest interior species 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. In conjunction with research at the adjacent Patuxent Wildlife Research Center, biologists of the U.S. Fish and Wildlife Service are studying these birds at Fort Meade. Censuses of breeding birds conducted by staff of the Research Center reveal that four forest interior birds are common throughout Fort Meade. Eleven forest interior species were reported from at least half of the stations censused. Several of these birds feed and nest on or near the ground and are vulnerable to predation and brood parasitism. These threats are greatest near the edges of forests and in small patches of forest.

All but one of the forest interior breeding birds that inhabit Fort Meade require the habitat provided by an old forest. Some of these species, such as the Pileated and Hairy Woodpeckers, nest in the cavities of large old trees. The Red-shouldered Hawk requires large trees to support its big nest.

The Ovenbird nests on the ground and requires the well-developed leaf litter of an old forest for its nest. Most of the forest interior species require the well-developed canopy of an old forest. The birds feed on insects that inhabit the canopy, understory, and shrub layer. Ground-feeding birds consume insects that inhabit the decaying logs of the 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.

OTHER VALUES AND SIGNIFICANCE:

The old forests also provide excellent habitat for native plants, including potential habitat for many rare species. The decaying logs of the old forest return nutrients to the soil and support soil fungi that enhance the nutrient and water absorption of native vascular plants. Non-native, weedy plants thrive in the increased sunlight and disturbed soil of forest edges and young forests. These weedy plants outcompete native herbaceous species. The forests of Fort Meade have not been surveyed for rare plants, although one rare species is known to grow along the Patuxent River. Twenty-six records of rare plants have been historically reported 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 older forests of Fort Meade also provide habitat for a variety of wildlife in addition to the forest interior dwelling birds. 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. Flying Squirrel and Eastern Gray Squirrel nest in the cavities of large, old trees. Bobcat have been reported occasionally. Beaver, geese, and a variety of ducks inhabit the swamps and marshes along the Patuxent and Little Patuxent Rivers and their tributaries. The populations of deer and fox are managed by regulated hunting and trapping. The fields maintained on Fort Meade offer feeding grounds for these game species.

The swamps of Fort Meade offer other unique biological resources. A species of nematode controls the mosquito population in the swamp along the Patuxent River. A Sycamore over 4 ft. in diameter inhabits the swamp along the Little Patuxent. In addition, the swamps and adjacent forested uplands that drain into them filter sediment and other pollutants that would otherwise flow downstream in the rivers.

Sites of historical significance, including old cemeteries, school houses, and meeting houses, have been discovered on Fort Meade.

THREATS AND MANAGEMENT NEEDS:

Threats

Clearing of the forests and drainage or filling of the wetlands are the greatest threats to the forests of Fort Meade. Clearing will further fragment the forests and reduce the populations of forest interior species which are already declining in this region. Many of these species require both extensive, contiguous forest cover and the habitat provided by an old forest. Clearing would also eliminate potential rare species habitat. Silvicultural management of these forests reduces the habitat quality for species of native plants, including many rare species, and for some forest interior species of wildlife.

Change in the quantity or a decline in the quality of water in the wetlands of Fort Meade will alter the composition of vegetation and potentially destroy both the rare plants and the unusual nematode that inhabit these wetlands. Loss of wetlands would increase flooding downstream.

Management Needs

Large tracts of contiguous forest, both upland and bottomland forest, should be designated as natural areas in which forest will not be cleared and silvicultural management will not be conducted. This will protect habitat for forest interior species and maintain the suitability of the forests for biological and ecological research. Any timber harvest or clearing planned outside of these natural areas should be conducted so that forest fragmentation is minimized. Broad forested corridors should be maintained between clearings. Any planned timber harvest or clearing should occur along the edges of existing forest. The creation of clearings that form isolated unforested patches or peninsulas surrounded by forest should be avoided.

In order to protect the water quality of the Patuxent River, maintain the vegetation composition of the wetland, and protect important wildlife habitat, the floodplain of the Patuxent and Little Patuxent Rivers should remain forested. Clearing of trees should not occur in the floodplain or on the upland slopes that drain into these rivers in order to avoid sedimentation and pollution of the rivers. Activities planned upstream from Fort Meade should be designed to eliminate potentially detrimental effects on the water quality of the rivers and wetlands of Fort Meade.

Surveys for rare species should be conducted at Fort Meade. Protection area boundaries should be determined based upon the results of these surveys, ongoing surveys of forest interior breeding birds, and wildlife surveys.

BOUNDARY RECOMMENDATIONS:

Further survey is needed to determine the protection boundary for this site. The protection area will include large contiguous tracts of forest along the Patuxent and Little Patuxent Rivers plus large contiguous tracts of upland forest south of Route 198.

SITE DESCRIPTION SUMMARY:

Bottomland Forests of Tulip Tree, Pin Oak, Sycamore, Sweet Gum, and Red Maple border the Patuxent and Little Patuxent Rivers in Fort Meade. Pin Oak and Sycamore are common in the swamps near the rivers, while Tulip Tree and Sweet Gum are frequent in the well-drained bottomlands. The shrub layer is extremely dense in many areas near the rivers.

Beech and species of oak dominate the upland forests. Where land was previously cultivated or cleared, pines are abundant.

A more complete description of the vegetation will be prepared after future survey.

Railroad tracks border the Fort to the north and east. Gravel pits occur on the Fort, primarily in the northern and eastern portions of the property. Streams have been dammed to create two lakes on the Fort. Most of the buildings and clearings for military activities are located in the northern portion of the property near Route 198. A number of clearings also occur on Trainfire Road, which leads from the Little Patuxent River south to the Patuxent River near the center of the property. A large powerline crosses the Fort from the Baltimore-Washington Parkway at the western edge of the property south and east generally paralleling the Patuxent River. Numerous roads cross Fort Meade. Patuxent River County Park borders the Fort to the southeast and west along the river. Aside from this park and nearby Federally-owned lands, most of the surrounding land has been developed for residential and commercial purposes.

Prepared by: Katharine A. McCarthy

Date: December 1988

PROTECTION AREA SUMMARY

Protection Area Name: Freetown Swamp

County: Anne Arundel USGS Quad: Curtis Bay

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Excellent examples of two rare plant communities occur within this protection area, a Red Maple-Sweet Bay Swamp and Mature Pine-Oak Forest. 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. Vegetation studies of the Baltimore-Washington, D.C. area conducted in the early 1900s 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 these sandy, well-drained uplands and in the highly acidic, sphagnous swamp. Among the species that grow in this stressful environment is a plant which is known from just three sites in Maryland. This species inhabits the acidic swamp and appears to thrive on the fresh water flowing through the adjacent sandy ridges. 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.

OTHER VALUES AND SIGNIFICANCE:

A nature trail planned to traverse the swamp and adjacent upland forest 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.

THREATS AND MANAGEMENT NEEDS

Threats

Changes in local hydrology may eliminate the rare species. This species occurs only in the wettest sections of the swamp.

Clearing of land near the swamp would encourage the intrusion of non-native, weedy species that may exclude the rare species. Also, clearing of the adjacent sandy ridges and along feeder streams would promote soil erosion and the sedimentation of the wetlands.

The rare species is an attractive wildflower that may be destroyed by collectors.

Management Needs

Residential development plans for the surrounding uplands should be designed to protect the hydrology of the swamp. Once these plans are implemented, the water level and water quality in the swamp should be monitored in order to determine the success of the water flow system. Data should be gathered prior to development for comparison.

The maintenance of a forested buffer is essential if the rare species is to survive. Clearing of the upland forest should be minimal wherever possible. The encroachment of weedy species should be monitored. Removal of these weedy plants may be required.

Local residents should be informed of the significance of the rare species population in order to generate interest and concern for the protection area. Literature concerning the rare species and unusual plant communities should be distributed to residents of the future housing development. A committee of local residents and biologists should be formed with the purpose of safeguarding the rare species and plant communities. The committee should actively monitor the protection area, develop plans to correct problems identified through monitoring, and implement these plans with the help of other local residents.

BOUNDARY RECOMMENDATIONS:

The protection area includes the rare species wetland habitat and adjacent forested uplands that drain into the wetland. A 50 ft. forested buffer along feeder streams is included to protect the water quality of the wetland.

SITE DESCRIPTION SUMMARY:

Sandy ridges border two small, perennial streams that converge within this 47 acre protection area. Pitch Pine and Virginia Pine dominate the overstory on the sandiest ridge, with Vaccinium spp. and greenbrier the dominant shrubs. The stream in the broader valley is bordered by a swamp of Red Maple, Tulip

Tree, and Sweet Pepperbush. In a narrower valley, the second stream flows through a wetter, sphagnous swamp of Red Maple and Sweet Bay bordered by the sandiest ridges. A variety of shrubs inhabit this swamp. Bellwort is abundant on the sphagnum mats. The well-drained, sandy ridges play an important role in recharging the water table of this swamp.

A large population of Periwinkle marks an old house site near the convergence of the streams. An old road is evident near the house. These are the only visible artificial disturbances to the swamp. Large stands of mature pines remain, but most of the uplands were logged within the last 50 years. These areas are dominated by oak and pine. Another old road crosses the uplands. To the east and north are homes and businesses within 400 ft. of the swamp.

Prepared by: Katharine A. McCarthy

Date: November 1988

PROTECTION AREA SUMMARY

Protection Area Name: Gumbottom Wetland

County: Anne Arundel USGS Quad: Round Bay

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This protection area 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. Only five bogs are known from Maryland's Western Shore, and these unique habitats warrant protection.

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, a showy orchid, and eleven rare species. One of the rare species is known nowhere else in Maryland. Two others occur in only six additional sites in the State. 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. One of the carnivorous plant species occurs in only one other location 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.

OTHER VALUES AND SIGNIFICANCE:

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" and 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.

THREATS AND MANAGEMENT NEEDS:

Threats

Development pressure threatens this site, especially on the uplands where forest cover is essential for protecting the quality and quantity of water in the wetland below. All of the rare species in the bog are dependent on the maintenance of the groundwater table and of the natural chemical composition of the water.

An increase in drainage from the wetland would threaten the existence of the bog. Such a change in drainage could result from dredging or widening the channel or culvert downstream from the bog or from changes to the road that serves as a dam for the bog. With greater drainage, trees would establish in the bog and eventually eliminate the rare species.

A gravel mining operation upstream could allow runoff containing sediment or pollutants to enter the stream below. Runoff from roads is another potential problem, especially from the road that bisects the wetland below the bog. When a connecting road was constructed uphill, a sediment control slope and rock-lined reservoir were constructed a short distance uphill from the bog. This project involved the removal of a large swath of trees and seems unnecessarily obtrusive. Both this clearing

and the road allows sunlight to penetrate the adjacent forest and thus encourage the growth of non-native, weedy, sun-loving species.

The crests of the steep slopes north of the bog are badly eroded due to heavy foot-traffic and runoff from the adjacent cleared recreational fields. The forest buffer appears to be wide enough at present to absorb this runoff and sediment load before it reaches the wetland. If this forest buffer were removed or narrowed, sediment reaching the bog would be extremely detrimental to the rare species and could destroy the bog.

North of the bog, trash dumped near the base of the slopes interferes the scenic qualities of the area and may pollute the wetland.

The sphagnum mat and rare species growing on it are vulnerable to compaction and trampling. Several of the rare species are attractive plants that might be collected by unscrupulous or uninformed wildflower enthusiasts. One species is a showy perennial plant that takes several years to reach reproductive maturity. This population is small and particularly vulnerable.

Management Needs

It is critical that an effective forest buffer be maintained to protect the hydrology of the rare species habitat and prevent the encroachment of non-native, weedy species. Within the protection area no clearing or forest cutting should be allowed. It is likely that development will occur on the more distant parts of the watershed above the wetland, but cooperation should be sought with developers to minimize the clearing of steep slopes and other activities deleterious to water quantity and quality in the watershed.

Outflow from the gravel mining operation should be monitored to insure that runoff does not impair the quality of the water in the stream.

No dredging, widening, or draining should be permitted on the stream below the bog. The road should not be widened or altered in a way that would affect the hydrology of the wetland.

Erosion should be monitored on the steep slopes, and installation of erosion control devices may be recommended in the future.

A cooperative effort with local citizens should be undertaken, perhaps through the local county park, to clean up the trash along the slopes near the park.

Because of the delicate nature of the bog habitat and its associated plant species, the location of the bog should be revealed only to those who are involved in protecting the site. Visitors should observe the bog from its edges, rather than walking onto, and thus compacting, the sphagnum mat. If developments such as walking trails or a nature center are contemplated, they should be focused on less fragile areas such as the scenic ravine south of the road, or the shrub swamp. A nature trail could be developed on an existing old road and trails south of the shrub swamp, perhaps with a boardwalk extension into the shrub swamp where the important ecological role of wetlands could be illustrated.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the wetland complex, including the rare species habitat, and a forested buffer. The forested buffer near the bog and shrub swamp extends to the crest of the hills on each side of the wetland. Upstream, the buffer extends approximately 150 ft. on each side of the stream. Downstream from the shrub swamp, the boundary includes the buffer along the stream to ensure maintenance of the hydrology of the wetland. The buffer extends to the edge of the Critical Area, which contains important natural habitats near this stream, but which is outside the scope of this report. The buffer is approximately 300 ft. in width near the road and 100 ft. downstream.

SITE DESCRIPTION SUMMARY:

At the downstream (eastern) end of this 161 acre protection area is a floodplain forest dominated by Red Maple, Skunk Cabbage, and Cinnamon Fern. The road above the floodplain forest functions as a dam, maintaining the inundated state of the wetlands upstream. A vast Red Maple swamp extends approximately 2000 feet upstream. The maples grow on hummocks dominated by Tussock Sedge. Southern Pond Lily grows in the water channels between hummocks. The adjacent woods south of the swamp are dominated by oaks with American Holly and Highbush Blueberry in the understory.

On the northern side of the swamp near the road is an elevated bog with a thick mat of sphagnum moss upon which grows a diverse array of typical bog species, most of them rare in Maryland. In the open areas lacking shrubs two carnivorous species grow, one of them abundantly. Also found in the open bog are several rare sedges. Both dominant shrubs are rare species, one of which is very abundant and extends into the edge of the maple swamp. Occasional small Red Maples and Smooth Alders are found at the edges of the bog. In the open water channels

running through the bog Southern Pond Lily grows abundantly. Small pools contain several species of bladderworts. The lower slopes of the adjacent forest exhibit the hydric soils of groundwater-influenced seeps. Hardwood swamp species such as Sweet Bay and Black Gum predominate, with a luxurious herbaceous layer of Cinnamon Fern, Netted Chain Fern, and club moss. Higher up the slopes are dominated by species of drier habitats such as Chestnut Oak and White Oak, with young Sassafras, Red Maples, and oaks in the understory. The upper slopes are bare in some places, and are crossed by with numerous highly eroded trails. Just above the slopes are the level, cleared ballfields and playground of a county park.

Upstream from the marsh the natural area narrows to a small strip of land along the stream as the stream near a mining operation. Farther upstream the stream is composed of two branches, both forested. Vegetional surveys have not yet been conducted in this area.

Prepared by: Judith L. Robertson

Date: November 1988

PROTECTION AREA SUMMARY

Protection Area Name: John Wesley Church

County: Anne Arundel USGS Quad: Round Bay

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

John Wesley Church Protection Area contains an unusually high quality wooded swamp bounded by forested, steep slopes. Swamp forests of this size and maturity are rare due to draining and filling for agriculture, development, 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 rare species grows among the diverse herbaceous species on the wooded slopes. 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.

OTHER VALUES AND SIGNIFICANCE:

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 at Arlington Echo Outdoor Center. The 1970 report "Scenic Rivers in Maryland" recommended this site as a "natural use area". It was also recommended in 1986 as one of the "Natural Areas of Highest Priority for Preservation". Gems of the Severn (1988) recommends the preservation of this site for passive recreation, a wildlife reservation, and possible extension of Arlington Echo Outdoor Center. Waters from this swamp forest feed into the Severn River, designated in 1970 as one of Maryland's Scenic Rivers. Non-tidal wetlands such as this are increasingly valued for their role in protecting the water quality of the rivers they feed and ultimately, the Chesapeake Bay.

THREATS AND MANAGEMENT NEEDS:

Threats

The major threats to this site are potential development of the uplands and clearing of the forested slopes. Logging or clearing may cause sedimentation and changes in hydrology that would be detrimental to the rare species and other native vegetation in the wetland. Opening of the forest canopy would also be detrimental because it would allow invasion of the forest by non-native weedy species that compete with native species. Erosion due to overuse of the area is another potential problem. Some trails in the area are already beginning to show signs of erosion damage.

Management Needs

No logging or clearing of the steep slopes above the wetland should be conducted. Private landowners should be encouraged to leave their forested slopes intact to protect the rare species habitat and the wetland. Any further construction should be limited to the level uplands. Any construction generating runoff into the site should be designed to protect the quality and quantity of water entering the wetland.

Trails should be maintained in order to reduce erosion damage. Signs may be needed to encourage visitors to remain on the trails.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the swamp forest, the rare species habitat, and a forested buffer. Where possible, the forested buffer extends up to 100 ft. beyond the top of the steep slope in order to protect the forested slopes from the impacts of upland development.

SITE DESCRIPTION SUMMARY:

John Wesley Church Protection Area is a 97 acre site containing a small stream, a hardwood swamp forest, and steep forested slopes. The stream flows northeast toward the Severn River. The swamp forest is dominated by small Red Maples and Sweet Bay. The dense shrub layer contains Sweet Pepperbush, High Bush Blueberry, and greenbrier, and is virtually impenetrable in some sections. Included in the diverse herbaceous layer are Skunk Cabbage, club mosses, Cinnamon Fern, and Royal Fern. Several small, sphagnous seeps in the narrow upstream portion of

the swamp contain Bladder Sedge, other sedges and grasses, Netted Chain Fern, and Halberd-leaved Tearthumb.

Both sides of the swamp are bordered by steep slopes with much drier soils. The slopes are dominated by hickories and mixed oaks, especially Chestnut Oak, White Oak, and Black Oak. American Holly and Flowering Dogwood dominate the understory, which is quite sparse in some areas. The slope also contains a diverse ground-layer including ladies'-slipper orchids, Trailing Arbutus, and several species of club mosses. A large ravine on the west side of the site is dominated by mature White and Chestnut Oaks, and contains a thick shrub layer of Mountain Laurel. This ravine also contains the rare species. An abandoned outbuilding is located near the head of the side ravine.

Portions of the site were probably logged 40-50 years ago. One section near Arlington Echo Outdoor Center shows evidence of a burn perhaps 10-20 years ago.

Prepared by: Judith L. Robertson

Date: November 1988

PROTECTION AREA SUMMARY

Protection Area Name: North Gray's Bog

County: Anne Arundel USGS Quad: Gibson Island

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This protection area contains a wetland complex including 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 which contain rare botanical communities that should be preserved. Only five other bogs are known from the Western Shore, all of them 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 harbors sizeable populations of five rare plant species, two of which occur at only six other sites in the State. This site is especially important because portions of the bog are in the early stages of development, with the potential habitat for rare species increasing in size as the development of the sphagnous mat continues.

OTHER VALUES AND SIGNIFICANCE:

Additional rare species are likely to be discovered when this site is surveyed at different times of the year when other species become identifiable.

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.

THREATS AND MANAGEMENT NEEDS:

Threats

Although the development of the nearby uplands incorporated measures to protect the wetlands, clearing of adjacent uplands on private land is still a potential threat. Clearing of the adjacent upland forest would endanger the quality and quantity of water necessary to maintain this unique wetland. The forested uplands capture the precipitation required to maintain the groundwater level of the wetland.

Clearing of the uplands would also produce the potential for runoff of pesticides and fertilizers from lawns. This potential is currently greatest near the pond, where the land has already been cleared up to the edge of the wetland. One of the most significant rare species grows primarily at the edge of the pond, and mowing by homeowners has destroyed part of this population.

Clearing of forest cover near the wetland also increases the likelihood of invasion by non-native, weedy species that thrive under increased sunlight following canopy removal. These weedy species often outcompete important native species.

Finally, the encroachment of woody species may eliminate the rare herbaceous species from portions of the bog.

Management Needs

A forested upland buffer should be maintained around the wetland to limit the potential for runoff of pollutants, depletion of the groundwater table, and invasion by weedy species. Landowners near the pond should be encouraged to restrict their use of pesticides, fertilizers or other chemicals near the pond. If possible, they should be encouraged to increase the size of the wooded buffer between their lawns and the wetland.

The development of the sphagnum mat in the old pond and the encroachment of tree species into the shrub bog upstream should be monitored. Because suitable sites for transient communities such as the shrub bog are becoming so limited in number, human intervention to prevent the establishment of trees may be needed. It may be necessary to remove the trees by hand in order to maintain the rare species habitat.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the wetland complex, including the rare species habitat, and a forested buffer required to maintain the water quality and vegetation composition of the habitat. The recommended buffer includes forested portions of adjacent parcels. It avoids houses and lawns, except for small portions of a few lawns that have been mowed to the edge of the wetland or near rare species populations.

SITE DESCRIPTION SUMMARY:

The downstream portion of this 50 acre site consists of an old pond maintained by a dirt road that functions as a dam. White Water Lily floats on the open water, and a sphagnum mat is

developing on the northwest side of the pond. Yelloweyed-grass, the carnivorous Spatulate Leaved Sundew, several rushes and sedges, and three rare species all grow in this developing bog. A fourth rare species occurs on drier land immediately adjacent to the pond under a canopy of pine, oak, and Sweet Bay, and along the narrow weedy strip of land on the bank of the roadside dam.

Upstream, a large, emergent marsh is carpeted with Three-way Sedge, Marsh St. John's-Wort, yellow-eyed grass and a showy rare sedge. Numerous hardwood stumps protrude from the marsh, indicating that the marsh formed recently.

The bog complex is best developed in a 300 ft.^{2} area just west of the marsh where the sphagnum mat is thickest and virtually all plants are acid-loving bog species. To the north the bog borders a Red Maple-Sweet Bay-Swamp Loosestrife shrub swamp with scattered patches of predominantly bog vegetation. One large hummock is dominated by a rare species. Proceeding upland, the Red Maple and Sweet Bay become increasingly taller, and bog species diminish in abundance. The wetland is surrounded by mesic, forested slopes dominated by oaks and Pitch Pine.

Along the southeast shore of the wetland are large but scattered patches of Cinnamon Fern, Swamp Loosestrife, and Virginia Willow. Several species of carnivorous bladderwort occur in the shallow water along the wetland edge.

Prepared by: Judith L. Robertson

Date: November 1988

PROTECTION AREA SUMMARY

Protection Area Name: Patuxent Maple Swamp

County: Anne Arundel, Prince Georges USGS Quad: Bowie

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This Red Maple Bottomland Forest is an excellent example of a palustrine floodplain forest. 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, non-tidal 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. This is the only known population in Maryland of the other rare species.

At the west end of the protection area, temporary pools in the Red Maple-Sweet Gum Forest provide habitat for a rare crustacean.

OTHER VALUES AND SIGNIFICANCE:

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.

THREATS AND MANAGEMENT NEEDS:

Threats

Regular flooding of this forest is essential to maintain the herbaceous openings inhabited by the rare species. Activities that reduce or eliminate flooding will eliminate the populations of rare species.

Clearing of trees within the swamp forest or on the adjacent uplands would promote the growth of non-native weedy vegetation to the exclusion of the rare species.

A decline in water quality of the Patuxent River upstream from the protection area may be detrimental to the rare species.

Management Needs

Proposals for the clearing or development of land within the watershed upstream should be reviewed for potential effects on the quality and quantity of water in this section of the Patuxent River.

Logging or clearing of the forest should not occur within the protection area.

If nature trails are constructed they should be routed to avoid the non-tidal wetlands.

The rare herbaceous species as well as the weedy, non-native species (particularly Moneywort) should be monitored to determine their reproductive success. It may be necessary to remove Moneywort by hand if this species encroaches on the populations of rare species.

Further survey is needed to determine the extent of the rare species populations.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the rare species habitat, adjacent wetlands and potential habitat, and a forested buffer required to maintain the population of rare species.

SITE DESCRIPTION SUMMARY:

Although Red Maple dominates this section of the Patuxent River floodplain, a variety of bottomland hardwood species inhabit this 47 acre wetland, including Sweet Gum, River Birch, Sycamore, Ironwood, and ash. Spicebush and arrow-wood dominate the shrub canopy. Lizard's Tail, False Nettle, and knotweed are the most abundant herbaceous species.

Deposits of silt on the leaves of shrubs and herbs indicate that the wetland is flooded in at least one foot of water during and shortly after periods of heavy rain.

Gravel was mined from the uplands on both sides of the Patuxent. The western section of the protection area includes a

large, shallow pit that is now covered by herbaceous vegetation, predominantly Water Purslane.

The forested buffer includes previously cleared land that is reverting to Virginia Pine. In addition, a forested wetland of Sweet Gum and Red Maple occurs in the western portion of the protection area.

Prepared by: Katharine A. McCarthy

Date: November 1988

PROTECTION AREA SUMMARY

Protection Area Name: Patuxent Wildlife Research Center

County: Anne Arundel, Prince Georges USGS Quad: Laurel

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Research Center includes over 3000 acres of nearly contiguous forest. A large portion of this forest (probably more than one third of the area) is mature upland forest. Approximately 700 acres of mature bottomland forest border the Patuxent River within the Research Center. 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.

Approximately 3000 acres of forest at the Wildlife Research Center are designated as Research Natural Areas by the U.S. Fish and Wildlife Service. 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. At least one rare plant species inhabits this area. 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.

OTHER VALUES AND SIGNIFICANCE:

There are several historical reports of 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.

THREATS AND MANAGEMENT NEEDS:

Threats

Fragmentation of the forests is the greatest threat to the forested complex of Federal lands that includes the Wildlife Research Center. Residential and commercial development surrounds the forests. There will be continual pressure to expand the roads that cross through the forests and to build new roads. The expansion of the two lane roads would reduce the habitat quality of the forests for species such as forest interior dwelling birds that require extensive, contiguous forest. In addition, the wider road would create a greater barrier to the movement of wildlife through the Wildlife Research Center.

Forest edges along roadsides and other clearings provide habitat for species of plants and wildlife that exclude the forest interior species. For example, many forest interior dwelling birds are neotropical migrants that nest on or near the ground and usually produce just one brood per year. Near forest edges, these forest interior birds are highly vulnerable to nest predation and brood parasitism by cowbirds and other species that inhabit the forest edges. Non-native weedy plants establish along the sunny forest edges and invade the forest interior. The shade-loving forest interior plants are gradually excluded by these weedy species. These changes created by fragmentation of the forest substantially reduce the value of the forest as a laboratory to study natural ecological processes. The ecosystem loses important components as these changes occur, and the natural processes are altered.

A decline in the water quality or change in the stream flow of the Patuxent River may alter the vegetation composition of the mature bottomland forest.

Management Needs

Existing roads should not be expanded and new roads should not be constructed in the Wildlife Research Center.

The clearing of forested land within the protection area should be prohibited. Trees should not be cut within the protection area unless necessary for safety along existing trails.

Activities planned upstream from the protection area that would reduce water quality or alter drainage patterns should be reviewed for potential effects on the bottomland forest that borders the Patuxent River. Plans should be modified to prevent sedimentation, pollution, and hydrological changes in the bottomland forest.

BOUNDARY RECOMMENDATIONS:

The protection area includes the mature bottomland forest, adjacent immature stands of bottomland forest, and adjacent upland forest that is undeveloped and is not actively managed for research. The area extends to Fort George G. Meade to the north and northeast and to the U.S. Department of Agriculture Research Center to the south and east.

SITE DESCRIPTION SUMMARY:

The 3000 acre protection area includes bottomland forest of Beech, Pin Oak, Tulip Tree, and Sweet Gum, and upland forests of oaks, Beech, and pine. The Patuxent River flows through well-drained bottomland forest dominated by Beech and swamp forest dominated by Pin Oak. Sweet Gum, Tulip Tree, and Red Maple are frequent in both types of forest. The well-drained bottomland forest supports a more diverse herbaceous layer that includes many spring wildflowers. The shrub layer of the well-drained bottomland forest is also better developed; Spicebush, Poison Ivy, and Black Haw are dominant.

Beech and White Oak dominate the uplands adjacent to the bottomland forest. Where land was previously cultivated, Virginia Pine and Pitch Pine are often abundant. In areas of sandy soil, Southern Red Oak and other oaks are mixed with the pines and the understory is sparse. The undisturbed upland forest south of Route 197 is dominated by oaks.

Prepared by: Katharine A. McCarthy

Date: December 1988

PROTECTION AREA SUMMARY

Protection Area: Shady Pond

COUNTY: Anne Arundel USGS Quad: Gibson Island

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Shady Pond is a one acre permanent freshwater pond which empties via a short stream into tidal waters. The water in Shady Pond is of unusually high quality. This is probably due to the relatively undisturbed nature of the wooded stream that feeds the pond.

The pond is surrounded by a rare plant species which is known from only six other locations in the state. None of these sites is well protected.

OTHER VALUES AND SIGNIFICANCE:

The marshy areas on the pond edge and the mesic streambanks may support additional rare species which were not identifiable at the time of the recent survey. Permanent freshwater ponds such as this one provide important feeding and breeding habitat for amphibians and water-dependent species of birds.

THREATS AND MANAGEMENT NEEDS:

Threats

Clearing of the land around the pond would destroy the rare plants that grow along the edge of the pond. On the southwest side, land has been cleared close to the pond, creating the potential for pollution of the pond if pesticides, fertilizers, or animal wastes are allowed to run off into the pond. The open canopy in this region is allowing the invasion of non-native, weedy species which compete with native plants, including the rare species. Additionally, disturbance of the stream that feeds the pond or of the woods surrounding the feeder stream could lower the water quality in the pond by increasing sedimentation or pollution.

Management Needs

A forested buffer should be maintained around the pond to protect the rare species. Within this protected area, vegetation should not be removed or altered. The mesic woods along the stream should remain undisturbed.

Landowners should be informed of the presence of the rare species. These owners should be encouraged to let the cleared area adjacent to the pond grow back and to avoid any activities near the pond that might cause pollutants to enter it.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the rare species habitat, a forested buffer around the pond, and a forested buffer along the stream. A buffer of 75 feet is recommended on the northwest and southwest sides of the pond, excluding residential lawns. A wider buffer (150 ft.) is proposed on the east side of the pond where the stream enters. Marshy areas providing potential rare species habitat are better developed on this side of the pond.

The forested buffer extends approximately 150 - 200 ft. to a nearby road on the south side of the stream. On the north side of the stream a 50 ft. buffer protects the quality of the stream and excludes houses nearby.

SITE DESCRIPTION SUMMARY:

Shady Pond is a shallow, acidic, freshwater pond of high water quality. This 13 acre site was used at one time for cranberry farming and the adjustable overflow gate is still present where the pond drains to the southwest, although it has not been used recently. The mesic forests north of the pond and along the stream are dominated by Red Maple and blueberry. A rare species occurs around the entire perimeter of the pond. Marshy areas on the eastern edge of the pond are dominated by Brown-fruited Rush as well as other rushes, sedges, and sphagnum moss. A small dirt road borders the pond on the southeast side and residential lawns extend close to the pond on the southwest.

Prepared by: Judith L. Robertson

Date: December 1988

PROTECTION AREA SUMMARY

Protection Area Name: Stony Run

County: Anne Arundel USGS Quad: Relay

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Pitch Pine-Red Maple Swamp Forest that borders Stony Run is a rare community on the Upper Coastal Plain. Several of the herbaceous species in the swamp usually inhabit colder regions in the mountains or in the Piedmont further 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 protection 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 non-native species throughout much of the swamp is probably a result of minimal recent disturbance to this area.

Five rare plant species grow in the well-developed herbaceous layer of the swamp forest. One of these plants is known from just three other sites in Maryland and is rare throughout its range. Portions of two of the sites for this species are protected voluntarily by landowners, but these voluntary agreements do not offer long-term protection for these sites. This population is the only recent siting of one of the rare plants in Maryland. Two of the other rare species are known from fewer than ten sites in the State. This relatively mature swamp forest provides opportunity to preserve these rare species as well as a rare community.

OTHER VALUES AND SIGNIFICANCE:

The Stony Run Protection Area is adjacent to a State Park and offers 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.

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

THREATS AND MANAGEMENT NEEDS:

Threats

Logging, selective cutting, or clearing of the forest would eliminate the rare species and the rare community. Most of the surrounding land has been cleared for development, and there will be continual pressure to clear this forest. The rare species require the well-developed, organic soil and high water quality of a mature, undisturbed forest.

An increase or decline in the quantity of water that drains into this swamp may destroy the rare species. The plants require saturated soil for part of the year but do not tolerate long periods of flooding. A decrease in the water quality of the swamp may also be detrimental to the rare species.

One of the rare species is a showy wildflower that is vulnerable to casual collection and to deliberate collection by wildflower gardeners and naturalists.

Management Needs:

Logging, clearing, and selective cutting of trees should not occur within the protection area.

Activities that would change the quantity or reduce the quality of water in the swamp forest should not be permitted. Activities that would alter stream flow or reduce water quality in Stony Run upstream from the protection area should be reviewed for potential effects on the rare species habitat; any plans for such activities should be designed to eliminate impacts on the swamp forest.

The exact locations of the rare species should be revealed only to individuals who require the information in order to protect the species. If the land is annexed to the State Park, signs should be posted to request that visitors refrain from picking flowers and collecting plants.

BOUNDARY RECOMMENDATIONS:

The protection area includes the rare species' wetland habitat, adjacent wetlands, and adjacent uplands that drain into these wetlands in order to protect the quality and quantity of water in the wetlands. The forested upland buffer also reduces the potential for intrusion by non-native, weedy species. Railroad tracks delimit the eastern boundary of the protection area.

SITE DESCRIPTION SUMMARY:

Within this 165 acre protection area is a large swamp forest dominated by Loblolly Pine and Red Maple. Tulip Tree and Sweet Bay form a subcanopy. Southern Arrowwood and Sweet Pepperbush are abundant and grow on hummocks of sphagnum in the wettest portions of the swamp. Skunk Cabbage dominates the herbaceous layer on these hummocks. Other herbaceous species include plants more commonly found in colder regions, such as Canada Mayflower, White Hellebore, and Wood Anemone. Turk's-cap Lily is common in some areas and its flowers create an impressive display in mid-summer.

Residential and commercial development nearly surround the protection area. Railroad tracks and a highway border the protection area to the east. An airport lies beyond the highway. Trees have been cleared within the protection area along a runway approach to the airport. To the west are an industrial park and residences. A road crosses Stony Run through the narrowest section of the protection area. To the north is a State Park.

Prepared by: Katharine A. McCarthy

Date: December 1988

PROTECTION AREA SUMMARY

Protection Area Name: Watershed Woods

County: Anne Arundel USGS Quad: South River

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Beech and species of oak dominate this mature deciduous forest. Trees measuring greater than two feet in diameter inhabit the uplands and ravine. Forests of similar age are extremely rare on the Upper Coastal Plain of Maryland. The absence of disturbance to this forest allowed the development of rich, loamy soil that supports an abundance and diversity of herbaceous species.

Among the numerous spring wildflowers is a species that occurs in just one other site in the State. It appears that this rare plant species relies on a soil fungus in order to absorb water and nutrients. However, the fungus only grows in well developed, undisturbed, loamy soils. The rarity of this plant species, with its associated fungus, is attributed to the scarcity of mature, undisturbed forests on the Upper Coastal Plain.

OTHER VALUES AND SIGNIFICANCE:

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.

THREATS AND MANAGEMENT NEEDS:

Threats

Due to the rare plant's association with soil fungi, any disturbance that dries or compacts the soil may eliminate the rare species. Such disturbances include the removal of trees, the use of machinery, and trampling.

Trails around the impoundments of two streams are bordered by non-native species. These weedy species also invade openings in the upland forest created by fallen trees. If left unchecked, the populations of non-native species may exclude the rare species.

Management Needs

Within the protection area, any activity that would disturb or compact the soil or alter the current drainage within the ravine should be reviewed for potential effects on the rare species. Logging or clearing of forest should not occur within the protection area. It is likely that even selective cutting of trees near the rare plants would eliminate the population.

This rare species does not produce vegetative growth above ground every year. However, stems of the plants survive in the soil year-round. These underground stems are also very sensitive to soil disturbance. It is important that the land managers are aware of the location of the plant population so they may avoid the population, even when the plants are not visible, if any activities are planned within the protection area.

The populations of the non-native species and the rare species should be monitored to determine their size and reproductive success.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the rare species' habitat and a buffer of forested slopes required to maintain the population of rare plants.

SITE DESCRIPTION SUMMARY:

Several intermittent and perennial streams dissect this 54 acre deciduous forest. The upper slopes are dominated by oaks and Beech with occasional Virginia Pine. Mountain Laurel and Vaccinium sp. are the dominant shrubs in the uplands. Tulip Tree and Spicebush are common on the lower slopes of the ravines. There is very little herbaceous cover on the uplands, possibly a result of both deer browse and soil conditions. The lower slopes of the ravines support a diverse herbaceous cover dominated by May-apple. Black Snakeroot, Bloodroot, and Showy Orchis also grow near the base of the ravines. The rare species occurs on the moist, lower slope of a ravine among many other herbaceous species.

The protection area is bordered by a highway to the south and by housing developments in all other directions.

Prepared by: Katharine A. McCarthy

Date: November 1988

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The following general references are provided as background material and suggested reading to supplement this report.

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Final Action On Regulations

For information concerning Final Action on Regulations, see inside front cover.

Symbol Key

Roman type indicates text already existing at the time of the proposed action. *Italic type* indicates new text added at the time of proposed action. A single underline indicates text added at the time of final action. [Single brackets] indicate deleted text. [[Double brackets]] indicate text deleted at the time of final action.

Title 07
DEPARTMENT OF HUMAN RESOURCES

Subtitle 03 INCOME MAINTENANCE ADMINISTRATION

07.03.05 General Public Assistance to Employables

Authority: Article 88A, §§17, 17A-1 — 17A-3, 65B, Annotated Code of Maryland

Notice of Final Action
[87-110-F]

On May 26, 1987, the Secretary of Human Resources adopted amendments to Regulations .09 and .11 under COMAR 07.03.05 **General Public Assistance to Employables.** These amendments, which were proposed for adoption in 14:8 Md. R. 941 (April 10, 1987), have been adopted as proposed. (DHR Transmittal Number 87-12)

Effective Date: June 29, 1987.

RUTH MASSINGA
Secretary of Human Resources

Title 08
DEPARTMENT OF NATURAL RESOURCES

Subtitle 03 WILDLIFE

08.03.08 Threatened and Endangered Species

Authority: Natural Resources Article, §§ 4-2A-01 — 4-2A-09, 10-2A-01 — 10-2A-09, Annotated Code of Maryland

Notice of Final Action
[87-061-F]

On June 9, 1987, new Regulations .01 — .11 under a new chapter, COMAR 08.03.08 **Threatened and Endangered Species**, were adopted by the Secretary of Natural Resources. Existing Regulations .01 and .02 under COMAR 08.03.08 **Nongame and Endangered Species** were repealed. These actions, which were proposed for adoption in 14:6 Md. R. 719 — 726 (March 13, 1987), have been adopted as proposed.

Effective Date: June 29, 1987.

TORREY C. BROWN, M.D.
Secretary of Natural Resources

Subtitle 05 WATER RESOURCES ADMINISTRATION

08.05.03 Construction on Non-Tidal Waters and Floodplains

Authority: Natural Resources Article, §§8-801 — 8-814, Annotated Code of Maryland

Notice of Final Action
[87-060-F]

On June 9, 1987, amendments to Regulation .03 under COMAR 08.05.03 **Construction on Non-Tidal Waters and Floodplains**, were adopted by the Secretary of Natural Resources. These amendments, which were proposed for adoption in 14:6 Md. R. 726 — 728 (March 13, 1987), have been adopted with the non-substantial changes shown below.

Effective Date: June 29, 1987.

Attorney General's Certification

In accordance with State Government Article, §10-113, Annotated Code of Maryland, the Attorney General certifies that the following changes do not differ substantively from the proposed text. The nature of each change and the basis for this conclusion are as follow:

Regulation .03D(3)(b): The new language is added to restate the fact that tidal floodplains are not covered by this regulation and precludes any misunderstanding by prospective applicants on this issue. The State's regulatory authority pursuant to Natural Resources Article, Title 8, is specifically limited to the 100-year floodplain of free flowing streams and does not encompass federally designated tidal special flood hazard areas. Regulation .03 restates this limitation on the State's jurisdiction.

.03 Requirements for a Permit.

A. — C. (proposed text unchanged)

D. Exemptions. The following activities are exempted from the requirements for a permit from the Administration under this chapter:

(1) — *(2)* (proposed text unchanged)

(3) A person who proposes to change in any manner the course, current, or cross-section of any waters of the State other than those referenced in §D(1) and (2) of this regulation does not need a permit from the Administration if the:

Title 08
DEPARTMENT OF NATURAL RESOURCES

Subtitle 03 WILDLIFE

08.03.08 Threatened and Endangered Species

Authority: Natural Resources Article, §§4-2A-01 — 4-2A-09 and §§10-2A-01 — 10-2A-09, Annotated Code of Maryland

Notice of Proposed Action
[87-061-P]

The Secretary of Natural Resources proposes to repeal existing Regulations .01 and .02 under **COMAR 08.03.08 Nongame and Endangered Species** and to adopt new Regulations .01 — .11 under **COMAR 08.03.08 Threatened and Endangered Species.**

The proposed action does not affect any threatened and endangered species regulation or designations under **COMAR 08.02.12 Tidewater Administration.** The proposed action includes an increase in the number of wildlife species on the lists and for the first time includes plants. In addition, some species which meet the statutory definition of fish because they spend part of their life cycle in water, namely, amphibians, reptiles, crustaceans, mollusks and only those finfish of the species Blackbanded Sunfish (Enneacanthus chaetodon), Maryland Darter (Etheostoma sellare), Glassy Darter (Etheostoma vitreum), Stripeback Darter (Percina notogramma) and Trout-Perch (Percopsis omiscomaycus) are added. The latter species are not game or sport fish, therefore, are of no commercial significance. The lists also contain, for the first time, the names of all those species which are federally listed and, therefore, are required by Maryland law to be listed in Maryland.

The criteria for listing and delisting species are set out and the process for petitioning the Department to list and delist a species as allowed by law is specified. The proposal also clarifies how to apply for the various permits which are allowed by law and what factors are considered before they are issued.

Maryland law authorizes the Secretary to prohibit certain acts with respect to threatened and endangered plants in addition to those set out in the statute. The added prohibitions are: taking threatened and endangered plants from private property without the permission of the owner and from State property without the permission of the Director; and exporting, possessing, processing, selling, offering for sale, delivering, carrying, transporting or shipping threatened plant species. The latter acts are already prohibited by statute with respect to endangered plants.

Maryland law also authorizes the Secretary to prohibit by regulation certain acts with respect to all other threatened species besides plants. Since there were no threatened species listed in the previous regulation, there were no additional prohibitions specified; thus, these regulations implement that section of the law for the first time. Included in the added prohibitions is an "incidental taking." This is a taking of a species which is caused by another otherwise lawful act, for example, the killing of a pond dwelling species by filling in a pond for other reasons. The landowner is required to give the Department 30 days notice before starting any action which would result in an "incidental taking." Within that 30 day time period the Department must either salvage the species or issue a permit for the "incidental take." The other added prohibitions are simply the same acts prohibited by statute with respect to endangered species.

This proposal defines for the first time what criteria are considered for designating Natural Heritage Areas. These Areas are an integral feature of the Critical Areas Criteria (set forth under **COMAR 14.15.01 — .11**) and by adding this regulation the Department hopes to aid the counties and the Critical Areas Commission in the protection of these Areas. Before Areas are designated the Department will notify all landowners of the proposed designation. There will be maps made available along with other pertinent and useful information. The Department hopes to work out management agreements with the landowners or buy conservation easements for property included in an Area if necessary.

The Critical Areas Criteria rely heavily on the Department's Threatened and Endangered Species Program to aid the counties in determining which species within the Critical Area need protection. The Department has available maps which locate listed species by planning zones and will make all this information as readily available as possible. The Department has always considered cooperative management agreements with private property owners to be the best way to preserve and protect habitat critical to threatened and endangered species, and intends to continue to use these agreements and other mutually agreeable management arrangements as much as possible.

Estimate of Economic Impact

I. Summary of Economic Impact. Administrative costs for units of the Department of Natural Resources will increase in terms of more staff time to address protection of these species, and some land acquisition costs will be incurred. Local governments will bear some costs in addressing protection of the listed species as part of their Critical Areas programs.

II. Types of Economic Impacts:	Revenue (+) Expense (−)	Amount
A. On issuing agency:		
1. Increased staff and support for threatened and endangered species Program	(−)	$193,497
2. Increased land acquisition staff and support	(−)	$74,106
3. Additional acquisition of interests in land	(−)	Indeterminable
B. On other State or local agencies affected:		
Local jurisdictions protect threatened and endangered species as part of Critical Areas programs	(−)	$40,000 — $100,000
C. On regulated industries or trade groups:	NONE	
	Benefit (+) Cost (−)	Amount
D. On other industries or trade groups affected:	NONE	

E. Direct and indirect effects on public:		
1. Prohibition on taking endangered wildlife may affect some real estate development	(−)	Indeterminable
2. Protect species' diversity	(+)	Indeterminable

III. Assumptions. (Identified by Impact Letter and Number from Section II):

A1. The amount indicated is a budget enhancement request for six new positions plus support for the Threatened and Endangered Species program. While not all attributable to the listing of species represented by this regulation, a significant portion of the additional staff time for which the new resources will be needed is to meet the needs of an expanded list of threatened and endangered species.

A2. The amount indicated is a budget enhancement request for two new positions plus support for acquisition of interests in land that may prove necessary to protect threatened and endangered species.

A3. At this time, it is impossible to calculate how much could be spent for acquisition of interests in land. The figure indicated is the amount budgeted in FY 1987 for acquisition of interests in property for protection of lands that support diverse ecological communities of plants or animals, including forestlands, habitats of rare, threatened or endangered species, and areas necessary for watershed protection. A similar amount has been requested for FY 1988.

B. The costs of local governments to develop Critical Area programs will be approximately $2,150,000 for FY 1987. A similar amount has been requested for FY 1988. The Director of the Critical Areas program estimates that between 2 percent and 5 percent of these costs may be attributable to that portion of the work involving threatened and endangered species.

E1. and E2. There is presently no trade in Maryland in any of the listed species, and therefore no impact is anticipated as a result of prohibiting such commerce. The prohibition on taking endangered species of wildlife in any manner will have some localized impacts on land use, but the impacts are indeterminable at this time. As to endangered or threatened species of plants, threatened species of wildlife, and wildlife species in neeed of conservation, the regulation prohibits only directed efforts to take the species; incidental impacts on the species from legitimate uses of land are not prohibited. Therefore, the listing of these species will not have an impact. Finally, there will be a long-term, positive, but incalculable benefit to the people of Maryland by protecting the diversity of species in the State.

Opportunity for Public Comment

Written comments may be sent to James Mallow, Forest, Park and Wildlife Service, Department of Natural Resources, Tawes State Office Building, Annapolis, MD 21401 or call 974-3771 Monday through Friday, 9 a.m. to 4 p.m. Public comment must be received not later than April 20, 1987 at 4 p.m.

If sufficient interest is shown a public hearing will be held. Copies of this proposal are available from James Mallow at the address given above.

.01 Definitions.

A. "Director" means the Director of the Maryland Forest, Park and Wildlife Service.

B. "Endangered extirpated species" means any species that was once a viable component of the flora or fauna of the State but for which no naturally occurring populations are known to exist in the State. Most of these species have not been recorded in Maryland since 1950.

C. "Endangered species" means any species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy including any species determined to be an "endangered species" pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543.

D. "Incidental taking" means takings of listed species that are incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by a person on private property.

E. "Jeopardize the continued existence of" means to engage in an action which reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of either the survival or recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of a listed species or otherwise adversely affecting the species.

F. "Listed species" means a species of flora or fauna deemed endangered, threatened or in need of conservation in this chapter due to any of the following factors:

(1) Present or threatened destruction, modification, or curtailment of the species' habitat or range;

(2) Overutilization for commercial, sporting, scientific, educational, or other purposes;

(3) Disease or predation;

(4) Inadequacy of existing regulatory mechanisms; or

(5) Other natural or manmade factors affecting the species' continued existence within the State.

G. "Natural heritage area" means any natural community of species designated in Regulation .10 in this chapter.

H. "Person" means any county, municipal corporation, or other political subdivision of the State, an individual, corporation, receiver, trustee, guardian, executor, administrator, fiduciary, or representative.

I. "Secretary" means the Secretary of the Department of Natural Resources.

J. "Service" means the Maryland Forest, Park and Wildlife Service.

K. "Species" means any species of wildlife or plant and reptiles, amphibians, crustaceans, mollusks and the following finfish: Enneacanthus chaetodon, Etheostoma sellare, Etheostoma vitreum, Percina notograma, Percopsis omiscomaycus or any part, egg, offspring, or dead body of any of them.

L. "Species in need of conservation" means any species determined by the Secretary to be in need of conservation measures for its continued ability to sustain itself successfully.

M. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

N. "Threatened species" means any species of flora or fauna which appears likely, within the foreseeable future, to become endangered including any species determined to be a "threatened species" pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543.

.02 Petitioning.

A. Except for species determined to be threatened or endangered pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543, any interested person may petition the Director to add or remove a species or natural heritage area to or from a list in this chapter. The Director shall review the evidence regarding the requested action and make a recommendation to the Secretary whether or not to list or delist the species or natural heritage area.

B. In a petition to list or delist a natural heritage area, the following information shall be provided:

(1) A map of the proposed natural heritage area.

(2) A description of the physical boundaries of the proposed area, total acreage, landowner name and address.

(3) A description of the biological community represented by the natural heritage area including, as far as practical, a list of the fauna and flora there, and other geologic,

hydrologic, or other features which blend together to make this area unique.

(4) A description of all major threats to the continued existence of the area, or if petitioning to delist an area, a description of how the natural features and species composition of the area have changed so it is no longer suitable to be designated as a natural heritage area.

(5) A statement indicating why the area should or should not be considered as among the best statewide examples of its kind.

(6) Other relevant information which might assist the Director in making a determination.

C. All sites used for evidence of current abundance shall be extant and all sitings shall be documented with appropriate vouchers. In a petition to list or delist a species, the following information shall be provided:

(1) A description of the biological distribution of the species in Maryland.

(2) Its life needs and habitat requirements.

(3) Evidence of its decline or evidence that it is more common than previously believed and documented.

(4) All known threats which jeopardize its continued existence.

(5) Other relevant biological and ecological data or other life history information pertinent to its status.

(6) The species shall be presently recognized as a valid species, or infraspecific taxa of regional or national significance. There shall be adequate documentation that it occurs naturally and is permanently established in Maryland.

.03 Permits.

A. Permits to take, transport, possess, sell, offer for sale, export or import any listed species may be obtained from the Director only after written application on a form provided by the Service, and upon payment of a fee of $25.

B. Each permit shall be subject to an expiration date and other limitations as may be prescribed by the Director.

C. Each permit application requesting permission to take a listed species from private property shall be accompanied by a signed statement from the landowner granting the applicant permission to enter the property to take the species.

D. A permit application shall describe the purpose of the request in such detail that the Director can determine whether it is in the best interest of the species and the State to issue it.

E. The Director shall consider, but not be limited to, the following information:

(1) The number of other known occurrences of the species in the State;

(2) Which of the occurrences of the species in §E(1) exist on:

(a) Private lands;

(b) Public lands; and

(c) What protection there is for the species' continued existence.

(3) The number of individuals in the occurrences of the species in §E(1) and the relative state of ecological stability.

F. Violation of any provision or restriction of the permit shall constitute a violation of this regulation and may result, at the discretion of the Director, in the revocation of the permit and confiscation of the species taken or possessed.

.04 Endangered Species of Wildlife, Reptiles, Amphibians, Mollusks, Crustaceans and Finfish.

A. Listing Criteria. The following factors shall be considered for listing any species other than plants as endangered:

(1) Whether the species is restricted to a minimal geographic area within Maryland;

(2) Whether the species has experienced a rapid, substantial decline in Maryland, and if the decline continues, the species' extirpation from Maryland is imminent;

(3) Whether the species' essential habitat has been rapidly lost and that loss is likely to continue;

(4) Whether the species' biology makes it highly susceptible to changes in its environment; or

(5) Whether the species' essential habitat is easily altered by even relatively minor activities.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population.

(2) A person may not take, export, possess, process, sell or offer for sale, deliver, carry, transport, or ship by any means any endangered wildlife, reptile, amphibian, mollusk, crustacean or finfish species except by special permit from the Director.

C. The following wildlife, reptile, amphibian, mollusk, crustacean and finfish species are considered endangered throughout Maryland unless a smaller range is indicated:

(1) Platyhelminthes. A Planarian (Procotyla typhlops).

(2) Mollusks. Ancient Floater (Alasmidonta heterodon).

(3) Crustaceans.

(a) Dearolf's Cave Amphipod (Crangonyx dearolfi);

(b) Greenbriar Cave Amphipod (Stygobromus emarginatus);

(c) Shenandoah Cave Amphipod (Stygobromus gracilipes).

(4) Insects.

(a) Northeastern Beach Tiger-Beetle (Cicindela dorsalis);

(b) Puritan Tiger-Beetle (Cicindela puritana);

(c) Six-Banded Longhorn-Beetle (Dryobius sexnotatus);

(d) Regal Fritillary (Speyeria idalia).

(5) Fish. Maryland Darter (Etheostoma sellare).

(6) Amphibians.

(a) Eastern Tiger Salamander (Ambystoma tigrinum);

(b) Green Salamander (Aneides aeneus);

(c) Hellbender (Cryptobranchus alleganiensis);

(d) Eastern Narrow-Mouthed Toad (Gastrophryne carolinensis).

(7) Reptiles.

(a) Atlantic Leatherback Turtle (Dermochelys coriacea);

(b) Atlantic Hawksbill Turtle (Eretmochelys imbricata);

(c) Northern Coal Skink (Eumeces anthracinus);

(d) Atlantic Ridley Turtle (Lepidochelys kempi);

(e) Mountain Earth Snake (Virginia valeriae pulchra).

(8) Birds.

(a) Piping Plover (Charadrius melodus);

(b) Peregrine Falcon (Falco peregrinus);

(c) Bald Eagle (Haliaeetus leucocephalus);

(d) Loggerhead Shrike (Lanius ludovicianus);

(e) Bewick's Wren (Thryomanes bewickii).

(9) Mammals.

(a) Black Right Whale (Balaena glacialis);

(b) Sei Whale (Balaenoptera borealis);

(c) Blue Whale (Balaenoptera musculus);

(d) Finback Whale (Balaenoptera physalus);

(e) Humpback Whale (Megaptera novaeangliae);
(f) Indiana Bat (Myotis sodalis);
(g) Sperm Whale (Physeter catodon);
(h) Delmarva Fox Squirrel (Sciurus niger cinereus);
(i) Water Shrew (Sorex palustris).

.05 Endangered Species of Plants.

A. Listing Criteria. The following factors shall be considered for listing a plant species as endangered:

(1) Whether only a few populations are known in Maryland and they cover only a small portion of land;

(2) Whether the species is restricted to a minimal geographic area;

(3) Whether the species has experienced a substantial decline in Maryland, and if the decline continues, the species' extirpation from Maryland is imminent;

(4) Whether the species' essential habitat has been rapidly lost and that loss is likely to continue;

(5) Whether the species' biology makes it highly susceptible to changes in its environment; or

(6) Whether the species' essential habitat is easily altered by even relatively minor activities.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population;

(2) A person may not:

(a) Export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any endangered plant species without a special permit from the Director, the federal government, or another state government;

(b) Take any endangered plant species from State property except by special permit from the Director; and

(c) Take any endangered plant species from private property without the written permission of the landowner.

C. The following plant species are considered endangered throughout Maryland unless a smaller range is indicated:

(1) Sensitive Joint-Vetch (Aeschynomene virginica);
(2) Sandplain Gerardia (Agalinis acuta);
(3) (Agalinis fasciculata);
(4) Thread-Leaved Gerardia (Agalinis setacea);
(5) Woolly Three-Awn (Aristida lanosa);
(6) Virginia Heartleaf (Asarum virginicum);
(7) Red Milkweed (Asclepias rubra);
(8) Serpentine Aster (Aster depauperatus);
(9) Tickseed Sunflower (Bidens coronata);
(10) Small Beggar-Ticks (Bidens discoidea);
(11) (Bidens mitis);
(12) Aster-Like Boltonia (Boltonia asteroides);
(13) Grass-Pink (Calopogon tuberosus);
(14) Long's Bittercress (Cardamine longii);
(15) Barratt's Sedge (Carex barrattii);
(16) Buxbaum's Sedge (Carex buxbaumi);
(17) Coast Sedge (Carex exilis);
(18) Giant Sedge (Carex gigantea);
(19) (Carex joorii);
(20) Dark Green Sedge (Carex venusta);
(21) Marsh Wild Senna (Cassia fasciculata var. macrosperma);
(22) Spreading Pogonia (Cleistes divaricata);
(23) Wrinkled Jointgrass (Coelorachis rugosa);
(24) Wister's Coralroot (Corallorhiza wisteriana);
(25) Fraser's Sedge (Cymophyllus fraseri);
(26) Smooth Tick-Trefoil (Desmodium laevigatum);
(27) Linear-Leaved Tick-Trefoil (Desmodium lineatum);
(28) Cream-Flowered Tick-Trefoil (Desmodium ochroleucum);
(29) Rigid Tick-Trefoil (Desmodium rigidum);
(30) Pineland Tick-Trefoil (Desmodium strictum);
(31) Pink Sundew (Drosera capillaris);
(32) Log Fern (Dryopteris celsa);
(33) Knotted Spikerush (Eleocharis equisetoides);
(34) Black-Fruited Spikerush (Eleocharis melanocarpa);
(35) Robbins' Spikerush (Eleocharis robbinsii);
(36) Water Horsetail (Equisetum fluviatile);
(37) Bent-Awn Plumegrass (Erianthus contortus);
(38) Parker's Pipewort (Eriocaulon parkeri);
(39) White-Bracted Boneset (Eupatorium leucolepis);
(40) Darlington's Spurge (Euphorbia purpurea);
(41) Harper's Fimbristylis (Fimbristylis perpusilla);
(42) Box Huckleberry (Gaylussacia brachycera);
(43) Swamp-Pink (Helonias bullata);
(44) Featherfoil (Hottonia inflata);
(45) Creeping St. John's-Wort (Hypericum adpressum);
(46) Coppery St. John's-Wort (Hypericum denticulatum);
(47) Dwarf Iris (Iris verna);
(48) Red-Root (Lachnanthes caroliana);
(49) (Leersia hexandra);
(50) Star Duckweed (Lemna trisulca);
(51) Downy Bushclover (Lespedeza stuevei);
(52) Mudwort (Limosella subulata);
(53) Sandplain Flax (Linum intercursum);
(54) Pondspice (Litsea aestivalis);
(55) Canby's Lobelia (Lobelia canbyi);
(56) (Ludwigia glandulosa);
(57) Hairy Ludwigia (Ludwigia hirtella);
(58) Sessile-Leaved Water-Horehound (Lycopus amplectens);
(59) Erect Water-Hyssop (Mecardonia acuminata);
(60) Torrey's Dropseed (Muhlenbergia torreyana);
(61) Low Water-Milfoil (Myriophyllum humile);
(62) Floating-Heart (Nymphoides cordata);
(63) Virginia False-Gromwell (Onosmodium virginianum);
(64) Canby's Dropwort (Oxypolis canbyi);
(65) Tall Swamp Panicgrass (Panicum scabriusculum);
(66) Wright's Panicgrass (Panicum wrightianum);
(67) Kidneyleaf Grass-of-Parnassus (Parnassia asarifolia);
(68) Yellow Nailwort (Paronychia virginica);
(69) Walter's Paspalum (Paspalum dissectum);
(70) Canby's Mountain Lover (Paxistima canbyi);
(71) Blue Scorpion-Weed (Phacelia ranunculacea);
(72) Jacob's-Ladder (Polemonium van-bruntiae);
(73) Cross-Leaved Milkwort (Polygala cruciata);
(74) Dense-Flowered Knotweed (Polygonum densiflorum);
(75) Slender Rattlesnake-Root (Prenanthes autumnalis);
(76) Alleghany Plum (Prunus alleghaniensis);
(77) Short-Beaked Baldrush (Psilocarya nitens);
(78) Long-Beaked Baldrush (Psilocarya scirpoides);
(79) Harperella (Ptilimnium nodosum);
(80) One-Sided Pyrola (Pyrola secunda);
(81) Yellow Water-Crowfoot (Ranunculus flabellaris);
(82) (Rhynchosia tomentosa);
(83) Short-Bristled Hornedrush (Rhynchospora corniculata);
(84) Thread-Leaved Beakrush (Rhynchospora filifolia);
(85) Grass-Like Beakrush (Rhynchospora globularis);

(86) Clustered Beakrush (Rhynchospora glomerata);
(87) Drowned Hornedrush (Rhynchospora inundata);
(88) Torrey's Beakrush (Rhynchospora torreyana);
(89) Sacciolepis (Sacciolepis striata);
(90) Sessile-Fruited Arrowhead (Sagittaria rigida);
(91) Sandbar Willow (Salix exigua);
(92) Canby's Bulrush (Scirpus etuberculatus);
(93) Water Clubrush (Scirpus subterminalis);
(94) Slender Nutrush (Scleria minor);
(95) Pink Bog-Button (Sclerolepis uniflora);
(96) Halberd-Leaved Greenbrier (Smilax pseudo-china);
(97) Red-Berried Greenbrier (Smilax walteri);
(98) Showy Goldenrod (Solidago speciosa);
(99) Two-Flowered Bladderwort (Utricularia biflora);
(100) Fringed Yelloweyed-Grass (Xyris fimbriata);
(101) Small's Yelloweyed-Grass (Xyris smalliana).

.06 Endangered Extirpated Species.

A. Listing Criteria. The following factors shall be considered for listing a species as endangered extirpated:

(1) The species was once a viable component of the State's flora and fauna and there are no records of it naturally occurring in Maryland after 1950; or

(2) The species was once a viable component of the State's flora or fauna and recent scientific investigations have documented the loss of its habitat or disappearance of its population in Maryland.

B. Permits. Upon the discovery of a viable, naturally occurring population of any species in §§C — H, that species will be considered an endangered species and shall require the permits and conditions afforded to that status.

C. The following plant species are considered endangered extirpated throughout Maryland:

(1) Pine-Barren Gerardia (Agalinis virgata);
(2) Rough-Stemmed Wheatgrass (Agropyron trachycaulum);
(3) Golden Colicroot (Aletris aurea);
(4) Beach Pigweed (Amaranthus pumilus);
(5) Canada Anemone (Anemone canadensis);
(6) Great Angelica (Angelica atropurpurea);
(7) Filmy Angelica (Angelica triquinata);
(8) Arethusa (Arethusa bulbosa);
(9) Lake Cress (Armoracia aquatica);
(10) Bradley's Spleenwort (Asplenium bradleyi);
(11) Steele's Aster (Aster concinnus);
(12) Silvery Aster (Aster concolor);
(13) Showy Aster (Aster spectabilis);
(14) (Axonopus furcatus);
(15) Mat-Forming Water-Hyssop (Bacopa stragula);
(16) Sea Ox-Eye (Borrichia frutescens);
(17) Triangle Grape-Fern (Botrychium lanceolatum);
(18) Leathery Grape-Fern (Botrychium multifidum);
(19) Small Grape-Fern (Botrychium simplex);
(20) Blue-Hearts (Buchnera americana);
(21) Great Indian-Plantain (Cacalia muhlenbergii);
(22) (Carex careyana);
(23) Cypress-Knee Sedge (Carex decomposita);
(24) (Carex foenea);
(25) (Carex glaucescens);
(26) Lake-Bank Sedge (Carex lacustris);
(27) New England Sedge (Carex novae-angliae);
(28) Variable Sedge (Carex polymorpha);
(29) (Carex striatula);
(30) (Carex tenera);
(31) (Carex tetanica);
(32) Wood's Sedge (Carex woodii);
(33) Chaffweed (Centunculus minimus);
(34) Purple Clematis (Clematis occidentalis);
(35) Curly-Heads (Clematis ocroleuca);
(36) Rose Coreopsis (Coreopsis rosea);
(37) Pygmyweed (Crassula aquatica);
(38) Hazel Dodder (Cuscuta coryli);
(39) (Cyperus plukenetii);
(40) Showy Ladies'-Slipper (Cypripedium reginae);
(41) Few-Flowered Tick-Trefoil (Desmodium pauciflorum);
(42) (Digitaria villosa);
(43) (Eleocharis halophila);
(44) Three-Ribbed Spikerush (Eleocharis tricostata);
(45) Downy Willowherb (Epilobium strictum);
(46) Seven-Angled Pipewort (Eriocaulon septangulare);
(47) Tall Rattlesnake Master (Eryngium yuccifolium);
(48) (Festuca paradoxa);
(49) Pumpkin Ash (Fraxinus profunda);
(50) Small Bedstraw (Galium trifidum);
(51) (Gentiana puberula);
(52) Sea Milkwort (Glaux maritima);
(53) Sharp-Scaled Mannagrass (Glyceria acutiflora);
(54) Dwarf Rattlesnake-Plantain (Goodyera repens);
(55) Tesselated Rattlesnake-Plantain (Goodyera tessellata);
(56) (Gratiola ramosa);
(57) Rough Heuchera (Heuchera villosa);
(58) Sea-Beach Sandwort (Honkenya peploides);
(59) Nits-and-Lice (Hypericum drummondii);
(60) Clasping-Leaved St. John's-Wort (Hypericum gymnanthum);
(61) Great St. John's-Wort (Hypericum pyramidatum);
(62) Bloodleaf (Iresine rhizomatosa);
(63) Small Whorled Pogonia (Isotria medeoloides);
(64) Small-Headed Rush (Juncus brachycephalus);
(65) New Jersey Rush (Juncus caesariensis);
(66) (Juncus megacephalus);
(67) Bayonet Rush (Juncus militaris);
(68) Torrey's Rush (Juncus torreyi);
(69) Common Juniper (Juniperus communis);
(70) Narrow-Leaved Pinweed (Lechea tenuifolia);
(71) Catchfly-Grass (Leersia lenticularis);
(72) Long-Awned Diplanche (Leptochloa fascicularis);
(73) Fall Witchgrass (Leptoloma cognatum);
(74) Scaly Blazing-Star (Liatris squarrosa);
(75) American Lovage (Ligusticum canadense);
(76) American Frog's-Bit (Limnobium spongia);
(77) Twinflower (Linnaea borealis);
(78) Florida Yellow Flax (Linum floridanum);
(79) Heartleaf Twayblade (Listera cordata);
(80) (Lobelia glandulosa);
(81) Carolina Clubmoss (Lycopodium carolinianum);
(82) Large-Flowered Barbara's Buttons (Marshallia grandiflora);
(83) (Matelea decipiens);
(84) (Matelea obliqua);
(85) Broad-Leaved Bunchflower (Melanthium latifolium);
(86) Nuttall's Micranthemum (Micranthemum micranthemoides);
(87) Evergreen Bayberry (Myrica heterophylla);
(88) Thread-Like Naiad (Najas gracillima);
(89) Northern Panicgrass (Panicum boreale);
(90) May Grass (Pharlaris caroliniana);
(91) (Phlox carolina);

(92) (Phlox glaberrima);
(93) Mountain Phlox (Phlox latifola);
(94) Downy Phlox (Phlox pilosa);
(95) Heart-Leaved Plantain (Plantago cordata);
(96) Slender Plantain (Plantago pusilla);
(97) (Poa saltuensis);
(98) Clammyweed (Polansia dodecandra);
(99) America Ipecac (Porteranthus stipulatus);
(100) Redheadgrass (Potamogeton richardsonii);
(101) Robbins' Pondweed (Potamogeton robbinsii);
(102) Flatstem Pondweed (Potamogeton zosteriformis);
(103) Pale Mannagrass (Puccinellia pallida);
(104) Awned Mountain-Mint (Pycnanthemum setosum);
(105) Greenish-Flowered Pyrola (Pyrola virens);
(106) (Ranunculus hederaceus);
(107) Bristly Crowfoot (Ranunculus pensylvanicus);
(108) Awned Meadow-Beauty (Rhexia aristosa);
(109) Tiny-Headed Beakrush (Rhynchospora microcephala);
(110) Few-Flowered Beakrush (Rhynchospora rariflora);
(111) Wild Black Currant (Ribes americanum);
(112) Hairy Wild Petunia (Ruellia humilus);
(113) Pursh's Ruellia (Ruellia purshiana);
(114) Slender Marsh Pink (Sabatia campanulata);
(115) Lance-Leaved Sabatia (Sabatia difformis);
(116) Slender Arrowhead (Sagittaria teres);
(117) Shining Willow (Salix lucida);
(118) (Salvia urticifolia);
(119) Hard-Stem Bulrush (Scirpus acutus);
(120) Torrey's Clubrush (Scirpus torreyi);
(121) Shining Nutrush (Scleria nitida);
(122) Veined Skullcap (Scutellaria nervosa);
(123) Small Skullcap (Scutellaria parvula);
(124) Sand Blueeyed-Grass (Sisyrinchium arenicola);
(125) Mountain Goldenrod (Solidago roanensis);
(126) Rock Goldenrod (Solidago rupestris);
(127) (Sorghastrum elliottii);
(128) Indian-Pink (Spigelia marilandica);
(129) (Stachys aspera);
(130) Trailing Stitchwort (Stellaria alsine);
(131) (Tephrosia spicata);
(132) Coastal False Asphodel (Tofieldila racemosa);
(133) Auricled Gerardia (Tomanthera auriculata);
(134) Buffalo Clover (Trifolium reflexum);
(135) (Triglochin striatum);
(136) Tall Cornsalad (Valerianella umbilicata);
(137) Purple Vetch (Vicia americana);
(138) Wolffiella (Wolffiella floridana).

D. The following fish species are considered endangered extirpated throughout Maryland:
(1) Glassy Darter (Etheostoma vitreum);
(2) Stripeback Darter (Percina notograma);
(3) Trout-Perch (Percopsis omiscomaycus).

E. The following amphibian species is considered endangered extirpated throughout Maryland: Greater Siren (Siren lacertina).

F. The following reptile species is considered endangered extirpated throughout Maryland: Rainbow Snake (Farancia erytrogramma).

G. The following bird species are considered endangered extirpated throughout Maryland:
(1) Bachman's Sparrow (Aimophila aestivalis);
(2) Ivory-Billed Woodpecker (Campephilus principalis);
(3) Lark Sparrow (Chondestes grammacus);
(4) Eskimo Curlew (Numenius borealis);
(5) Red-Cockaded Woodpecker (Picoides borealis);
(6) Roseate Tern (Sterna dougallii);
(7) Greater Prairie Chicken (Tympanuchus cupido).

H. The following mammal species are considered endangered extirpated throughout Maryland:
(1) Gray Wolf (Canis lupus);
(2) American Elk (Cervus canadensis);
(3) Eastern Mountain Lion (Felis concolor);
(4) Snowshoe Hare (Lepus americanus);
(5) Marten (Martes americana).

.07 Threatened Species of Wildlife, Reptiles, Amphibians, Mollusks, Crustaceans, and Finfish.

A. Listing Criteria. The following factors shall be considered for listing species other than plant species as threatened:

(1) Whether the species has experienced a steady, substantial decline in Maryland, and if the decline continues, the species is likely to become endangered;

(2) Whether there has been steady, widespread loss of the species' essential habitat; or

(3) Whether protection measures already taken have significantly reduced the chances of the species becoming extirpated from Maryland.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Except by special permit from the Director a person may not take, export, possess, process, sell, offer for sale, deliver, carry, transport or ship by any means any threatened wildlife, reptile, amphibian, mollusk, crustacean or finfish species.

(2) Permits to take threatened species shall be issued only for:

(a) Scientific research designed to enhance the recovery of the species or population;

(b) Other valid scientific research; or

(c) Educational purposes designed to further public awareness regarding the species.

(3) Incidental taking of a threatened wildlife, reptile, amphibian, mollusk, crustacean or finfish species shall be allowed only after the Director has been notified 30 days in advance of the change in land use or other action by a private landowner which shall result in the incidental taking. The Maryland Forest, Park and Wildlife Service, upon receipt of the application for an incidental taking permit from the landowner, shall within 30 days either:

(a) Take action to salvage the threatened species; or

(b) Issue to the landowner an incidental taking permit authorizing the landowner to proceed with the action which will result in the incidental taking of the species.

C. The following species are considered to be threatened throughout Maryland unless a smaller range is indicated:
(1) Crustaceans. Allegheny Cave Amphipod (Stygobromus allegheniensis).
(2) Insects. Rare Skipper (Problema bulenta).
(3) Reptiles.
(a) Atlantic Loggerhead Turtle (Caretta caretta);
(b) Atlantic Green Turtle (Chelonia mydas).
(4) Birds. Black Skimmer (Rynchops niger).

.08 Threatened Species of Plants.

A. Listing Criteria. The following factors shall be considered for listing a plant species as threatened:

(1) Whether the species has experienced a substantial decline in Maryland, and if the decline continues, the species is likely to become endangered;

(2) Whether there has been a steady widespread loss of the species' essential habitat; or

(3) Whether the species has been listed as endangered but it has been shown that protection measures taken have significantly reduced the chances of the species becoming extirpated from Maryland.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population.

(2) A person may not:

(a) Export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any threatened plant species except by a special permit from the Director;

(b) Take any threatened plant species from State property except by special permit from the Director; and

(c) Take any threatened plant species from private property without the written permission of the landowner.

C. The following plant species are considered threatened throughout Maryland unless a smaller range is indicated:

(1) Single-Headed Pussytoes (Antennaria solitaria);

(2) Giant Cane (Arundinaria gigantea);

(3) Glade Fern (Athyrium pycnocarpon);

(4) Maryland Bur-Marigold (Bidens bidentoides);

(5) Button Sedge (Carex bullata);

(6) Shoreline Sedge (Carex hyalinolepis);

(7) Inflated Sedge (Carex vesicaria);

(8) Leatherleaf (Chamaedaphne calyculata);

(9) Red Turtlehead (Chelone obliqua);

(10) Goldenseal (Hydrastis canadenis);

(11) Deciduous Holly (Ilex decidua);

(12) Narrow-Leaved Bushclover (Lespedeza angustifolia);

(13) Wild Lupine (Lupinus perennis);

(14) Climbing Fern (Lygodium palmatum);

(15) American Lotus (Nelumbo lutea);

(16) Red Bay (Persea borbonia);

(17) Pale Green Orchis (Platanthera flava);

(18) Purple Fringeless Orchis (Platanthera peramoena);

(19) Spongy Lophotocarpus (Sagittaria calycina);

(20) Engelmann's Arrowhead (Sagitttaria engelmanniana);

(21) Northern Pitcher-Plant (Sarracenia purpurea);

(22) Virginia Mallow (Sida hermaphrodita);

(23) Featherbells (Stenanthium gramineum);

(24) Mountain Pimpernel (Taenidia montana);

(25) Steele's Meadowrue (Thalictrum steeleanum);

(26) Kate's-Mountain Clover (Trifolium virginicum);

(27) Dwarf Trillium (Trillium pusillum);

(28) Purple Bladderwort (Utricularia purpurea).

.09 Species in Need of Conservation.

A. Listing Criteria. The following factors shall be considered for listing a species as in need of conservation:

(1) Whether the population is limited or declining within Maryland; and

(2) Whether the species may become threatened in the foreseeable future, if current trends or conditions persist.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Except by special permit, a person may not take, export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any species in need of conservation.

(2) Permits to take species in need of conservation shall be issued only for:

(a) Scientific research designed to enhance the recovery of the species or population;

(b) Other valid scientific research; or

(c) Educational purposes designed to further public awareness regarding the species.

(3) Incidental taking permits are not required for species in need of conservation.

C. The following species are considered to be in need of conservation throughout Maryland unless a smaller range is indicated:

(1) Insects. King's Hairstreak (Satyrium kingi).

(2) Fish. Blackbanded Sunfish (Enneacanthus chaetodon).

(3) Amphibians. Carpenter Frog (Rana virgatipes).

(4) Reptiles. Map Turtle (Graptemys geographica).

(5) Birds.

(a) Henslow's Sparrow (Ammodramus henslowii);

(b) Short-Eared Owl (Asio flammeus);

(c) American Bittern (Botaurus lentiginosus);

(d) Sedge Wren (Cistothorus platensis);

(e) Little Blue Heron (Egretta caerulea);

(f) Common Moorhen (Gallinula chloropus);

(g) American Oystercatcher (Haematopus palliatus);

(h) Least Bittern (Ixobrychus exilis);

(i) Black Rail (Laterallus jamaicensis);

(j) Swainson's Warbler (Limnothlypis swainsonii);

(k) Least Tern (Sterna antillarum).

(6) Mammals.

(a) Porcupine (Erethizon dorsatum);

(b) Bobcat (Lynx rufus);

(c) Least Weasel (Mustela nivalis);

(d) Small-Footed Bat (Myotis leibii);

(e) Southeastern Shrew (Sorex longirostris).

.10 Natural Heritage Areas.

A. Listing Criteria. In order to qualify as a natural heritage area a natural community shall:

(1) Contain one or more threatened or endangered species or wildlife species in need of conservation;

(2) Be a unique blend of geological, hydrological, climatalogical or biological features; and

(3) Be considered to be among the best Statewide examples of its kind.

B. The Forest, Park and Wildlife Service shall prepare maps describing the location of all natural heritage areas. The maps shall be filed in the office of the Director of the Forest, Park and Wildlife Service, Department of Natural Resources, Tawes State Office Building, Annapolis, MD 21401.

C. The following areas are designated natural heritage areas:

(1) Kasecamp Shale Barrens ..... Allegany County;

(2) Maple Run ..... Allegany County;

(3) Outdoor Club Shale Barrens ..... Allegany County;

(4) Sideling Hill Creek .. Allegany, Washington County;

(5) Cypress Creek Swamp ..... Anne Arundel County;

(6) Eagle Hill Bog ..... Anne Arundel County;

(7) Upper Patuxent Marshes .. Anne Arundel, Prince George's County;

(8) Black Marsh ..... Baltimore County;

(9) Robert E. Lee Park ..... Baltimore County;

(10) Camp Roosevelt Cliffs ..... Calvert County;

(11) Cove Point Marsh ..... Calvert County;

(12) Flag Ponds ..... Calvert County;

(13) Randle Cliff Beach ..... Calvert County;

(14) Grove Neck ..... Cecil County;
(15) Plum Creek ..... Cecil County;
(16) Allen's Fresh ..... Charles County;
(17) Chicamuxen Creek ..... Charles County;
(18) Popes Creek ..... Charles County;
(19) Upper Nanjemoy Creek ..... Charles County;
(20) Chicone Creek ..... Dorchester County;
(21) Mill Creek ..... Dorchester County;
(22) Savanna Lake ..... Dorchester County;
(23) Upper Blackwater River ..... Dorchester County;
(24) Upper Nanticoke River, Marshes and Swamps ..... Dorchester, Wicomico County;
(25) High Rock ..... Garrett County;
(26) Toliver Run ..... Garrett County;
(27) Great Falls ..... Montgomery County;
(28) Irish Grove ..... Somerset County;
(29) Hickory Point Cypress Swamp ... Worcester County;
(30) Lower Nassawango Creek ..... Worcester County;
(31) Mattaponi ..... Worcester County;
(32) North Sinepuxent Bay Dunes .... Worcester County.

.11 Violation of Regulations.

Violation of these regulations is a misdemeanor punishable under Natural Resources Articles, §§10-2A-07, 10-1101 et seq., 4-2A-07, and 4-1201 et seq., Annotated Code of Maryland.

TORREY C. BROWN, M.D.
Secretary of Natural Resources

Subtitle 05 WATER RESOURCES ADMINISTRATION

08.05.03 Construction on Non-Tidal Waters and Floodplains

Authority: Natural Resources Article §§8-801 thru 8-814, Annotated Code of Maryland

Notice of Proposed Action
[87-060-P]

The Secretary of Natural Resources proposes to amend Regulation .03 under **COMAR 08.05.03 Construction on Non-Tidal Waters and Floodplains.** The purpose of this amendment is to delete certain exemptions for projects in environmentally sensitive areas of the State's waterways.

Estimate of Economic Impact

I. Summary of Economic Impact. Natural Resources Article, §8-803, Annotated Code of Maryland, requires that any person wishing to change in any manner the course, current, or cross-section of any stream or body of water, first obtain a permit from the Department. Permits are obtained following the submittal of an application and accompanying documentation prescribed in **COMAR.** Regulations governing these activities have existed since the 1930's and have been amended from time-to-time in order to keep pace with goals and objectives of the Department of Natural Resources. The regulatory changes proposed at this time are necessary in order to incorporate those items the General Assembly recognized as necessary in order to preserve and enhance the quality of the State's water resources as they relate to the Chesapeake Bay.

II. Types of Economic Impacts.	Revenue (+) Expense (−)	Magnitude
A. On issuing agency: The Department expects an increase in workload as a result of the deletion of certain exemptions.	(−)	$141,000
B. On other State or local agencies affected: Additional cost to prepare submittals to the Department for review and approval.	(−)	Indeterminable. Depends on amount of applications received from other agencies.
C. On regulated industries or trade groups: 1. Additional cost to prepare engineered submittals to the Department for review and approval.	(−)	$500,000
2. Cost to persons obtaining a permit due to processing time.	(−)	$87,250
3. Time delay for those projects that require an administrative opportunity for a public hearing.	(−)	$105,000
D. On other industries or trade groups affected: Certain delays in starting the intended works may be incurred to the permit applicant as a result of the regulatory process. These delays could be borne by trade groups or subcontractors as a result of scheduling problems.	(−)	Determined on a case-by-case basis but could result in lost earnings to trade groups.
E. Direct and indirect effects on public:	(+)	Could be very large.

III. Assumptions. (Identified by Impact Letter and Number from Section II):

A. A 20 percent increase in applications received is anticipated which would bring the total number of files reviewed by WRA to 1,200 yearly. Each engineer reviews an average of 174 files per year and an inspector inspects an average of 72 waterway permit projects yearly. Based upon the current staff available, it is projected that 1 engineering and 2 inspector positions will be required.

B. An estimated expense to other State and local agencies would be based upon the time and material required to prepare permit applications.

C.1. Given an estimated increase in permit applications of 200 per year, an estimated project cost of $25,000, and an average application preparation fee of 10 percent of the project cost.

C.2. This cost is based on a minimum time to obtain a permit of one month and interest of 12 percent per annum on an average project cost of $25,000.

C.3. This cost is based on a minimum time delay of 2 additional months in permit processing time due to an expected 50 percent increase in the number of applications received. Also included is an average hearing notice publication cost of $100 per permit.

D. Depending on the amount of detailed submittals required for a particular project, time delays will result to the construction industry. In addition, improper implementation of the construction drawings, which cannot be anticipated, can result in time delays to the contractor.

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