IDENTIFICATION AND PROTECTION OF REFERENCE WETLAND NATURAL COMMUNITIES IN MARYLAND:
Potomac Watershed Floodplain Forests

Report Submitted To:

The United States Environmental Protection Agency
Clean Water Act 1995 State Wetlands Protection Development Grant Program

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The Biodiversity Program
(formerly The Natural Heritage Program)
Maryland Department of Natural Resources
Wildlife and Heritage Division

30 June 1999

[U.S. EPA Reference Wetland Natural Communities of the Potomac Drainage Floodplain Forests Grant # CD993275]

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ACKNOWLEDGMENTS

We would like to express our appreciation to the following agencies, organizations, and people for their time and support: The United States Environmental Protection Agency for providing funding through the Clean Water Act's 1995 State Wetlands Protection Development Grant Program; Richard Weigand, Lynn Davidson, Paula Becker, Ann Raspberry, Jennifer Meininger, Ed Thompson, and Katharine McCarthy, all with the Maryland Department of Natural Resources' Wildlife and Heritage Division, for guidance in locating previously identified floodplain forests; Chris Lea for guidance in site selection, data collection, and community interpretation; Rodney Bartgis for assistance in site selection along Sideling Hill Creek; C & O Canal National Historical Park, The Nature Conservancy, and the many private landowners for permitting access to survey locations; and Leslie Sneddon with the Eastern Regional Office of The Nature Conservancy for consultation on interpretation of analyses.

The field work for this project was conducted by Diane Thomson with assistance from Ashton Berdine and Jennifer Meininger. The data analyses and report writing were conducted by Diane Thomson, Andrew Gould, and Ashton Berdine with editorial comments and peer review by Lesley Sneddon and Gary Flemming.

INTRODUCTION

In recent years, the practice of natural resource conservation through the protection of rare, threatened, and endangered species has come under fire by both the general public and the scientific community (Wilcove et al., 1996). These species have served as regulatory endpoint umbrellas, used to protect the larger systems that they inhabit. These procedures have led to the focus of conservation efforts onto majestic species like the Bald Eagle and charming species like the Spotted Owl (Harwell et al., 1990). These species have acted as representatives for their natural systems, but rare species usually do not play a major ecological role within these systems. Actually, the endpoints of conservation efforts should be the natural systems themselves (Harwell et al., 1990). Originally, these representatives served their systems well; it is difficult to induce the public to feel strongly about the conservation of ecologically important endpoints such as predatory mites (Pimentel and Edwards, 1982) and other invertebrates (Wilson, 1987), arbuscular mycorhizal fungi (Van der Heijden et al., 1998), or the nitrogen cycle (Barbour et al., 1987). But, land protection based on charismatic endangered animal species can create a great deal of public controversy (e.g. Spotted Owl conservation in the Pacific Northwest) and often leaves many questions unresolved (Williams, 1996). What happens to land that is currently protected, because of the presence of a species, once that species recovers and is de-listed? What happens to the same type of land if the species becomes extinct? Also, these conservation concepts can lead to the intentional degradation of private land in order to ensure that no endangered species move in and create a regulatory situation, such as in the case of the Red-cockaded Woodpecker in the Southeastern United States (Bean and Wilcove, 1997; Bonnie, 1997).

The complications associated with species level conservation have given rise to a relatively new method in the protection of natural resources. Vegetation communities have been identified as generally appropriate units of biodiversity conservation, they are hierarchically above individual species but more manageable than larger landscape units such as watersheds or physiographic provinces (Thompson, 1996). The definition of vegetation communities used in this report closely follows that of Mueller-Dombois and Ellenberg (1974): communities are physiognomically uniform assemblages of plants which are ecologically related to each other and their physical environment, and predictably found under similar habitat conditions. The abiotic environment is not a component of the definition of vegetation communities, it is assumed that these conditions determine the combination of species within the concept (Thompson, 1996). Often, the vegetation community descriptions are necessarily vague, recognizing that these associations intergrade at ecotones and that boundaries are artificial constructs necessary for conservation. Vegetation communities are merely empirical tools used for natural resource conservation, not an absolute representation of ecological truth (Thompson, 1996).

Historically, a debate has transpired as to whether vegetation actually consists of distinct

communities or a continuum of overlapping species ranges (Grossman et al., 1994). Much of this discussion centered around the "supra-organism" view of F. E. Clements (1936) versus the "individualistic" view of H. Gleason (1926). A full treatise of this debate can be found in Whittaker (1962) and Mueller-Dombois and Ellenberg (1974). More recently, Austin and Smith (1989) have reevaluated this debate and emphasized that there is not actually a polar dichotomy between these two concepts, rather the frames of reference of the observer are in conflict. Vegetation patterns are characterized by the link between individual species distribution patterns, their occurrence in landscape features, and the distribution of the landscape features (Grossman et al., 1994). Species can be individually distributed along gradients, uni-dimensional or complex, following any possible model (Austin, 1987; Austin and Smith, 1989). The pattern of distribution of the landscape features that control environmental factors constrains the pattern of species combinations, their distribution in the landscape, and their frequency (Grossman et al., 1994). Thus the views of community and continuum complement, rather than exclude each other (Westhoff and Van der Maarel, 1978; Austin, 1991).

Vegetation communities are a tractable level of hierarchy for establishing preservation benchmarks because their conservation allows the protection of the overall trophic structure, which is essentially biodiversity (Harwell et al., 1990). Also, there are some legal provisions for protecting vegetation communities: Section 403 © of the Federal Water Pollution Control Act specifically calls for consideration of changes in species diversity (Harwell, 1984b), and Section 301(h) of the Federal Water Pollution Control Act indirectly calls for maintenance of species diversity through its "balanced indigenous population" endpoint as interpreted by regulations and litigation (Harwell, 1984a). Generally, high priority vegetation communities are habitat to high priority plant and animal species, protection of the community will protect these species (Keddy and Wisheu, 1989; Noss, 1987). Conservation using this "coarse-filter" approach has been documented for some taxa (Panzer and Schwartz, 1998). Also, vegetation communities, with their associated biological, chemical, and physical processes, drive the biogeochemical processes of the earth (Naeem et al., 1994). Vegetation community based inventories give a better assessment of the status, distribution, and interrelatedness of vegetation types across the landscape as compared to the historically more prevalent methods of jurisdictionally based (ie. county or agency) inventory. Often, these types of inventory are limited to smaller geographic land units, lead to haphazard data collection, and conclude with improper understanding of community rarity.

Unlike species, vegetation communities are not always self-evident on the landscape. A series of floristic data, collected across both geographic and temporal gradients, is often necessary for naming and understanding vegetation community types. This information must be expressed within the organizational framework of a community classification for the best utilization of the biological data. This classification is a way of collecting uniform hierarchical data that facilitates effective resource stewardship by ensuring compatibility and widespread

use of the information by various individuals and agencies (Grossman et al., 1994). The National Vegetation Classification System (Grossman et al., 1998) is a current priority of The Nature Conservancy and the network of Natural Heritage Programs. This system is the product of a great body of earlier scientific work and over twenty years of data collection by these organizations. Classification is a critical ingredient in the recipe of conservation, it allows for the accurate identification and description of the full range of vegetation community types within the landscape. This along with information on rarity permits formation of proper protection priorities.

Within the framework of The National Vegetation Classification System (Grossman et al., 1998) are hierarchically more finely divided classifications at the regional and state levels. This project contributes to the development of the Maryland Vegetation Classification (Berdine, 1998) which is used for management within the state, comparison to other states, and fine tuning the Community Alliances and Elements of the Eastern Region - 2nd Draft (Sneddon et al., 1996) and The National Vegetation Classification System (Grossman et al., 1998). The Maryland Vegetation Classification (Berdine, 1998) facilitates complete inventory and mapping of the vegetation of Maryland in such formats as the Biological Conservation Database (BCD) and the Gap Analysis Program (Scott and Jennings, 1998). It is also critical for the Maryland Department of Natural Resources' ecosystem - based management approach (MD DNR, 1996). Development of the classification through a series of "special projects", intensely focusing on a small subset of community types, yields the required detailed description of community types as well as the identification and mapping of exemplary examples of these types as reference sites.

With the exception to portions of Garrett and Worcester Counties, the entire land surface area of Maryland lies within the Chesapeake Bay drainage basin. This is one of the largest and most productive estuaries in the United States (Lipson and Lipson, 1997). All of the wetlands within the Chesapeake drainage are integral to the healthy function of the Bay. The phrase "Chesapeake Bay Drainage" is painted on the storm drains in Baltimore City and "The Bay Starts Here" stickers adorn the sinks of many public bathrooms. These statements are also true of the wetlands scattered throughout the state. In order to truly protect the bay, the sources and buffers throughout its watershed must receive protection priority. In addition to their connection with the Chesapeake Bay, Maryland's wetlands are critical habitat for numerous rare, threatened, and endangered plant and animal species and serve valuable ecosystem functions such as flood control, water filtration, and nutrient recycling (Tiner, 1995). Within the diverse set of Maryland's wetlands, there are a very unique group of non-tidal palustrine wetlands called floodplain forests. Prior to this project, very little was known about the species composition, distribution, and abundance of the communities found in these Maryland floodplain forests. Floodplain forests serve valuable ecosystem functions, furnish

habitat to numerous taxonomic groups, are increasingly threatened, and are often habitat for numerous rare, threatened, and endangered plant and animal species. In general, floodplain forests are threatened by both traditional agricultural land use, as well as residential and commercial development.

Fragmentation and development pressures are degrading Maryland's wetland resources at an alarming rate. An estimated 1.2 million acres of wetlands occurred in Maryland before European settlement, but that number is now reduced to 600,000 acres (Tiner, 1995). Of these 600,000 acres of wetlands, approximately 51% (342,000 acres) are non-tidal palustrine wetlands (Tiner, 1995). The state has lost over 600 acres of these wetlands each year since 1955. The drastic loss has accelerated the need for more qualitative information on the character and significance of these wetland resources. This information is necessary for setting protection priorities and initiating existing protection mechanisms. This study was restricted to all floodplain forests within the Potomac River watershed covering almost two-thirds of the state of Maryland, where these communities are poorly understood and severely threatened. The pressure imposed by the sprawling development has heightened the need for study of relatively pristine examples of these community types.

One impediment to wetland protection and restoration efforts is the lack of adequate benchmarks against which to assess ecological integrity. The health of an ecosystem is difficult, if not impossible to assess without explicit knowledge of the target community. Objective measures of the impacts of anthropogenic disturbance on the complex and vast ecosystems of Maryland's palustrine wetlands present a daunting challenge. The measurement of these stresses, documentation of changes, and estimation of geographic cover depends upon the identification of basic units of these wetlands, the component communities, which are some of the end products of this project.

PURPOSE

The purpose of this project was to develop a more complete understanding of the vegetation communities within the floodplain forests of the Potomac River watershed. This was accomplished by developing a vegetation community classification for these wetland types. This classification will be used to augment the ongoing Maryland Vegetation Classification (Berdine, 1998), the Community Alliances and Elements of the Eastern Region - 2nd Draft (Sneddon et al., 1996), and The National Vegetation Classification System (Grossman et al., 1998). With this classification, exemplary examples of each community type were identified and described as reference sites. The information gathered in this project will be used to complement other projects studying palustrine floodplain forests in the Northeastern United States.

The information generated by this project will simplify the regulatory review of these floodplain forests by providing the quantitative data necessary to objectively rank these communities as to their rarity and biological importance. The results of this study will be used to aid in the conservation of these rare communities, to assist in current regulation, to support mapping projects such as the Gap Analysis Program (Scott and Jennings, 1998), and to interpret regional data at higher hierarchical levels. They will also be used by the US EPA cooperators to determine baseline levels of parameters within reference wetlands for long term modeling and conservation.

The end products of this project are: a detailed vegetation community classification and description and reference site descriptions for long term monitoring. These products will be utilized by the Maryland Department of the Environment: Non-tidal Wetlands and Waterways Division, Maryland Department of Natural Resources: Wildlife and Heritage Division, traditional users of the Natural Heritage's Biological Conservation Database, and the Gap Analysis Program.

METHODS

Landscape Analysis

In order to collect ecologically pertinent information, the intricate process of Landscape Analysis must supersede field surveys. The process starts with the development of a preliminary definition of the abiotic and biotic factors that contribute to the community structure of the system of study. Our definition of a floodplain forest was based on previous field experience, consultation with regional ecologists, and literature surveys. For the purposes of this study, a floodplain forest is defined as a forest with canopy closure greater than 60% occurring along the Potomac River or its tributaries and falling within the 100 year flooding regime of the river or tributary it is alongside.

Once a clear search image was established, the process of assembling a portfolio of potential sites occurred using the standard methodologies employed by The Nature Conservancy and the network of state Natural Heritage Programs. Some of these floodplain forests were already known to the Maryland Wildlife and Heritage Division, and were used in determining the definition. Interviews of knowledgeable individuals, both professional and amateur, led to the discovery of many previously unknown sites. Searching thematic spatial data maps (e.g. soils, geology, topographic, etc.) for signatures associated with occurrences of these types of wetlands also yielded the discovery of new sites. A very useful technique was searching the Biological Conservation Database for the locations of rare species that characteristically inhabit these floodplain forests. Attempts to utilize aerial photography and National Wetland Inventory maps were relatively successful in narrowing our search to larger forested tracts within the watershed. At the completion of the Landscape Analysis phase of the project, over 200 potential sites were identified. Owners of private land and managers of public land were contacted and site visits were approved. Proper plant collection permits for public and private land were obtained.

Landscape analysis for this project occurred during the period from February 1995 to May 1995 and again during the winter of 1996-97.

Spatial Distribution of Vegetation: Implications for Sampling Design

An effective and accurate vegetation classification requires sampling the full range of compositional heterogeneity, but the complex spatial nature of vegetation presents a number of problems when designing an optimal sampling scheme at the landscape scale (Grossman et al., 1994). Some characteristics of a good sampling approach are flexibility, replicability, and cost effectiveness; it attempts to characterize as many vegetation patterns possible with efficiency in mind (Grossman et al., 1994). Due to time, budgetary constraints, and large geographic area of the Potomac River watershed, it was implausible to use the methods of

multiple random plot samples of a single vegetation type at one site or repeated sampling of single plots over time to capture the overall composition. Also, randomization procedures may actually be counterproductive to the intent of ecological surveys, especially where the occurrence of natural patterns are known to be non-random (Gillison and Brewer, 1985). In general, plant communities do not occur randomly on the landscape, they occur where the abiotic factors constrain the individual species that constitute the community. Although sampling theory emphasizes randomization in order to provide a probability structure for statistical analysis or to give credibility to statistical models, the recovery of vegetation patterns are not necessarily accomplished by standard statistical sampling procedures (Gillison and Brewer, 1985).

To compensate for these restrictions, an inherently subjective method of selecting sample locations was employed to capture the full floristic range, both among and within vegetation types. While the number of samples within each vegetation type was proportional to its abundance across the entire landscape, types with greater within-type heterogeneity required more intensive sampling.

Field Surveys

Sampling was stratified such that vegetation types were sampled in approximate proportion to their representation on the landscape, and sampling occurred across the entire region of the Potomac River watershed in Maryland. Attempts were made to capture the full range of variation in local conditions, including hydrology, soil chemistry and texture, elevation, aspect, and geologic substrate. A random approach was used to the extent possible to aid in the selection of sites from the set of potential sites, but several factors contributed to the need for a primarily subjective and non-random approach to the actual location and configuration of sample plots. These include the need to place plots in homogeneous vegetation, the necessity to capture as much of the floral heterogeneity of a site as possible, the desire to ease future relocation, and the existence of restrictions on site access.

The field work for this project followed standard methodologies utilized by The Nature Conservancy and the network of state Natural Heritage Programs (Sneddon, 1993) and occurred during the 1996 and 1997 field seasons. The sites identified in landscape analysis were visited and given an initial qualitative rank, which is a relative scale where "A" is excellent, "B" is good, "C" is marginal or fair, and "D" is poor. The ranking was based on four factors: Quality, Condition, Viability, and Defensibility. Only those sites receiving ranks A - C qualified for quantitative survey. Knowledge of the history of land management was also important for the initial ranking (Grossman et al., 1994). These surveys avoided ecotones and significant unusual disturbance events.

Site selection and plot layout placed plots in fairly homogeneous vegetation and avoided sites recently disturbed by human activities or natural events that may have resulted in atypical composition or structure. Plots were small enough to encompass homogeneous vegetation and uniform local conditions and large enough to capture the full range of within-community variation in species composition and vegetation structure.

Vegetation Sampling

At each survey site, project ecologists became familiar with the vegetation and potential vegetation communities. Then, one temporary survey plot was established in the most representative location for each potential community type at each site. The Natural Heritage Methodology utilizes 10 m X 10 m (100 m^2) for herbaceous vegetation, 15 m X 15 m (225 m^2) for shrubland vegetation, and 20 m X 20 m (400 m^2) for forest vegetation, as recommended by Mueller-Dombois and Ellenberg (1974). These standard sizes for plots were used unless the community occupied a smaller area, and then the vegetation of the entire occurrence was recorded. Plant taxonomy and nomenclature followed that of Gleason and Cronquist (1991).

Each plot was surveyed for presence of all vascular plant species rooted in the plot and the percent ground cover was recorded for each species. Cover was estimated by a summation of vertical projections of the canopies of each individual of each species and recorded as a percentage, with a maximum value of 100. All species within the plot that had less than one percent cover received the default value of 0.5%. Any species not rooted within the survey plot, but included in the community were recorded and assigned a cover of zero. The total percent cover for each physiognomic strata was estimated and the dominants of each strata were recorded.

Appendix 1 (Form 3, page 2) contains a sample field form for recording vegetation data and Sneddon (1993) contains detailed instructions for filling out these community field forms.

Environmental Parameters

The location of each community plot was measured in the field using *CMT - March II* global positioning system (GPS) units or subsequently determined from topographic maps. Elevation (within 20 feet) and topographic position were determined using USGS 7.5 minute quadrangle maps. Percent slope was measured with a clinometer and aspect was measured to the nearest 5° using a compass. Geologic substrate was determined from field samples or available geologic topographic maps produced by the Maryland Geological Survey. Soil profiles were recorded from samples extracted with a soil auger. Soil moisture regime, soil stoniness, soil drainage, and average soil texture and color were measured from the soil cores. Also, assignment of hydrologic regime and determination of inundation were based on site position relative to water sources, examination of soil surveys and National Wetlands

Inventory maps, and on-site assessment. Surface substrate cover was estimated visually; precision varies such that all values sum to 100 %.

Appendix 1 (Form 3, page 1) contains a sample field form for recording Environmental Parameters and Sneddon (1993) contains detailed instructions for filling out these community field forms.

Site Descriptors

Brief descriptions of each community including characteristic species and community processes, as well as its landscape context were recorded. An elevation range and community size were determined from USGS 7.5 minute quadrangle maps. Comments on management needs, protection, and ownership were recorded. The landform, geology, soil, hydrology, system, and physiognomic characteristics were described. The vegetation structure was summarized by recording the dominant vascular plant species, height, and estimate of the total percent cover for each physiognomic strata. Then each community occurrence surveyed was ranked again, in comparison to other examples that were surveyed for quantitative data within the scope of the project.

Appendix 1 (Form 2) contains a sample field form for recording Site Descriptors and Sneddon (1993) contains detailed instructions for filling out these community field forms.

Metadata

Each sample plot was assigned a unique numeric or alphanumeric identifier. Dates of sampling, participants, county, physiographic region, and USGS 1:24,000 topographic map quadrangle were recorded. The size and configuration of each plot were noted and photo documentation typically consisted of at least one wide angle photograph of the entire plot. A sketch map accompanied each plot cover sheet, indicating orientation of the plot, locations of soil samples and soil depth measurements, location of photo point(s), and distances and directions to any landmarks.

Field surveys occurred in the time period from June 1995 to September 1995, June 1996 to September 1996, and from June 1997 to September 1997.

Data Compilation and Analysis

After the completion of field surveys, a complete species list for the project was determined and transcribed to a QuatroPro spreadsheet. Then, the percent cover for each species was entered for each community plot. Error checking procedures included manual inspection for transcription errors, invalid formats, values, and species codes. After error checking was completed, archival data files and data forms were prepared. As necessary, environmental variables and site descriptors were calculated or derived (e.g. determining elevation from

topographic maps) and numerical indices derived from descriptive scalars (e.g. site moisture regime). The QuatroPro spreadsheet files were then converted to PC-ORD format (McCune and Mefford, 1995).

Data analysis involved both classification and ordination techniques on the full data set. Then various further reductions were derived by separately removing weedy species, poor quality sites, and herbs. TWINSPAN (Hill, 1979b) and Cluster Analysis within PC-ORD (McCune and Mefford, 1995) were used as tools for developing a classification of vegetation types. Both of these analyses were used because Two Way Indicator Species Analysis is a polythetic divisive classification model while Cluster Analysis is a polythetic agglomerative classification model. They determine classifications using different assumptions and mathematical algorithms (Gauch, 1982; Jongman et al., 1995). Vegetation types were recognized using these classification statistics and refined through subsequent interpretation and comparison with other data. Then, summary statistics for each type (including mean cover, relative cover, constancy, fidelity, and indicator value for each species) were calculated using Indication Species Analysis. These statistics were used to guide the selection of nominal species for each type, with reference, where possible, to existing vegetation community types. This resulted in a meaningful classification of associations, which was cross-walked with existing vegetation community types using the Maryland Vegetation Classification (Berdine, 1998), the Community Alliances and Elements of the Eastern Region - 2nd Draft (Sneddon et al., 1996), and The National Classification System (Grossman et al., 1998). Ordination techniques were used to identify the relationships of recognized vegetation types to one another and the environmental gradients along which they are distributed (Gauch, 1982; Jongman et al., 1995). These techniques were also used to validate the vegetation types determined with the classification models. Ordination was performed using Detrended Correspondence Analysis (Hill, 1989a), as implemented in PC-ORD (McCune and Mefford, 1995).

The objective algorithms of the analysis techniques within PC-ORD were the primary tool used to determine the vegetation classification (McCune and Mefford, 1995). But, these analysis techniques often do not recognize compositional subtleties of similar communities. They often focus on presence or absence of certain species, which can be due to seasonal and conditional biases rather than true community shift. Also, common non-native species tend to combine community types. Therefore, a certain degree of subjective determination by highly trained project ecologists, with the consultation of regional ecologists, was utilized to fine-tune the classification.

Detailed descriptions of each vegetation community type were prepared. They contain descriptions of physiognomy and composition, the range of habitat conditions across which a type occurs, and spatial distribution. They also include the features that distinguish a type from similar types, nomenclatural synonymy, global and state conservation rank, lists of rare species, a discussion of characteristic species, disturbance history, successional status, and

conservation and management concerns. Also, a list of high quality reference sites was created. These include detailed site descriptions and accurate digital maps created with ArcView using field collected GPS plot data and *SureRaster* digital topographic maps.

Data compilation and analysis occurred during the time period from October 1997 to July 1998.

RESULTS

Of the over 200 sites initially identified as potential floodplain forests to visit, 140 were visited and quantitative data was collected from 180 plots.

Through discretion of project ecologists, consultation with regional ecologists, and comparison with the classifications of neighboring states with similar vegetation community types, the final interpretation was based on the analyses of the data primarily split by dominant woody species, physiographic province, and landscape position (flooding periodicity). The regional species that are characteristic of the various physiographic provinces were often distinct enough for a community split in TWINSPAN (Hill, 1989b).

Community Descriptions

The interpretation of ecological statistics was used as a tool to clarify relationships of field observations. All things considered, the classification of floodplain forest vegetation ascertained fourteen community types in the Potomac River watershed. These types are:

Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa Forest

Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana Forest

Acer saccharinum - Ulmus americana - (Populus deltoides) Forest

Fagus grandifolia - Liriodendron tulipifera Forest

Platanus occidentalis - Acer negundo / Asarum canadense Forest

Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba Forest

Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea Forest

Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana Forest

Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus Forest

Acer rubrum - Nyssa sylvatica - Betula nigra Forest

Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia Forest

Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum Forest

Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca Forest

Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium Woodland

The complete descriptions of these vegetation communities can be found in the Community Description section of this report.

Reference Sites

One site containing an exemplary example of each of the fourteen floodplain forest community types was identified, mapped, and described. The order of these sites in this report correspond to the order in which its vegetation community is described. These sites are: Southern Sideling Hill Creek Floodplain, Bear Island, Dickerson Floodplain, Blockhouse Point, Cabin John Island, St Mary's River Floodplain, Pomfret Swamp, Mattawoman Creek at Bumpy Oak Road, Piscataway and Potomac Confluence, Brushy Ridge Floodplain, Savage River Floodplain, Point Lookout Woods, and Olmstead Island Complex. The full descriptions of these sites can be found in the Reference Site Description section of this report.

DISCUSSION

Site Visits

During the landscape analysis for this project, over 200 sites that were potential habitat for floodplain forest communities were identified. The most productive method used to determine these sites was interviews with knowledgeable individuals. Discussions with both amateur and professional ecologists led to the discovery of over 50% of the potential sites. The second most productive method for site identification was searching the Natural Heritage's Biological Conservation Database (BCD) for the locations of rare species that characteristically occurred in these floodplain forest types. De novo searches led to a small additional group of sites. These searches were primarily based upon hydrologic interpretation of topographic maps with some additional information gleaned from geology and soils map. These data sources were generally used only for the identification of potential sites with specialized geologic characteristic. Aerial photos and NWI maps were used sparingly; generally only as a tertiary source of information once perspective sites were identified.

During the field surveys for this project, 140 of the over 200 potential sites were visited for preliminary assessment. The remaining sites were not visited due to several factors. The leading cause of most of the unvisited sites was the acquisition of new site information after the completion of landscape analysis. The second leading cause of unvisited sites was the denial of site visit by landowners. Also, after a preliminary understanding of these community types was established, the need to collect additional data tapered and sites were not visited.

Of the 140 sites that were visited, 180 community plots were surveyed. The diversity of vegetation community types within the Potomac drainage floodplain forests was higher than expected. After the preliminary classification was developed, sites were visited to check this classification and data was collected only in suspected new community types. As a rule of thumb, between 10 and 15 plots for each community type are best for an accurate classification. Since this classification has 14 community types, the 180 plots were ample for their description. One reason that visited sites were not surveyed is that the floodplain contained D quality community occurrences.

Classification

This project yielded fourteen forested community types found within the Potomac River watershed floodplains in Maryland. This classification is a product of untangling statistical analyses and interpreting the landscape. These community types were determined by balancing the results of various classification and ordination techniques on several versions of collected data with the opinions of project ecologists, regional ecologists, and previous classifications of these community types. One cannot solely utilize multivariate statistical

methods and expect to determine an ecologically meaningful classification. These statistics are merely a tool, albeit an extremely powerful one, to assist in the understanding of ecological information. Often times, these tools cannot accurately examine subtle relationships between generally similar vegetation types and create groups based on the presence or absence of less ecologically meaningful species.

Some of the natural community types determined in the analysis seem to be linked to abiotic factors. The dominant factors that determined the classification of these vegetation types is geographic position and flooding regime. Many of the vegetation types split by physiographic province due to distribution of montane and lowland species. Flooding periodicity and strength (ie. landscape position) were other factors greatly influencing floodplain vegetation.

Wetland Conditions

Although high quality examples of each of these fourteen community types exist within the Potomac River watershed, most of these floodplains suffer from significant abiotic and biotic threats. There are heavy impacts on these floodplain forests from traditional land use practices. Many examples of the forested wetland types have been logged, either historically or within the last 80 years. It has been estimated that 10,000 acres of palustrine wetlands were lost to agricultural practices between 1955 and 1978 and 2062 acres were lost due to agricultural practices between 1982 and 1989 (Tiner, 1995). Where wetlands have not been completely destroyed, soil compaction and decimation of native plants have resulted from intensive livestock grazing. Feeding, trampling, and seed dispersal by animals at a high density can destroy the pristine areas as thoroughly as can a chainsaw (Janzen, 1986). The impacts of traditional land use are accompanied by the pressures from land development. The conversion of land from natural and agricultural to commercial and residential poses one of the single largest threats to palustrine wetlands in Maryland.

The landscape of Maryland is highly fragmented. Now, natural communities generally exist as isolated patches often within a matrix of agricultural land, urban development, pastures, and clearcuts (Burgess, 1988). This is especially true of the floodplain forests or the Potomac River watershed in Maryland. These floodplains are often small biologically rich islands surrounded by relatively depauperate upland forest or sterile cultural habitats. They may be linked genetically via gene flow by pollen and seed dispersal vectors. But, the habitat between fragments can be a formidable barrier to colonization (Wilcove et al., 1986), pollination (Aizen and Feinsinger, 1994), and dispersal (Matlack, 1994). Much of the surrounding upland forest has been removed, cutting off natural corridors. This forest fragmentation can cause changes in the remnant patch's internal community structure, composition, biomass, and microclimate (Laurance et al., 1998). The fragmentation also causes a loss of habitat heterogeneity, which leads to local extinctions (Wilcove et al., 1986). Diversity within a community is a balance of regional speciation and dispersal with predation, competitive

exclusion, adaptation, and stochastic variation. Local diversity is dependent on regional diversity and regional and historical processes profoundly influence local community structure (Ricklefs, 1987). We must consider the matrix of processes on large spatial and temporal scales effecting natural communities. Protecting the land that contains the wetland vegetation communities alone may not be enough to protect the communities themselves.

Habitat fragmentation has led to the development of habitats for ruderal and non-native species which then can directly threaten native interior species (Wilcove et al., 1986). Other alterations to floodplain habitats have also resulted in the introduction of non-native species into these communities. The largest nuisance species in these floodplain forests is *Microstegium vimineum*. There are very few examples of these floodplains in which this species is absent. If the pattern of this species is similar in these floodplains as it is in other palustrine wetlands and uplands of Maryland, then this species could soon become the dominant in most occurrences. Other non-native species that are problems in these floodplains are: *Alliaria petiolata*, *Glechoma hederacea*, *Lonicera japonica*, *Celastrus orbiculatus*, *Dioscorea batatas*, *Hedera helix*, *Lysimachia nummularia*, *Rosa multiflora*, *Allium vineale*, *Arthraxon hispidus*, *Coronilla varia*, *Duchesnea indica*, *Hemerocallis fulva*, *Iris pseudacorus*, *Lamium purpureum*, *Lespedea cuneata*, *Ornithosgalum nutans*, *Perilla frutescens*, *Phalaris arundinacea*, *Polygonum sachalinse*, *Ranunculus ficaria*, *Sorghum halepense*, *Ampelopsis brevipedunculata*, *Euonymus fortunei*, *Solanum dulcamara*, *Vinca minor*, *Berberis thunbergii*, *Ligustrum* spp. (Privet), *Lonicera morrowii*, *L. tatarica*, *Rubus phoenicolasius*, *Ailanthus altissima*, *Catalpa bignonioides*, *Morus alba*, *Paulownia tomentosa*, and *Prunus avium*. Efforts should be made to reduce these species through manual removal.

Conservation Implications

Current conservation norms determine protection priorities based on species level information. Although the conservation of rare, threatened, and endangered species is a reasonable endpoint, often these species occur in highly fragmented and human dominated landscapes. These habitat conditions may not allow the persistence of these species. This type of conservation is substantively attempting to maintain biodiversity through protecting these occurrences as umbrella endpoints. However, the conservation of biodiversity may be better served through the protection of rare and / or exemplary common examples of vegetation communities. Vegetation communities can play a much broader role by linking habitat and process information to specific species requirements (WPC, 1998). Potentially, the protection of vegetation communities will protect the full range of heterogeneity on the landscape, and thus biodiversity. Communities can have longer term viability than rare, threatened, and endangered species. Generally, a large scale stochastic event must occur to alter the structure and composition of vegetation communities at a site, while smaller scale events could eliminate a species from that same site.

Proper documentation and understanding of the biotic and abiotic factors that contribute to vegetation communities can lead to predictive ability of where these communities occur on the landscape, what species can be found within them, and what rarity and condition qualities exist. By creating a classification of floodplain forests of Maryland's Potomac River watershed, this project has assisted in these factors.

The information obtained from this project will be used in planning and regulation by state agencies, federal agencies, municipalities, land trusts, and conservation groups concerned with protection of ecological values in the following ways:

1) Inventory information is used directly within the state's regulatory framework. The Wildlife and Heritage Division, Maryland Department of Natural Resources, serves as a clearing house of information on the status, location, and distribution of rare plant and animal species and exemplary natural communities in the state. The Wildlife and Heritage Division administers the state's Threatened and Endangered Species Act, which requires the compliance of state agencies and private land developers in the protection of threatened and endangered species with the state via permitting for proposed activities affecting said species.

The Wildlife and Heritage Division has long reviewed proposed activities of many state agencies, and is collaborating with the state's Water Resources Administration to review wetland permit applications. Water Resources' Water and Wetlands Program has adopted rules which require that impacts on state-listed plant and animal species and exemplary natural communities tracked in the Biological Conservation Database (BCD) must be considered for all major and minor projects.

2) Protection results through the dissemination of Natural Heritage information to traditional users of this data, including federal agencies, developers, consultants, private landowners, municipalities, and conservation groups. These groups request natural resource information in the early planning stages of local projects, and for longer term municipal zoning, development planning , and conservation priority setting. In addition to these traditional uses exists the following results:

a) Maps of high protection priorities and biologically important examples of vegetation communities discovered will soon be available in a digital form through the Wildlife and Heritage Division's Information Technology GIS system (although not within the scope of this project). This will provide the Maryland Department of Natural Resources with a consistent and compatible data layer for its use in review and the planning process. Updated and specific information resulted from this project is an important aspect for Natural Heritage data use by others, since much of our historic natural community data

is vaguely located and causes misinterpretation by users not familiar with the specific site of species.

b) The data is made available to local and international land trusts and conservation organizations. Because of the potential rarity of these vegetation communities, the protection of exemplary occurrences automatically becomes a priority for The Nature Conservancy field offices.

3) This inventory also complements Section 104 (b) (3) projects undertaken by the Nontidal Wetlands and Wetlands and Waterways Division in several ways. The Water Resources Division is currently developing a computerized database for accessing permitting information more efficiently. Natural Heritage information on unique wetland resources could be represented as a GIS data layer in this database. This would help create a better permit review context for applications received by the Division. Although this option is available, Wildlife and Heritage Division staff currently review wetlands permits and other applications and provide comments on the potential project impacts directly to the Nontidal Wetlands and Waterways Division. This data will also aid in the development of watershed management plans. Inventory must be completed as one of the first steps in plan development.

4) The results from this project will be shared with the governments and conservation organizations of neighboring states with similar community types. This data will also be shared with The Nature Conservancy. The data will be compiled with the data from other states and analyzed with a regional perspective. This will increase the ability to recognize meaningful patterns and make classification decisions, which will in turn result in an improved context for making conservation and management decisions over a large and comprehensive landscape on the scale of natural community and species ranges (WPC, 1998).

5) The results of this project provide the necessary baseline data for long term monitoring for assessing the function of similar floodplain forests by other wetland researchers. Reference wetlands are recommended as the best examples of each community type defined for continued research by EPA cooperators. This information will also be used to provide a critical reference by which to measure the success of mitigation efforts.

Additional Research Needs

This survey of the forested communities of Maryland's Potomac River watershed should not stand alone. A better understanding of these dynamic and diverse systems would be acquired with additional research. There appears to be a multitude of amphibians, birds, reptiles,

odinates, lepidoptera, and other insects that utilize these floodplain forests as habitat and may play a vital role in their function. Intensive study of these taxa should be conducted, but with sensitivity to wetland impacts due to site visitation. Also, research on the soil chemistry, hydrogeo-morphology, and nutrient cycles in these floodplain forests would aid in the understanding of the functions of these wetlands.

Community Descriptions

Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa Forest

COMMON NAME	Sugar maple - White ash - White basswood / Black snakeroot Forest
ELEMENT CODE	6237
SYNONYM	Lowland Mixed Mesophytic Forest
NATIONAL SYNONYM	•*Fagus grandifolia - Acer saccharum - Liriodendron tulipifera* Unglaciated Forest Alliance (2411 in part) •*Acer saccharum - Liriodendron tulipifera - Fraxinus americana / Staphylea trifolia* Forest (6201 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Lowland or Submontane Cold-deciduous Forest
ALLIANCE	*Acer saccharum - Fraxinus americana - Tilia americana* Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest is not restricted to floodplains, however this description is based on floodplain data (where it is found to occur in areas which are flooded every fifteen to thirty years). This forest is found on rich, mesic silty loam or loam soils which are created from lighter sediments often carried by slow moving flood waters. This community is usually protected from strong floodwater currents due to its landscape position on higher elevations or protected areas in river bends. These areas average 100 feet in elevation along the main stem of the Potomac River and occur at higher elevations on tributaries such as the lower stretch of Sideling Hill Creek. This community may also be found on sandy loam soils at elevations over 150 feet along the Potomac River main stem and on larger tributaries, as well. Ground cover is variable and includes woody debris, bare soil, and leaf litter, ranging from zero to 98 percent. Bare soil cover is typically higher when the alluvium is sandy.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Acer saccharum, Fagus grandifolia, Liriodendron tulipifera, Quercus alba, Q. rubra, Fraxinus americana, F. pennsylvanica*
Shrub	*Asimina triloba, Lindera benzoin, Cornus florida, Hamamelis virginiana, Carpinus caroliniana*
Vine	*Parthenocissus quinquefolia*
Herbaceous	*Polystichum acrostichoides, Sanicula gregaria, Brachyelytrum erectum, Pilea pumila, Asarum canadense, Caulophyllum thalictroides*

ADDITIONAL CHARACTERISTIC SPECIES

Fagus grandifolia, Carya cordiformis, C. laciniosa, Tsuga canadensis, Tilia americana, Platanus occidentalis, Quercus michauxii, Q. velutina, Boehmeria cylindrica, Cystopteris protrusa, Cimicifuga racemosa

VEGETATION DESCRIPTION

The tree canopy in this *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest is co-dominated by *Acer saccharum, Liriodendron tulipifera, Quercus alba*, and *Fraxinus pennsylvanica.* Other tree species that occur are *Fagus grandifolia, Tilia americana, Carya cordiformis, Quercus michauxii*, and *Q. velutina*. The shrub layer is moderately dense averaging 45 percent cover and is typically dominated by *Asimina triloba* and sometimes *Lindera benzoin, Cornus florida, Hamamelis virginiana*, and *Carpinus caroliniana,* as well. Vine cover averages three percent and *Parthenocissus quinquefolia* is the most common vine. Herbaceous cover is also moderate averaging 35 percent cover. *Polystichum acrostichoides, Sanicula gregaria*, and *Brachyelytrum erectum* are the most abundant herbs on silty loams while *Pilea pumila, Asarum canadense, Caulophyllum thalictroides*, and *Eupatorium rugosum* are most abundant on sandy loam soils. Some other frequent species that occur include *Quercus rubra* seedlings, *Acer rubrum, Nyssa sylvatica, Prunus serotina* seedlings, *Ilex opaca, Arisaema triphyllum, Aster divaricatus, Carex platyphylla, Festuca subverticillata, Polygonatum biflorum*, and *Solidago caesia*. Spring ephemerals include *Podophyllum peltatum, Jeffersonia diphylla, Erythronium* sp., *Claytonia virginiana, Dentaria laciniata*, and *Ranunculus abortivus.*

On river bends of Potomac River tributaries, this community sometimes occurs in close association and up slope from the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest (2582).

The invasive non-native species *Microstegium vimineum, Lonicera japonica*, and *Alliaria petiolata* are often present and may threaten community integrity by out-competing native species. At some sites the non-natives are drastically changing community composition.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur within this community include *Galium concinnum, Ptelea trifoliata, Carex conoidea, Athyrium pycnocarpon, Erigenia bulbosa*, and *Carya laciniosa. Arisaema dracontium* is an uncommon (S4) species which also occurs in this community.

RANGE

According to Terrestrial Vegetation of the Northeastern United States (Sneddon et al. 1998), the *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest occurs in New York, New Jersey, Pennsylvania, Maryland, West Virginia, and possibly Virginia.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur on floodplains along Sideling Hill Creek and Monocacy River, and along the Potomac River in the Potomac Gorge.

CONSERVATION RANK

S3

RANK CONFIDENCE

High

RANK JUSTIFICATION

Rank accounts for wide distribution, high level of threat from non-native species, and the number of known occurrences in Maryland. More inventory data is needed to document other examples in Maryland.

REFERENCE SITES

- Cropley, Montgomery County (38 58 38 N, 77 13 11 W) and (38 58 36 N, 77 13 14 W) -- precise coordinates for community occurrence at this site
- Southern Sideling Hill Creek (39 39 12 N, 78 20 40 W) and (39 38 39 N, 78 20 29 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

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AUTHOR

Diane Thomson, 1998.

Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana Forest

COMMON NAME	Chestnut oak - Northern red oak - White oak - Pignut hickory / Hop hornbeam Forest
ELEMENT CODE	6809
SYNONYM	Oak - Hickory Ancient Terrace Floodplain Forest
NATIONAL SYNONYM	*Quercus prinus - Quercus rubra / Gaylussacia baccata* Forest [Provisional] (6057 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Lowland or Submontane Cold-deciduous Forest
ALLIANCE	*Quercus prinus - Quercus rubra* Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest may be limited to upper rocky floodplain terraces and is known to occur in the Potomac Gorge. In the gorge, the Potomac River flows over resistant rocks at Great Falls, at which point the river narrows causing flooding velocity (and scouring) to intensify. On Bear Island, this forest community occurs in the 100 year floodplain and was likely flooded in the catastrophic flood of 1936. Soils are shallow, averaging less than 10 cm in depth, and the top 1-5 cm are organic. Soils are somewhat poorly drained to well drained silt and sandy loams. Thin soils contribute to xeric conditions which are the likely cause of stunted tree cover. Exposed bedrock averages 25 percent cover at the surface.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Quercus alba, Q. rubra, Q. prinus, Carya glabra, Fagus grandifolia*
Tall shrub	*Ostrya virginiana, Diospyros virginiana, Juniperus virginiana, Kalmia latifolia, Sassafras albidum, Cornus florida, Asimina triloba, Hamamelis virginiana*
Short shrub	*Vaccinium stamineum, Vaccinium pallidum*
Vine/liana	*Smilax rotundifolia, Vitis* sp., *Parthenocissus quinquefolia*
Herbaceous	*Danthonia spicata, Panicum boscii, Panicum* spp., *Aster divaricatus, Arisaema triphyllum*

ADDITIONAL CHARACTERISTIC SPECIES

Carya tomentosa, C. cordiformis, Quercus stellata, Chionanthus virginicus, Smilax glauca, Viburnum rafinesquianum, Deschampsia flexuosa, Carex pensylvanica, Hystrix patula, Brachyelytrum erectum, Verbesina alternifolia, Cardamine concatenata, Claytonia virginica, Erythronium americanum

VEGETATION DESCRIPTION

The tree canopy in this *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest is low in height, averaging 20 meters. In addition to these tree species, *Carya tomentosa, C. cordiformis,* and *Quercus stellata* are also characteristic. Also occurring are *Pinus virginiana, Acer rubrum, Nyssa sylvatica,* and *Fraxinus americana.* Shrub cover is moderate averaging 20 percent and includes *Ostrya virginiana, Diospyros virginiana, Juniperus virginiana,*

Chionanthus virginicus, *Hamamelis virginiana*, *Kalmia latifolia*, *Vaccinium stamineum* and *V. pallidum*. Vines of *Smilax glauca*, *S. rotundifolia*, and *Parthenocissus quinquefolia* are frequent. Herbs such as *Danthonia spicata*, *Carex* spp. and *Panicum* spp. average 50 percent cover.

A more mesic and species rich variant of this forest type has been observed and is characterized by an abundance of *Fagus grandifolia*, *Arisaema triphyllum*, *Asimina triloba.*, and spring ephemerals. This variant has little exposed bedrock and deeper soils (averaging 20 cm) than the typical community expression. This variant may also receive low velocity backwater flooding. The tree canopy is similar except that *Fagus grandifolia* is one of the dominant species. The shrub layer is moderately dense averaging 30 percent cover and include *Asimina triloba*, *Sassafras albidum*, *Cornus florida*, and *Vaccinium stamineum*. Vines of *Smilax glauca* and *Parthenocissus quinquefolia* typically occur at less than one percent cover. Abundant herbaceous species are *Podophyllum peltatum*, *Geranium maculatum*, *Viola palmata*, *Arisaema triphyllum*, and *Aster divaricatus* average 30 percent cover. Ephemerals, such as *Cardamine concatenata*, *Claytonia virginica*, and *Erythronium americanum* are abundant in the spring

This forest occurs in close association with the *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland (6813) , but receives less scouring from floodwaters because it occurs farther from the Potomac River and at higher elevations than the woodland type. In addition, the forested community has more tree cover, less exposed bedrock, and deeper soils than the closely associated woodland type. Other communities that may be adjacent to this *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest are the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest (6814) and the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest (6815).

The invasive non-native species *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are often present and may threaten community integrity by out-competing native species. At some sites the non-natives are drastically changing community composition.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur within this community include *Melica mutica*, and *Scutellaria saxitilis*. *Hybanthus concolor* has been observed in the more mesic and rich variant.

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), the *Quercus prinus - Quercus rubra* Forest Alliance occurs in Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and possibly Maryland and West Virginia. Inventory has confirmed this alliance in Maryland, as well.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur along the Potomac River, on Bear Island (Montgomery County) and possibly on other adjacent islands in the Great Falls area.

CONSERVATION RANK

S1/S2

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for a very restricted distribution, higher level of threats from non-native species, and the limited number of known occurrences in Maryland. More inventory and further comparison to other Oak-Hickory upland forests is needed to finalize the conservation rank in Maryland.

REFERENCE SITES

Bear Island, Montgomery County (38 59 27 N, 77 14 43 W) and (38 58 53 N, 77 14 07 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

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AUTHOR

Diane Thomson, 1998.

Acer saccharinum - Ulmus americana - (Populus deltoides) Forest

COMMON NAME	Silver maple - American Elm - (Eastern Cottonwood) Forest
ELEMENT CODE	2586
SYNONYM	Low Terrace Floodplain Forest
NATIONAL SYNONYM	•*Acer saccharinum - Populus deltoides / Matteuccia struthiopteris* Forest (6147 in part) •*Acer saccharinum / Boehmeria cylindrica* Forest (6176 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Acer saccharinum* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest is an alluvial forest in the Ridge and Valley, Blue Ridge, and Piedmont physiographic provinces. This is the typical low terrace forest found immediately adjacent to larger rivers such as the Potomac and is usually found on moderately well drained or poorly drained silt loam or sandy loam. Annual river flooding generally occurs in the spring and can be severe, depositing large amounts of sand and woody debris from upstream. Leaf litter and woody debris are usually present and bare soil averages moderately high cover.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Acer saccharinum, Acer negundo, Platanus occidentalis, Populus deltoides*
Shrub	*Asimina triloba, Lindera benzoin*
Vine/liana	*Parthenocissus quinquefolia, Toxicodendron radicans*
Herbaceous	*Eupatorium rugosum, Urtica dioica, Pilea pumila, Verbesina alternifolia, Laportea canadensis, Impatiens capensis*

ADDITIONAL CHARACTERISTIC SPECIES

Ulmus americana, Fraxinus pennsylvanica, Artemesia annua, Vitis spp., *Rudbeckia laciniata, Elymus villosus, Bidens frondosa, Boehmeria cylindrica, Cryptotaenia canadensis, Polygonum virginianum, Teucrium canadense, Leersia virginica, Scrophularia marilandica*

VEGETATION DESCRIPTION

The tree canopy in this *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest is dominated by *Acer saccharinum* (greater than 25 percent cover), *Acer negundo, Platanus occidentalis*, and occasionally, *Populus deltoides.* Areas where *Acer saccharinum* and *Populus deltoides* co-dominate generally have well-drained sandy loam soils because *Populus deltoides* colonizes newly formed sandbars (Sharitz and Mitsch 1993). The shrub layer averages 20 percent cover and is dominated by a mix of *Asimina triloba, Lindera benzoin*, and *Acer negundo. Parthenocissus quinquefolia* and *Toxicodendron radicans* are frequently encountered vines (vines typically are less than five percent cover). Herbaceous

species generally cover approximately 50 percent of the ground by late season and are dominated by *Eupatorium rugosum, Urtica dioica, Pilea pumila, Verbesina alternifolia, Laportea canadensis,* and *Impatiens capensis. Saururus cernuus* also occurs within this forest community in small depressions having saturated mucky soils. Other characteristic species include *Ulmus americana, Fraxinus pennsylvanica, Artemesia annua, Vitis* spp., *Rudbeckia laciniata, Elymus villosus, Bidens frondosa, Boehmeria cylindrica, Cryptotaenia canadensis, Polygonum virginianum, Teucrium canadense, Leersia virginica,* and *Scrophularia marilandica.*

A small patch variant recognized by a greater dominance of *Fraxinus pennsylvanica* and *Ulmus americana* is found in more poorly-drained areas within the typical *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest. These poorly drained areas include sloughs or flats typically having silt loams. In addition to *Fraxinus pennsylvanica* and *Ulmus americana, Acer saccharinum* is common along the edges of this small patch inclusion. *Acer negundo* and *Lindera benzoin* dominate a sparse shrub layer that averages less then 15 percent cover. Vines of *Parthenocissus quinquefolia* are present at low cover (less than one percent). The herbaceous layer within this variant is much less, averaging 25 percent total cover. Herb species are similar to the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest except that the variant contains *Polygonum arifolium* and more *Carex* species. This variant is known to occur at Dickerson Floodplain, Frederick County and Great Falls Floodplain, Montgomery County.

The three non-native invasive plant species that pose the greatest threat to this community are *Glechoma hederacea, Alliaria petiolata* and *Microstegium vimineum.* Other non-native species commonly encountered include *Polygonum cespitosum, Hemerocallis fulva, Humulus japonicus, Ailanthus altissima, Stellaria media, Calystegia sepium,* and *Chenopodium album.* Non-native species often have a greater ability to out-compete native species in this community, thus altering community composition and lowering species diversity.

OTHER NOTEWORTHY SPECIES

A state rare plant species, *Cyperus retrofractus* (S2) is known to occur within this community.

RANGE

According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest occurs in Kentucky, Tennessee, Virginia, Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Also noted in Terrestrial Vegetation of the Northeastern United States (Sneddon et al. 1998), the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest occurs in Arkansas, Iowa, Illinois, Indiana, Kentucky, Michigan, Missouri, Minnesota, ,Ohio, Ontario, Tennessee, Virginia, and Wisconsin. Inventory has confirmed this alliance in Maryland, as well.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur in the Ridge and Valley, Blue Ridge, and Piedmont physiographic provinces.

CONSERVATION RANK

S5

RANK CONFIDENCE

High

RANK JUSTIFICATION

Rank accounts for wide distribution and number of known occurrences in Maryland.

REFERENCE SITES

- Weaverton / Brunswick Floodplain, Washington/Frederick Co. (39 19 45 N, 77 40 34 W) and (39 18 34 N, 77 37 32 W) -- precise coordinates for community occurrence at this site
- Dickerson Floodplain, Montgomery County (39 11 53 N, 77 28 17 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Mouth of Sidling Hill Creek, Allegany County (39 38 20 N, 78 20 10.5 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

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AUTHOR

Diane Thomson, 1998.

Fagus grandifolia - Liriodendron tulipifera Forest

COMMON NAME	Beech - Tulip poplar Forest
ELEMENT CODE	6807
SYNONYM	Beech - Tulip Piedmont Streamside Forest
NATIONAL SYNONYM	*Fagus grandifolia - Liriodendron tulipifera / Euonymus americanus / Athyrium felix-femina* ssp. *asplenioides* Forest (7201 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Fagus grandifolia* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Fagus grandifolia - Liriodendron tulipifera* Forest occurs on narrow floodplains adjacent to small streams that have steep-sided banks. Flooding frequency is one to five years. The soils are moderately deep (averaging 20 cm), moderately well-drained sandy loam and silt loam with some mottling, and covered by leaf litter.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Fagus grandifolia*, *Liriodendron tulipifera*
Shrub	*Fagus grandifolia*, *Ulmus rubra*, *Carpinus caroliniana*, *Sassafras albidum*
Herbaceous	*Athyrium thelypterioides*, *Polystichum acrostichoides*, *Dioscorea quaternata*

ADDITIONAL CHARACTERISTIC SPECIES

Asplenium platyneuron, *Mitchella repens*, *Carex platyphylla*, *Medeola virginica*, *Osmunda cinnamomea*, *Sanguinaria canadensis*, moss spp.

VEGETATION DESCRIPTION

The tree canopy in this *Fagus grandifolia - Liriodendron tulipifera* Forest is co-dominated by the two nominal species. The shrub and herbaceous layers are both somewhat sparse, each averaging less then 10 percent cover. The shrub layer is composed of *Fagus grandifolia* saplings, *Ulmus rubra*, *Carpinus caroliniana*, and *Sassafras albidum* and the herbs include *Athyrium thelypterioides*, *Polystichum acrostichoides*, *Dioscorea quaternata*, *Asplenium platyneuron*, *Mitchella repens*, *Carex platyphylla*, *Medeola virginica*, *Osmunda cinnamomea*, and *Sanguinaria canadensis*. Other herbs present include *Podophyllum peltatum*, *Aster divaricatus*, *Thelypteris noveboracensis*, *Arisaema triphyllum*, *Onoclea sensibilis*, *Geum virginianum*, *Ranunculus abortivus*, *Sedum ternatum*, *Viola* sp., *Vitis riparia*, *Osmorhiza claytonii*, and *Thelypteris hexagonoptera*.

OTHER NOTEWORTHY SPECIES

[none]

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeast United States (Weakley et al. 1998), the *Fagus grandifolia* Forest Alliance occurs in Georgia?, Kentucky?, Mississippi, South Carolina, Tennessee?, Texas?, and Virginia. This documentation in Maryland constitutes a northern extension of the Alliance's known range.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur along streams in Montgomery County. More surveys are likely to reveal a wider distribution along other small streams in the Piedmont physiographic province.

CONSERVATION RANK

S3?

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for known occurrences and the probable distribution in Maryland. More inventory data is needed to finalize the conservation rank in Maryland.

REFERENCE SITES

Blockhouse Point, Montgomery County (39 03 44 N, 77 18 23 W) and (39 03 46 N 77 18 41 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

Thomson, D. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

Weakley, A.S., K.D. Patterson, S. Landaal, M. Payne and others. 1998. Terrestrial Vegetation of the Southeastern United States (draft). The Nature Conservancy, Southeast Regional Office. Chapel Hill, North Carolina.

AUTHOR

Diane Thomson, 1998.

Platanus occidentalis - Acer negundo / Asarum canadense Forest

COMMON NAME	Sycamore - Box elder / Wild ginger Forest
ELEMENT CODE	6815
SYNONYM	High Terrace Piedmont Floodplain Forest
NATIONAL SYNONYM	•*Platinus occidentalis - Acer saccharinum - Juglans nigra - Ulmus rubra* Forest (7334 in part) •*Platinus occidentalis - Acer negundo* Forest (2092 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Platanus occidentalis* - (*Fraxinus pennsylvanica, Celtis laevigata, Acer saccharinum)* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest is a floodplain forest that occurs primarily on the Piedmont, but can also occur on the western shore of the Coastal Plain and the Ridge and Valley physiographic provinces. The forest can occur on riverfronts, on low terraces and on higher terraces receiving less intense flooding. The alluvial soils are generally well drained silt or sand loams. Flooding generally occurs on an annual basis. Leaf litter and bare soil vary from zero to 70 percent cover and woody debris deposited from flooding is often present.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Platanus occidentalis, Acer negundo*
Shrub	*Asimina triloba, Lindera benzoin*
Vine/liana	*Parthenocissus quinquefolia*
Herbaceous	*Asarum canadense, Laportea canadensis, Cryptotaenia canadensis, Hydrophyllum canadense, Impatiens capensis, Sanicula gregaria, Senecio aureus*

ADDITIONAL CHARACTERISTIC SPECIES

Betula nigra, Celtis occidentalis, Carya cordiformis, Juglans nigra, Ulmus rubra, U. americana, Liriodendron tulipifera, Fraxinus pennsylvanica, Arisaema triphyllum, Festuca subverticillata, Verbesina alternifolia, Vitis riparia, Pilea pumila, Aster divaricatus, Circaea lutetiana, Toxicodendron radicans, Rudbeckia laciniata, Euonymus americanus, Hystrix patula, Menispermum canadense, Elymus virginicus, E. villosus, Viola spp., *Cystopteris protrusa, Carex* spp.

VEGETATION DESCRIPTION

The tree canopy in this *Platanus occidentalis - Acer negundo / Asarum canadense* Forest is dominated by *Platanus occidentalis* and *Acer negundo.* Other tree species that may occur include *Carya cordiformis, Juglans nigra, Ulmus rubra*, U. americana), *Liriodendron tulipifera, Fraxinus pennsylvanica*, and occasionally *Acer saccharinum. Acer*

saccharinum, however, is not prominent, comprising less than 20 percent cover. *Carya cordiformis*, *Juglans nigra*, and *Ulmus americana* may be locally dominant within this forest community, as well. The *Platanus occidentalis - Acer negundo / Asarum canadense* Forest shrub layer is co-dominated by *Acer negundo*, *Asimina triloba*, and *Lindera benzoin* averaging 50 percent cover. *Parthenocissus quinquefolia* is the most abundant vine. The herbaceous layer is very diverse, averaging 40 percent cover, commonly including *Asarum canadense*, *Laportea canadensis*, *Cryptotaenia canadensis*, *Hydrophyllum canadense*, *Impatiens capensis*, *Sanicula gregaria*, and *Senecio aureus*. Other characteristic, yet less dominant, species include *Arisaema triphyllum*, *Festuca subverticillata*, *Verbesina alternifolia*, *Vitis riparia*, *Pilea pumila*, *Aster divaricatus*, *Circaea lutetiana*, *Toxicodendron radicans*, *Rudbeckia laciniata*, *Euonymus americanus*, *Hystrix patula*, *Menispermum canadense*, *Elymus virginicus*, *E. villosus*, and *Viola* spp. *Polystichum acrostichoides*, *Polygonatum biflorum*, *Polygonum virginianum*, *Urtica dioica*, *Geum virginianum*, and *Eupatorium rugosum* are also frequently encountered. Spring wildflowers may include *Jeffersonia diphylla* and *Podophyllum peltatum*.

One variant of the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest are small patch inclusions dominated by *Celtis occidentalis*, *Juglans nigra*, *Acer negundo*, and *Asimina triloba*. This variant is further back from the river edge on higher or slightly more protected areas. *Quercus shumardii* is locally dominant and *Fagus grandifolia* may be present at low cover in this variant. Nutrient rich indicators, such as *Cystopteris protrusa* and spring ephemerals such as *Claytonia virginica*, *Podophyllum peltatum*, *Ranunculus abortivus*, *Floerkea proserpinacoides*, *Trillium sessile*, *Jeffersonia diphylla*, *Mertensia virginica*, *Dicentra* sp., *Geranium maculatum*, and *Aquilegia* sp., are more common in this variant. State rare plant species known to occur in this variant are *Quercus shumardii*, *Carex grayi*, and *C. jamesii*. This variant occurs at Great Falls Floodplain in Montgomery County.

Another small patch variant is dominated by *Betula nigra* and *Carex* spp. can be distinguished in saturated loamy soils. Bare soil comprises 50 to 90 percent of the ground cover. Other tree species found in this variant include *Acer rubrum* and occasional *Platanus occidentalis*. Saplings of tree species are sparse in the shrub layer averaging five percent cover. *Toxicodendron radicans* is the dominant vine and herb cover varies from five to 50 percent cover. *Carex* species include *Carex amphibola*, *C. crinita*, *C. lupilina*, *C. lurida*, *C. squarrosa*, *C. tribuloides*, *C. trisperma*, and state rare *Carex conoidea*. Other herbs include *Boehmeria cylindrica*, *Glyceria striata*, *G. septentronalis*), *Impatiens capensis*, and *Lycopus virginicus*.

The two invasive non-native species that pose the greatest threat to this community are *Alliaria petiolata* and *Microstegium vimineum*. Other non-natives encountered in this community include *Rosa multiflora*, *Polygonum cespitosum*, *Glechoma hederacea*, *Hemerocallis fulva*, *Humulus japonicus*, *Lonicera* spp., *Duchesnia indica*, *Helix hedera*, *Ailanthus altissima*, *Lysimachia nummularia*, and *Solanum nigrum*. Non-native species have a greater ability to outcompete the native species in this community, thus altering community composition and lowering species diversity.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur within this community include *Athyrium pycnocarpon*, *Quercus shumardii*, *Carex jamesii*, and *Carex grayi*. *Arisaema dracontium*, is an uncommon (S4) plant species, is known to occur within this community, as well.

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), the *Platanus occidentalis - (Fraxinus pennsylvanica, Celtis laevigata, Acer saccharinum)* Temporarily Flooded Forest Alliance occurs in Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia. Also noted in the Terrestrial Vegetation of the Northeastern United States (Sneddon et al. 1998), the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest occurs in Connecticut, Delaware, Maryland (?), New York, Pennsylvania (?), Rhode Island, and West Virginia. Inventory has confirmed this alliance in Maryland.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur in the Ridge and Valley, Piedmont, and Coastal Plain physiographic provinces.

CONSERVATION RANK
S4

RANK CONFIDENCE
High

RANK JUSTIFICATION
Rank accounts for wide distribution, threat of non-native plant invasion and community degradation, probable and known of occurrences in Maryland.

REFERENCE SITES
- Outdoor Club Floodplain, Allegany County (39 34 45 N, 78 27 38 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Big Woods, Washington County (39 29 30 N, 77 47 53 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Cabin John Island, Montgomery County (38 57 56 N, 77 08 33 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Fort Washington Ravines, Prince Georges County (38 42 28 N, 77 01 56 W) -- precise coordinates for community occurrence at this site

COMMENTS
[none]

REFERENCES
Sneddon, L., M. Anderson, and J. Lundgren. 1998. International Classification of Ecological Communities: Terrestrial Vegetation of the Northeastern United States (July 1998 Working Draft). The Nature Conservancy, Eastern Conservation Science, Boston, Massachusetts.

Thomson, D. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

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AUTHOR
Diane Thomson, 1998.

Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba Forest

COMMON NAME	Sycamore - Sweetgum - Tulip poplar / Pawpaw Forest
ELEMENT CODE	6812
SYNONYM	Coastal Plain Streamside Forest
NATIONAL SYNONYM	*Platanus occidentalis - Liquidambar styraciflua / Asimina triloba* (7340 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera)* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest typically occurs along active and former channels - in ravines and areas of braiding, meandering, and intermittent streams on the western shore of the Coastal Plain. Flooding frequency is typically annual. Soils are typically somewhat poorly drained clay loam or sandy clay loam, but can be well-drained sandy loam where more alluvium is deposited. Litter averages 40 percent cover and woody debris is also present.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Platanus occidentalis, Liquidambar styraciflua, Betula nigra, Liriodendron tulipifera, Acer rubrum*
Shrub	*Asimina triloba, Carpinus caroliniana, Lindera benzoin, Ilex opaca*
Vine/liana	*Toxicodendron radicans, Parthenocissus quinquefolia, Smilax rotundifolia*
Herbaceous	*Boehmeria cylindrica, Arisaema triphyllum*

ADDITIONAL CHARACTERISTIC SPECIES

Impatiens capensis, Vitis riparia, Chasmanthium latifolium, Carex intumescens

VEGETATION DESCRIPTION

The tree canopy in this *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest is dominated by *Platanus occidentalis, Liquidambar styraciflua, Betula nigra, Liriodendron tulipifera*, and *Acer rubrum*. Shrubs range from 10 to 90 percent cover (typically 15 percent) and are characterized by *Asimina triloba, Carpinus caroliniana, Lindera benzoin*, and *Ilex opaca*. *Toxicodendron radicans* is often abundant averaging five percent cover. The herb layer is often over 50 percent cover, diverse, and variable with *Boehmeria cylindrica* and *Arisaema triphyllum* being the most abundant species. Other less common species found in this community include *Geum*

virginianum, *Campsis radicans*, *Carex debilis*, *Lycopus virginicus*, *Galium aparine*, *G. mollugo*, *Polystichum acrostichoides*, *Athyrium thelypterioides*, *Impatiens capensis*, *Pilea pumila*, *Ulmus americana Cornus florida*, *Quercus phellos*, *Q. michauxii*, and *Circaea lutetiana*. Spring ephemerals such as *Claytonia virginiana*, *Ranunculus abortivus*, and *Cardamine concatenata*, are also noted in this community.

Alliaria petiolata and *Lonicera japonica* are invasive non-native species which are present and threaten community diversity and composition by out-competing native species.

OTHER NOTEWORTHY SPECIES

Puccinellia pallida, a state rare (S1) plant species, is known to occur within this community.

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), *Platanus occidentalis - (Liquidambar styraciflua, Liriodendron tulipifera)* Forest Alliance occurs in Georgia, Kentucky, North Carolina, South Carolina, Tennessee, and Virginia. This documentation in Maryland constitutes a northern extension of the alliance's known range.

MARYLAND DISTRIBUTION

This community is known to occur in Charles and St. Mary's Counties on the western shore of the Coastal Plain.

CONSERVATION RANK

S3?

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for known and probable distribution, high level of threat from non-native plant species, and number of known occurrences in Maryland. More inventory data is needed to finalize the conservation rank in Maryland.

REFERENCE SITES

- Johnson Gully, Prince Georges County (38 41 14 N, 77 04 24 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Wades Bay, Charles County (38 25 58 N, 77 15 20 W) -- precise coordinates for community occurrence at this site
- St. Mary's River, St. Mary's County (38 15 10 N, 76 30 30 W) -- precise coordinates for community occurrence at this site

COMMENTS

This community is similar to and occurs in association with the *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginica* Forest (6810). However, of the two communities, the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest occurs over a higher water table, lower and usually adjacent to river or stream channels (active or former). Also, soils supporting this community are typically clay loams which are more poorly drained than the sandy loams of the with *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginica* Forest (6810).

REFERENCES

Thomson, D. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

Weakley, A.S., K.D. Patterson, S. Landaal, M. Payne and others. 1998. Terrestrial Vegetation of the Southeastern United States (draft). The Nature Conservancy, Southeast Regional Office. Chapel Hill, North Carolina.

AUTHOR

Diane Thomson, 1998.

Quercus (palustris, phellos) - Acer rubrum / Cinna arundinacea Forest

COMMON NAME	Pin oak - Willow oak - Red maple / Wood reed-grass Forest
ELEMENT CODE	6811
SYNONYM	Pin oak Wet Forest
NATIONAL SYNONYM	•*Quercus palustris - Quercus bicolor / Carex* spp. Forest (4643 in part) •*Quercus palustris* - (*Quercus bicolor*) Forest [Provisional] (7399 in part) •*Quercus phellos* Seasonally Flooded Forest [Provisional] (7402 in part) •*Quercus phellos / Carex (intumescens, joorii) / Sphagnum lescurii* Forest (7403 in part) •*Quercus palustris - Acer rubrum / Osmunda cinnamomea* Forest (6240 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Quercus palustris - Acer rubrum* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Quercus (palustris, phellos) - Acer rubrum / Cinna arundinacea* Forest occurs in pockets of saturated soils in, or at the edges of, depressions within a larger floodplain forest community that typically floods on an annual basis. In Maryland this is a small patch community less than 20 acres in size, but it is known to occur as a large patch community in Virginia (Fleming, personal communication). This community typically overlies soils of somewhat poorly drained loam or clay loam. Leaf litter averages 50 percent cover while bare soil is typically constitutes less than five percent cover and woody debris makes up less than two percent cover.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Quercus palustris, Q. phellos, Acer rubrum, Liquidambar styraciflua*
Shrub	*Viburnum dentatum, V. prunifolium*
Vine/liana	*Toxicodendron radicans, Parthenocissus quinquefolia, Smilax rotundifolia*
Herbaceous	*Cinna arundinacea, Boehmeria cylindrica, Carex* spp., *Aster vimineus*

ADDITIONAL CHARACTERISTIC SPECIES

Ilex verticillata, Vaccinium corymbosum, Carpinus caroliniana, Glyceria striata, Chasmanthium laxum

VEGETATION DESCRIPTION

The tree canopy in this small patch forest is co-dominated by *Quercus palustris, Acer rubrum, Liquidambar styraciflua,* and *Q. phellos.* The shrub layer averages 20 percent cover and is abundant with various tree seedlings, *Ilex verticillata, Viburnum dentatum, V. prunifolium, Carpinus caroliniana,* an less frequently with *Vaccinium corymbosum.* Vine cover averages five percent and is dominated by *Toxicodendron radicans, Parthenocissus quinquefolia,* and *Smilax rotundifolia.* Herbs average 35 percent cover and are characterized by *Cinna arundinacea, Boehmeria cylindrica, Carex*

spp., and *Aster vimineus*. Other less frequent species include *Arisaema triphyllum, Aster divaricatus, Lycopus virginicus, Ranunculus abortivus, Euonymus americanus,* and *Lindera benzoin*.

Typically, this *Quercus (palustris, phellos) - Acer rubrum / Cinna arundinacea* Forest occurs in pockets of saturated soils in, or at the edges of, depressions embedded within a larger matrix community, the *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest (6810).

Invasive non-native species such as *Microstegium vimineum* and *Lonicera japonica* out-compete native species and threaten the species diversity within this community . Native *Rubus* spp. may also dominate at recent small patch disturbances within the community, often lowering community diversity, as well.

OTHER NOTEWORTHY SPECIES

Carex typhina, a state rare (S3) plant is known to occur in this community.

RANGE

This is a newly proposed community association, therefore national distribution requires further determination.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur in the Piedmont and the western shore of the Coastal Plain. Known locations are in Montgomery, Prince Georges, and Charles Counties.

CONSERVATION RANK

S2?

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for the known and probable distribution, high level of threat from non-native species, and limited number of known occurrences in Maryland. More inventory data is needed to finalize the conservation rank in Maryland.

REFERENCE SITES

- Piscataway Park, Prince Georges and Charles Counties (38 40 48 N, 77 05 23 W) -- precise coordinates for community occurrence at this site
- Pomfret Swamp, Charles County (38 35 45 N, 77 03 30 W) -- precise coordinates for community occurrence at this site

COMMENTS

Gary Fleming, Community Ecologist of the Virginia Division of Natural Heritage has found similar forests on seasonally flooded, claypan bottomlands of the Piedmont, particularly in the Triassic basins.

REFERENCES

Fleming, G. 1998. Personal communication. Virginia Department of Conservation and Recreation, Virginia Division of Natural Heritage. Richmond, VA.

Thomson, D. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

AUTHOR

Diane Thomson, 1998.

Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana Forest

COMMON NAME	Tulip poplar - Red maple - Sweet gum / Indian Cucumber-root Forest
ELEMENT CODE	6810
SYNONYM	Coastal Plain Bottomland / Tributary Forest
NATIONAL SYNONYM	[none]
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Temporarily Flooded Cold-deciduous Forest
ALLIANCE	*Liquidambar styraciflua* - (*Liriodendron tulipifera - Acer rubrum*) Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

The *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest is a matrix community common on Maryland's Upper Coastal Plain, especially near small streams or on low slopes, on well drained to somewhat poorly drained soils. This deciduous forest is influenced by temporary seasonal flooding during the growing season. An organic layer of one to 10 cm overlies soils that are sandy loams and sandy clay loams.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Liquidambar styraciflua, Liriodendron tulipifera, Acer rubrum, Nyssa sylvatica*
Tall shrub	*Asimina triloba, Lindera benzoin, Ilex opaca*
Vine/liana	*Smilax rotundifolia, Toxicodendron radicans, Parthenocissus quinquefolia*
Herbaceous	*Thelypteris noveboracensis, Mitchella repens, Euonymus americanus, Medeola virginiana*

ADDITIONAL CHARACTERISTIC SPECIES

Fagus grandifolia, *Quercus michauxii*, *Q. rubra*, *Ulmus rubra, Cornus florida*, *Carpinus caroliniana*, *Clethra alnifolia*, *Magnolia virginiana*, *Vaccinium corymbosum*, *Viburnum* spp., *Carex* spp., *C. intumescens*, *C. debilis*, *Woodwardia aerolata*, *Onoclea sensibilis*

VEGETATION DESCRIPTION

The canopy of this forest is dominated by *Liriodendron tulipifera* and *Acer rubrum*, and to a less extent *Liquidambar styraciflua*. Other species which are occasionally found in the canopy include *Fagus grandifolia*, *Nyssa sylvatica*, and *Quercus rubra*. The understory includes a mixture of *Liriodendron tulipifera*, *Acer rubrum*, *Liquidambar styraciflua*, *Fagus grandifolia*, *Ilex opaca*, and *Nyssa sylvatica*. Less frequent understory trees include *Ulmus rubra, Cornus florida*, and *Carpinus caroliniana*. Species in the shrub layer can be variable across the landscape, but most commonly include *Lindera benzoin*, *Asimina triloba*, and *Ilex opaca*. Less common shrub species include *Clethra alnifolia*, *Magnolia virginiana*, *Viburnum* spp. and *Vaccinium corymbosum*. The herbaceous layer covers 10 - 50 percent of the forest floor and is quite diverse. Characteristic herbaceous species include *Thelypteris noveboracensis*, *Mitchella repens*, *Euonymus*

americanus, and *Medeola virginiana*. Other less common herbs include *Carex* spp., *C. intumescens, C. debilis, Woodwardia aerolata*, and *Onoclea sensibilis.*

One small patch community (less than 20 acres) often embedded within the *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest is the *Quercus (palustris, phellos) - Acer rubrum / Cinna arundinacea* Forest (6811) which occurs in pockets of saturated soils in, or at the edge of, depressions within the larger matrix community.

Invasive non-native species such as *Microstegium vimineum* and *Lonicera japonica* are known threats within this community. They out-compete native species, threaten the species diversity, and alter community composition within this forest type.

OTHER NOTEWORTHY SPECIES

[none]

RANGE

According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), the *Liquidambar styraciflua - (Liriodendron tulipifera, Acer rubrum)* Temporary Flooded Forest Alliance occurs in Alabama, Arkansas?, Florida, Georgia, Kentucky?, Louisiana?, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. This documentation in Maryland constitutes a northern extension of the alliance's known range.

MARYLAND DISTRIBUTION

This community is know to occur along the headwater streams of Zekiah Swamp in Charles County and other tributaries to the Potomac River on the western shore of the Coastal Plain.

CONSERVATION RANK

S3

RANK CONFIDENCE

High

RANK JUSTIFICATION

Rank accounts for the limited distribution, moderate level of threat from non-native species, and the number of known occurrences in Maryland.

REFERENCE SITES

- Cedarville-Zekiah Run, Charles County (38 38 11 N, 76 47 30 W) -- precise coordinates for site only and not necessarily for the community occurrence
- Pomfret Swamp, Charles County (38 35 44 N, 77 03 25 W) -- precise coordinates for community occurrence at this site
- Mattawoman Creek at Bumpy Oak Road (38 34 53 N, 77 04 17 W) -- precise coordinates for community occurrence at this site

COMMENTS

This *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginica* Forest community is similar to, and occurs in association with, the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest (6812). However, of the two communities, the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest (6812) has a higher ground water table since it occurs more directly adjacent to river or stream channels (active or former). Soils supporting this community are typically clay loams which are more poorly drained than the sandy loams of the with *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginica* Forest (6811).

REFERENCES

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Weakley, A.S., K.D. Patterson, S. Landaal, M. Payne and others. 1998. Terrestrial Vegetation of the Southeastern United States (draft). The Nature Conservancy, Southeast Regional Office. Chapel Hill, North Carolina.

AUTHORS:
Jennifer Meininger, 1998.
Diane Thomson, 1998.

Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus Forest

COMMON NAME	Red maple - Green ash / Lizard's-tail Forest
ELEMENT CODE	6808
SYNONYM	Maple - Ash Swamp
NATIONAL SYNONYM	[none]
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Seasonally Flooded Cold-deciduous Forest
ALLIANCE	*Acer rubrum - Fraxinus pennsylvanica* Seasonally Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

This small patch (less than 20 acres) deciduous forest is characterized by seasonal flooding. The *Acer rubrum - Fraxinus pennsylvanica/ Saururus cernuus* Forest type occurs within the wettest areas of Zekiah Swamp, Charles County where there is standing water for much of the growing season and also near the mouth of Piscataway Creek, Prince Georges County. In some cases flooding is influenced by current or prior beaver activity. Typically this vegetation occurs on poorly to very poorly drained soils that are seasonally to permanently flooded. Generally, but not always, a thin organic layer of 1 to 5 cm overlies soils which consist of sandy or silty clay loams.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Acer rubrum, Fraxinus pennsylvanica, F. profunda, Quercus lyrata*
Tall shrub	*Lindera benzoin, Leucothoe racemosa, Viburnum prunifolium, V. rafinesquianum, V. recognitum, Ilex verticillata*
Vine/liana	*Smilax rotundifolia, Parthenocissus quinquefolia, Toxicodendron radicans*
Herbaceous	*Saururus cernuus, Peltandra virginica, Boehmeria cylindrica, Triadenum walteri, Cinna arundinacea, Pilea pumila, Polygonum arifolium*

ADDITIONAL CHARACTERISTIC SPECIES

Quercus phellos, Lobelia cardinalis, Carex crinita, Populus heterophylla, Impatiens capensis, Mimulus alatus, Lycopus virginicus, Glyceria striata

VEGETATION DESCRIPTION

This community is characterized by *Acer rubrum* and *Fraxinus pennsylvanica* in the canopy and subcanopy layers, which may be quite open in some examples due to seasonal to permanent flooding. Lesser amounts of *Quercus lyrata, Nyssa sylvatica, Quercus phellos*, and *Populus heterophylla* are also frequently found in the canopy. *Fraxinus profunda* may be local within this community, as well. The shrub layer includes *Lindera benzoin, Leucothoe racemosa, Ilex verticillata, Viburnum prunifolium, V. rafinesquianum*, and *V. recognitum*. In the wetter examples of this community, the canopy is quite open due to tree mortality. In areas with a semi-open canopy, there is a more developed shrub and herbaceous layer.

In these more open examples, shrubs can include *Alnus serrulata*, *Cornus amomum*, and *Rosa palustris*. Herbaceous species are dominated by *Saururus cernuus, Peltandra virginica*, and *Boehmeria cylindrica*, but may also include scattered individuals of *Triadenum walteri, Lobelia cardinalis*, and *Cinna arundinacea*, and *Ludwigia palustris*.

No invasive non-native plants have been observed in this community type.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur in this forest community include *Carex louisianica*, *Carex gigantea*, *Polygonum densiflorum*, *Fraxinus profunda*, *Carex typhina*, *Bidens discoidea*, *Polygonum setaceum*, and *Panicum aciculare*.

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeast United States (Weakley et al. 1998), the *Acer rubrum - Fraxinus pennsylvanica* Seasonally Flooded Forest Alliance occurs in Arkansas, Kentucky, North Carolina, Oklahoma, South Carolina, Tennessee?, Virginia, Illinois, Indiana, Maryland, Michigan, Missouri, New Jersey, Ohio, Wisconsin, West Virginia, and Ontario.

MARYLAND DISTRIBUTION

This community is known to occur in the wettest areas of Zekiah Swamp in Charles County and near the mouth of Piscataway Creek, Prince Georges County. This forest also occurs in freshwater tidal and non-tidal floodplains of the Patuxent River in Prince Georges and Anne Arundel Counties.

CONSERVATION RANK

S2?

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for the known and probable distribution of occurrences in Maryland. More inventory data is needed to finalize the conservation rank in Maryland.

REFERENCE SITES

- Zekiah Swamp (Ross Branch, North Clark Run), Charles County
- Piscataway and Potomac Confluence, Prince Georges County (38 41 36 N, 77 03 23 W) and (38 42 03 N, 77 02 46 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

Meininger, J. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

Meininger, J. 1998. Forest Communities of Zekiah Swamp Nontidal Wetland of Special State Concern. Wildlife and Heritage Division, Maryland Department of Natural Resources, 19 pp.

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AUTHORS:

Jennifer Meininger, 1998.
Diane Thomson, 1998.

Acer rubrum - Nyssa sylvatica - Betula nigra Forest

COMMON NAME	Red maple - Black gum - River birch Forest
ELEMENT CODE	6814
SYNONYM	Maple - Gum - Birch Wet Forest
NATIONAL SYNONYM	[none]
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous Forest
PHYSIOGNOMIC GROUP	Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Saturated Cold-deciduous Forest
ALLIANCE	*Acer rubrum - Nyssa sylvatica* Saturated Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest occurs along pond edges and vernal pools that typically have bedrock close to, or partially exposed at, the surface. This small patch forest community forms a concentric zone around bedrock ponds that is typically less than 10 meters wide. Exposed soils are shallow, poorly drained loams generally with equal cover of leaf litter and bare soil unless there is standing water in the pond flooding the community.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Acer rubrum*, *Nyssa sylvatica*, *Betula nigra*, *Fagus grandifolia*
Shrub	*Viburnum rafinesquianum*, *Vaccinium stamineum*
Vine/liana	*Smilax rotundifolia*, *Campsis radicans*
Herbaceous	*Carex* spp., *Polygonum* spp., grasses including *Panicum dicotomum*, *P. boscii*

ADDITIONAL CHARACTERISTIC SPECIES

Quercus prinus, *Ilex verticillata*, *Polygonum* spp., *Euonymus americanus*

VEGETATION DESCRIPTION

The tree canopy in this *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest is codominated by these three nominal species, with *Betula nigra* being the least abundant of the three. In addition, *Quercus rubra* or *Quercus phellos* may be locally abundant. *Quercus prinus*, *Fagus grandifolia* and *Fraxinus pennsylvanica* may also be present at lower cover because they typically are in the surrounding forest community. Shrubs are generally dense averaging 30 percent cover. Abundant species include *Viburnum rafinesquianum*, *Vaccinium stamineum*, and *Ilex verticillata*. Herbaceous cover is poorly developed, but may include *Carex* spp., *Polygonum* spp., and grasses such as *Panicum dicotomum* and *P. boscii*. Panicum *dicotomum* is a species often associated with more disturbed habitats.

Alliaria petiolata and *Microstegium vimineum* are invasive non-native plants which have the potential to out-compete native species in this community, thus altering community composition and lowering species diversity.

OTHER NOTEWORTHY SPECIES

[none]

RANGE

This is a newly proposed designation, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998), the *Acer rubrum - Nyssa sylvatica* Saturated Forest Alliance occurs in Alabama?, Arkansas, Georgia?, Kentucky, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, Connecticut, Delaware, Illinois?, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, and Vermont.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur around small bedrock ponds and pools on Bear Island, Montgomery County.

CONSERVATION RANKS

S2?

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank reflects the need for more inventory and distribution data in Maryland.

REFERENCE SITES

Bear Island, Montgomery County (38 59 17 N, 77 14 34 W) and (38 58 58 N, 77 14 21 W) -- precise coordinates for community occurrence at this site

COMMENTS

[none]

REFERENCES

Thomson, D. 1996. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

Weakley, A.S., K.D. Patterson, S. Landaal, M. Payne and others. 1998. Terrestrial Vegetation of the Southeastern United States (draft). The Nature Conservancy, Southeast Regional Office. Chapel Hill, North Carolina.

AUTHOR

Diane Thomson, 1998.

Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia Forest

COMMON NAME	Hemlock - Tulip poplar / Great laurel / Wood fern Forest
ELEMENT CODE	6817
SYNONYM	Mesic Hemlock - Hardwood Ridge and Valley Forest
NATIONAL SYNONYM	•*Acer saccharum - Fraxinus americana - Tilia americana - Magnolia acuminata / Cimicifuga racemosa* Forest (6237 in part) •*Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Tiarella cordifolia* Forest (7543 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Mixed Evergreen-deciduous Forest
PHYSIOGNOMIC GROUP	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
ALLIANCE	*Tsuga canadensis - Liriodendron tulipifera* Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest occurs on ravine uplands and floodplains. This description is based on floodplain data only. The forest has well drained sandy loam soils that tend to be nutrient rich due to the influence of possible high pH parent bedrock upstream and up slope. This is suspected due to the presence of nutrient rich indicator species such as *Liriodendron tulipifera*, *Thalictrum pubescens*, *Oxalis grandis*, and *Galium tinctorum* (Gleason and Cronquist 1991). This community typically floods every one to five years leaving woody debris and fresh alluvial deposits. Leaf litter is also a large component of the ground layer, averaging 20 percent cover.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Liriodendron tulipifera*, *Tsuga canadensis*, *Quercus alba*
Shrub	*Rhododendron maximum*, *Cornus florida*, *Hamamelis virginiana*
Vine	*Parthenocissus quinquefolia*
Herbaceous	*Osmunda claytoniana*, *Thelypteris noveboracensis*, *Polystichum acrostichoides*, *Verbesina alternifolia*

ADDITIONAL CHARACTERISTIC SPECIES

Q. rubra, *Carya ovata*, *Pinus strobus*, *Prunus serotina*, *Carpinus caroliniana*, *Bromus pubescens*, *Cimicifuga racemosa*, *Dioscorea quaternata*, *Oxalis grandis*, *Thalictrum pubescens*, *Thelypteris hexagonoptera*, *Galium tinctorum*, *G. triflorum*, *G. pilosum*, *Lysimachia terrestris*, *Panicum latifolium*, *Mitchella repens*, *Podophyllum peltatum*.

VEGETATION DESCRIPTION

The tree canopy in this *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest co-dominated by *Liriodendron tulipifera*, *Tsuga canadensis*, and *Quercus alba*. In areas, *Tsuga canadensis* is locally dominant. Other tree species that occur are *Acer rubrum*, *Nyssa sylvatica*, and *Carpinus caroliniana*. The shrub layer is generally sparse, but having *Cornus florida* and *Hamamelis virginiana* frequent at low cover or patches of dense *Rhododendron maximum*. Overall shrub cover is generally less than 15 percent. Herbaceous cover is high, averaging 70 percent. *Osmunda claytoniana*, *Thelypteris noveboracensis*, *Polystichum acrostichoides*, and *Verbesina alternifolia* are the most abundant herbs. Other frequent species that occur include *Quercus palustris*, *Q. prinus*, *Q. velutina*, *Carya* spp., *Ostrya virginiana*, *Lindera benzoin*, *Magnolia acuminata*, *Arisaema triphyllum*, *Aster divaricatus*, *Carex platyphylla*, *Podophyllum peltatum*, *Circaea lutetiana*, *Dioscorea quaternata*, *Eupatorium rugosum*, *Polygonatum biflorum*, and *Solidago caesia*.

Often, up slope from this floodplain *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest are shale barrens whose dominant species include trees such as *Pinus virginiana*, *Juniperus virginiana*, *Celtis tenuifolia*, and *Quercus ilicifolia*. In addition, nearby north-facing slopes are often a continuation of this *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest, a result of similar low light and mesic conditions as the floodplains. Hemlock dominated floodplains are often in deeper ravines and blocked from sunlight by steep-sided slopes. Similarly, north-facing slopes receive less sunlight due to their angle to the sun.

Invasive non-native plants such as *Microstegium vimineum* and *Alliaria petiolata* are out-competing native herbaceous species in this community. These non-natives are drastically changing community composition.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur within this community include *Galium concinnum*, *Carex woodii*, and *Carex leptonervia*.

RANGE

Forests in this alliance are known to occur mostly in the southern and central Appalachians, but also occur in the Cumberland Plateau and Cumberland Mountains of Kentucky, Tennessee, and Alabama, and the Allegheny Plateau of West Virginia. This alliance is also known to occur in Georgia, North Carolina, South Carolina, and Virginia. Inventory has confirmed this alliance in Maryland, as well.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur on the floodplains of major tributaries to the Potomac River in the Ridge and Valley physiographic province (Allegheny and Washington Counties).

CONSERVATION RANK

S2

RANK CONFIDENCE

High

RANK JUSTIFICATION

Rank accounts for limited distribution, moderate level of threat from non-native species and the limited number of high quality occurrences known in Maryland.

REFERENCE SITES

- Riser Road Floodplain - Sideling Hill Creek Macrosite, Washington County (39 40 37 N, 78 19 33 W) -- precise coordinates for community occurrence at this site
- Brushy Ridge Floodplain - Sideling Hill Creek Macrosite, Allegany County (39 39 55 N, 78 20 02 W) -- precise coordinates for community occurrence at this site
- Old Telephone Floodplain - Sideling Hill Creek Macrosite

COMMENTS

[none]

REFERENCES

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Maryland Natural Heritage Program. 1995. Inventory of Rare, Threatened, and Endangered Species and Significant Habitats on the Aaron Straus Wilderness Area and Vicinity, Allegany and Washington Counties, Maryland.

Thomson, D. 1997. Community field forms. Wildlife and Heritage Division, Maryland Department of Natural Resources, Annapolis, MD.

AUTHOR

Diane Thomson, 1998.

Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum Forest

COMMON NAME	Hemlock - Yellow birch - Black cherry / Great laurel Forest
ELEMENT CODE	6206
SYNONYM	Hemlock - Hardwood Montane Forest
NATIONAL SYNONYM	[none]
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Mixed Evergreen-deciduous Forest
PHYSIOGNOMIC GROUP	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
ALLIANCE	*Tsuga canadensis - Betula alleghaniensis* Forest Alliance

ENVIRONMENTAL DESCRIPTION

This description is based on data taken from floodplain occurrences only. The *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest is known to occur on the Allegheny Plateau along the Savage River, Lostland Run, and Laurel Run at elevations ranging from 1640-2100 feet. This mixed forest is also known to occur on mesic north facing slopes of the Allegheny Plateau but needs further inventory and description. Woody debris piles, intermittent channels, deep alluvial loam, and a shallow organic horizon (0-3 cm) indicate that this community is flooded every one to ten years. Leaf and needle litter ranges from 25 to 95 percent cover and typically overlies deep well drained sandy and silty loams, silt loams, or occasional cobble.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Tsuga canadensis, Acer saccharum, Fagus grandifolia, Betula lenta, B. alleghaniensis, Liriodendron tulipifera*
Shrub	*Rhododendron maximum, Magnolia acuminata, Hamamelis virginiana*
Herbaceous	*Disporum languinosum, Maianthemum canadense, Trillium* sp., *Smilacina racemosa, Polygonatum biflorum, Uvularia perfoliata, Medeola virginiana, Clintonia umbellata, Athyrium thelypterioides, Dioscorea quaternata*

ADDITIONAL CHARACTERISTIC SPECIES

Tilia americana, Acer pensylvanicum, A. rubrum, Quercus rubra, Tiarella cordifolia, Impatiens capensis, Polystichum acrostichoides, Lycopus uniflorus, Epifagus virginiana

VEGETATION DESCRIPTION

The tree canopy in this *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest is co-dominated by *Tsuga canadensis, Acer saccharum, Fagus grandifolia, Betula lenta,* and *Betula alleghaniensis.* Also occurring are *Liriodendron tulipifera, Tilia americana, Acer rubrum,* and *Quercus rubra.* Shrubs of *Rhododendron maximum* and *Hamamelis virginiana* average 20 percent cover. The herbaceous layer is usually sparse, averaging two

percent cover. Herbs include *Athyrium thelypterioides*, *Dioscorea quaternata*, *Thelypteris noveboracensis*, and many species in the Liliaceae (*Disporum languinosum*, *Maianthemum canadense*, *Trillium* sp., *Smilacina racemosa*, *Polygonatum biflorum*, *Uvularia perfoliata*, *Medeola virginiana*, and *Clintonia umbellata*). Also frequent are *Arisaema triphyllum*, *Collinsonia canadensis*, and *Impatiens capensis*. Various mosses occur at low cover.

The highly invasive non-native *Microstegium vimineum* is present, and has the potential to out-compete the native herbaceous species in this community. Non-natives have the potential to change community composition and integrity and lower species diversity.

OTHER NOTEWORTHY SPECIES

[none]

RANGE

According to the Terrestrial Vegetation of the Northeastern United States (Sneddon et al. 1998), the *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest occurs in Maryland, New Jersey, New York, Pennsylvania, Tennessee, Virginia, and West Virginia.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur on major Potomac River tributary floodplains on the Allegheny Plateau in Garrett County.

CONSERVATION RANK

S2

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for the restricted distribution, moderate level of threat from non-native species, and the limited number of high quality occurrences known in Maryland.

REFERENCE SITES

- Savage River, Garrett County (39 34 42 N, 79 05 49 W) -- precise coordinates for community occurrence at this site
- Lostland Run, Garrett County (39 21 49 N, 79 13 59 W) -- precise coordinates for community occurrence at this site

COMMENTS

This forest is a placeholder for all major Potomac River tributary floodplain forests in the Allegheny Plateau physiographic province.

REFERENCES

Sneddon, L., M. Anderson, and J. Lundgren. 1998. International Classification of Ecological Communities: Terrestrial Vegetation of the Northeastern United States (July 1998 Working Draft). The Nature Conservancy, Eastern Conservation Science, Boston, Massachusetts.

Thomson, D. 1997. Community field forms. Wildlife and Heritage, Maryland Department of Natural Resources, Annapolis, MD.

AUTHOR

Diane Thomson, 1998.

Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca Forest

COMMON NAME	Loblolly pine - Basket oak - Southern red oak - Sweet gum / American holly Forest
ELEMENT CODE	6816
SYNONYM	Loblolly - Oak Bottomland Forest
NATIONAL SYNONYM	●*Pinus taeda - Liquidambar styraciflua - Nyssa biflora* Temporarily Flooded Forest (4606 in part) ●*Pinus taeda - Liquidambar styraciflua - Acer rubrum* var. *rubrum / Vaccinium stamineum* Forest (6011 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Mixed Evergreen-deciduous Forest
PHYSIOGNOMIC GROUP	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Mixed Needle-leaved Evergreen - Cold-deciduous Forest
ALLIANCE	*Pinus taeda - Liquidambar styraciflua - Nyssa biflora* Temporarily Flooded Forest Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Pinus taeda - Quercus (michauxii - falcata) - Liquidambar styraciflua / Ilex opaca* Forest is found in mesic bottomlands near or along the Potomac River on the Coastal Plain physiographic province on well-drained to poorly drained soils. Soils are mostly covered with pine needles and leaf litter. Some occurrences of this community may be transitional between upland and wetland, while others may be seasonally saturated on perched water tables (Fleming 1998).

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Pinus taeda, Liquidambar styraciflua, Quercus michauxii, Q. falcata, Q. palustris*
Tree subcanopy	*Ilex opaca*
Shrub	*Ilex opaca*
Vine/liana	*Toxicodendron radicans, Smilax rotundifolia*

ADDITIONAL CHARACTERISTIC SPECIES

Mitchella repens, Osmunda regalis, Chasmanthium laxum, Parthenocissus quinquefolia

VEGETATION DESCRIPTION

The tree canopy in this *Pinus taeda - Quercus (michauxii - falcata) - Liquidambar styraciflua / Ilex opaca* Forest is dominated by *Pinus taeda, Liquidambar styraciflua, Quercus michauxii, Q. falcata,* and *Q. palustris. Liriodendron tulipifera* and *Nyssa sylvatica* are less common species. *Ilex opaca* is the dominant species in the tree subcanopy and shrub layers. The herb layer is almost non-existent. *Thelypteris noveboracensis, Parthenocissus quinquefolia,* and *Cypripedium acaule* are occasionally present.

One early successional variant of this community observed is co-dominated by *Pinus taeda, Liquidambar styraciflua,* and *Acer rubrum*. This variant is similar in that it has *Liquidambar styraciflua, Ilex opaca,* and *Toxicodendron radicans* as

dominants, but different in that it does not have *Quercus michauxii*, *Q. falcata*, and/or *Q. phellos*. In addition, *Nyssa sylvatica* has been observed in this variant. The shrub layer is sparse but includes *Vaccinium corymbosum*, *V. stamineum*, *Ilex opaca*, and *Cornus florida*. The herb layer is almost non-existent. However, *Onoclea sensibilis* and a grass species have been observed. The Terrestrial Vegetation of the Southeastern United States (Weakley et al. 1998) has defined a similar community type, the ***Pinus taeda - Liquidambar styraciflua - Acer rubrum*** var. ***rubrum / Vaccinium stamineum*** Forest (6011), occurring in Alabama, Georgia, North Carolina, South Carolina, Virginia, Maryland, and possibly Pennsylvania and West Virginia. This variant may be considered this type given further data collection and analysis.

The invasive non-native *Lonicera japonica* is present and may become a threat to the community. Non-native species have the potential to change community composition and integrity by lowering species diversity.

OTHER NOTEWORTHY SPECIES

[none]

RANGE

This is a newly proposed community association, therefore national distribution requires further determination. According to the Terrestrial Vegetation of the Northeastern United States (Sneddon et al. 1998), the *Pinus taeda - Liquidambar styraciflua - Nyssa biflora* Temporarily Flooded Forest Alliance occurs in Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia. This inventory extends the northern limit of this Alliance to now include Maryland, as well.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur in southern Charles County and in St. Mary's County on the western shore of the Coastal Plain.

CONSERVATION RANK

S4

RANK CONFIDENCE

Medium

RANK JUSTIFICATION

Rank accounts for the number of known occurrences on the western shore and the large number of probable occurrences suspected on the eastern shore of the Coastal Plain in Maryland.

REFERENCE SITES

- Potter Creek Woods, St. Mary's County (38 04 10 N, 76 21 48 W) -- precise coordinates for community occurrence at this site
- Point Lookout Woods, St. Mary's County (38 03 45 N, 76 20 52 W) -- precise coordinates for community occurrence at this site

COMMENTS

The driest extreme of this community, found on alluvial sand, included more xeric species such as *Opuntia humifusa*, *Kalmia latifolia*, and *Sassafras albidum*.

REFERENCES

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AUTHOR

Diane Thomson, 1998.

Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium Woodland

COMMON NAME	Virginia pine - Pignut hickory - Red oak - Post oak / Wild oats Woodland
ELEMENT CODE	6813
SYNONYM	Pine - Oak Xeric Bedrock Floodplain Woodland
NATIONAL SYNONYM	●*Pinus (rigida, pungens, virginiana) - Quercus (prinus, coccinea)* Woodland [Provisional] (3769 in part)
TNC SYSTEM	Terrestrial
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Mixed Evergreen-deciduous Woodland
PHYSIOGNOMIC GROUP	Mixed Needle-leaved Evergreen - Cold-deciduous Woodland
PHYSIOGNOMIC SUBGROUP	Natural/Semi-natural
FORMATION	Mixed Needle-leaved Evergreen - Cold-deciduous Woodland
ALLIANCE	*Pinus (rigida, pungens, virginiana) - Quercus (prinus, coccinea)* Woodland Alliance

ENVIRONMENTAL DESCRIPTION

In Maryland, the *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland may be limited to upper rocky floodplain terraces and is known to occur in the Potomac Gorge on Olmstead and Falls Islands, and part of Bear Island. In the gorge, the Potomac River flows over resistant rocks at Great Falls, at which point the river narrows causing flooding velocity (and scouring) to intensify. This woodland occurs within the 30 year flood zone on thin soils (depth averaging less than 20 cm) in areas where bedrock has greater exposure (averaging 40 percent) at the surface. Thin soils contribute to xeric conditions causing stunted and sparse tree cover. In addition, thin soils do not allow deep rooting and therefore, trees are more susceptible to flood damage such as uprooting. *Pinus virginiana* may be particularly susceptible as it grows on the more shallow soils. Typically, soils are extremely well drained sandy loams, but silt loam and fine organic matter also occur in places.

MOST ABUNDANT SPECIES

Strata	Species
Tree canopy	*Quercus stellata, Q. rubra, Q. prinus, Pinus virginiana, Carya glabra*
Tall shrub	*Fraxinus americana, Juniperus virginiana, Chionanthus virginicus, Viburnum prunifolium, V. dentatum*
Short shrub	*Vaccinium pallidum, Rhus copallinum*
Vine/liana	*Campsis radicans, Vitis* sp.
Herbaceous	*Chasmanthium latifolium, Danthonia spicata, Carex* spp., *Panicum boscii, P. clandestinum, P. dicotomum, Solidago ulmifolia, Helianthus divaricatus, Schizachyrium scoparium, Euphorbia corollata*
Non-vascular	Moss spp., Lichen spp.

ADDITIONAL CHARACTERISTIC SPECIES

Euthamia tenuifolia, Desmodium sp., *Antennaria plantaginifolia, Aster patens, Aureolaria flava, Comandra umbellata, Pycnanthemum flexuosum, Gleditsia triacanthos, Rosa carolina, Phlox subulata.*

VEGETATION DESCRIPTION

The stunted tree canopy in this *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland averages approximately 10 meters in height and is co-dominated by *Quercus stellata, Q. rubra, Q. prinus, Pinus virginiana,* and *Carya glabra.* Also occurring are *Acer rubrum, Nyssa sylvatica,* and *Fraxinus americana.* This community is considered a woodland because the majority of tree crowns are not overlapping and their total cover is less than 60 percent (typically 20 to 50 percent for this association). The tall shrub layer is co-dominated by *Fraxinus americana, Juniperus virginiana, Chionanthus virginicus, Viburnum prunifolium,* and *V. dentatum* averaging 20 percent cover; the short shrub layer is dominated by *Vaccinium pallidum* and tree seedlings. *Rhus copallinum* and *Rosa carolina* are also characteristic shrubs , but occur at low cover. The herbs are diverse and abundant (averaging 40 percent cover) including *Danthonia spicata, Carex* spp., *Panicum* spp., *Chasmanthium latifolium, Solidago ulmifolia, Schizachyrium scoparium, Euphorbia corollata,* and others. Other graminoids may also be abundant.

This community is in close association with *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest (6809), but receives more scouring from floodwaters because it is closer to the Potomac River and at lower elevations. It also has similar herbaceous species with a herbaceous river scour community that is in close proximity, but has not yet been described.

The invasive non-native species *Lonicera japonica* is present and may become a greater threat to the community in the future by out-competing native species.

OTHER NOTEWORTHY SPECIES

State rare (S1 to S3) plant species known to occur within this community include *Helianthus occidentalis, Coreopsis tripteris, Galactia volubilis, Solidago racemosa, Hibiscus laevis, Ilex decidua, Ruellia strepens, Triosteum setaceum, Solidago spathulata, Astragalus canadensis,* and *Lathyrus venosus.*

RANGE

This is a newly proposed community, therefore national distribution requires further determination. According to International Classification of Ecological Communities: Terrestrial Vegetation of United States (Anderson et al., 1998) the *Pinus (rigida, pungens, virginiana) - Quercus (prinus, coccinea)* Woodland Alliance occurs in Georgia, New Jersey, South Carolina, North Carolina, Maryland Pennsylvania, Virginia, and West Virginia.

MARYLAND DISTRIBUTION

In Maryland, this community is known to occur at Great Falls of the Potomac River, on Bear and Olmstead Islands, Montgomery County.

CONSERVATION RANK

S1

RANK CONFIDENCE

High

RANK JUSTIFICATION

Rank accounts for a very restricted distribution, high level of threat from non-native species, and limited number of known occurrences in Maryland.

REFERENCE SITE

Olmstead Island, Montgomery County (38 59 51 N, 77 15 08 W) and (38 59 51 N, 77 15 06 W) -- precise coordinates for community occurrences at this site

COMMENTS

The community is similar to the description for *Pinus virginiana - Quercus (alba, stellata, falcata, velutina)* (6171), a community that occurs on slopes, but not flooded terraces. Other places to survey for this community include Vasso, Herzog, and Sherwin Islands (Wiegand 1998).

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AUTHOR

Diane Thomson, 1998.

Reference Site Descriptions

Southern Sideling Hill Creek Floodplain

COUNTY Allegany and Washington Counties, Maryland

USGS QUAD Bellegrove, MD

PRIMARY REASON FOR SELECTION

Southern Sideling Hill Creek Floodplain contains a high quality occurrence and one of Maryland's best examples of the *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest (6237) that occurs on a floodplain.

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Southern Sideling Hill Creek Floodplain contains a forest along Sideling Hill Creek in the Ridge and Valley physiographic province. Temporary Flooding typically occurs every two to three years. This portion of floodplain along Sideling Hill Creek is approximately two miles long, very narrow (less than 100 meters), and bordered by steep slopes in all directions. Old roads give access to the floodplain.

The *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest is the only forest type on the Southern Sideling Hill Creek Floodplain.

At least six plant species considered rare, threatened or endangered in Maryland are known to occur at Southern Sideling Hill Creek.

COMMUNITY DESCRIPTION

Southern Sideling Hill Creek Floodplain was chosen as a reference site primarily because it is habitat to one of the best examples of the *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest that occurs on a floodplain known in Maryland. This occurrence varies only slightly from the typical, defined in the Vegetation Description section of this report, in that the non-native *Microstegium vimineum* can dominate small patches of herbaceous cover, thus altering species diversity. This community type may be uncommon in Maryland and is preliminarily ranked as S3, a designation meaning that between 21 and 100 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Southern Sideling Hill Creek Floodplain is contained within Sideling Hill Wildlife Management Area, thus receiving some protection and conservation attention. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Southern Sideling Hill Creek Floodplain occurrence of *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest ranks as a "B" or "good" example when compared to all other known Maryland examples of this community type. The prevalence of Microstegium vimineum, a non-native invasive species, and its detrimental effects on species diversity in the herbaceous layer, prevent this site from receiving an "A" occurrence rank. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Sideling Hill Wildlife Management Area owned by The Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Sideling Hill Wildlife Management Area

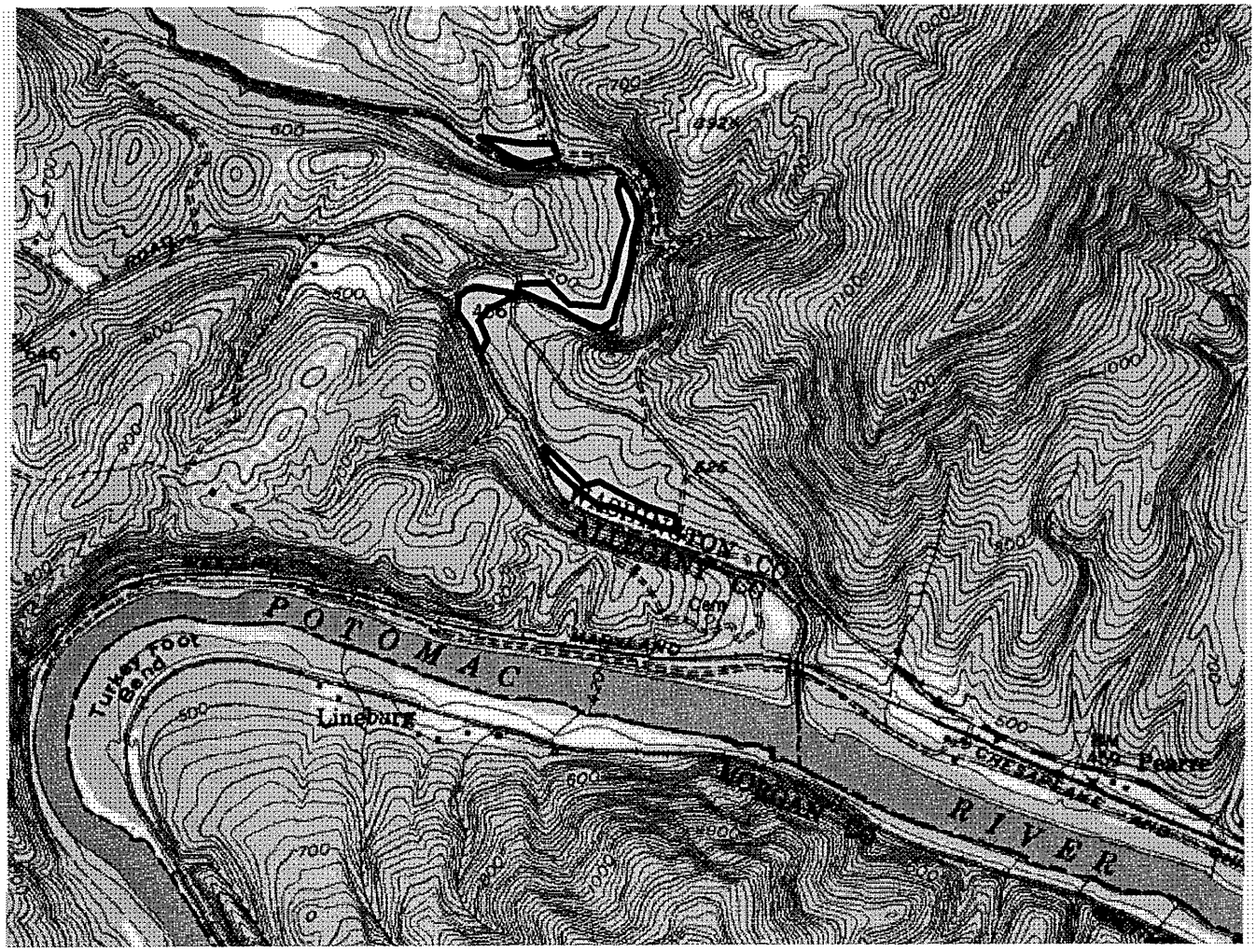
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

39 39 12 N, 78 20 40 W and 39 38 39 N, 78 20 29 W -- precise coordinates for *Acer saccharum - Fraxinus americana - Tilia americana / Cimicifuga racemosa* Forest at this site

Southern Sideling Hill Creek Floodplain



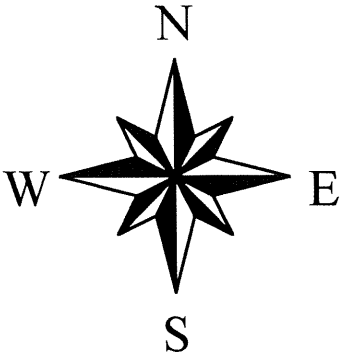
0.6 0 0.6 1.2 Miles

Bellgrove Quad, Allegheny and Washington Counties

This site is dominated by:

Acer saccharium - Fraxinus americana - Tilia americana / Cimicifuga racemosa

Forest



Bear Island

COUNTY Montgomery County, Maryland

USGS QUAD Falls Church, VA

PRIMARY REASON FOR SELECTION

Bear Island contains high quality occurrences and one of Maryland's best examples of the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest (6814) and the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest (6809).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Bear Island is located on the Potomac River in the Piedmont physiographic province and contains at least four forested communities including the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest and the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest. Other non-forested communities found on Bear Island include various woodlands and river scour shrub and herbaceous communities. This floristically diverse area is also geologically diverse, containing various sedimentary and metamorphic rock types with some igneous intrusions (see Cloos E. and J.L. Anderson. 1950. Geology of Bear Island, Potomac River, Maryland. The John Hopkins Press, Baltimore.). Floristic diversity is closely linked to this varied geologic diversity as well as the varied flooding regimes and hydrologic influences. The island is within the one hundred year flood zone and was inundated in the 1936 flood. Soils are shallow in areas where bedrock is exposed at the surface. The majority of the 150 acre site is on the southwest side of the Chesapeake and Ohio Towpath and Canal. On the northeast side of the canal is upland forest, National Park land, and residential areas.

Acer rubrum - Nyssa sylvatica - Betula nigra Forest is a minor component of the 150 acre island and found in small patches in wet depressions and along pond edges. The *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest is a dominant community, occurring on higher and dryer ancient floodplain terraces and bedrock outcrops. Not as dominant, but also occurring over large areas, is the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest and *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland.

At least 53 plant species considered rare, threatened, or endangered in Maryland are known to occur on Bear Island.

COMMUNITY DESCRIPTION

Bear Island was chosen as a reference site primarily because it is habitat to one of the best examples of the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest and the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest known in Maryland. These floodplain/wetland community types are currently considered to be rare in Maryland. The *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest is preliminarily ranked as S1/S2, a designation meaning that between 1 and 20 occurrences are known or suspected within the State, while the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest is preliminarily ranked as S2, a designation meaning that between 6 and 20 occurrences are known or suspected within the State. These particular occurrences are part of a set of similar communities used to define and classify the community types for the Maryland Vegetation Classification, thus type localities. See the Vegetation Description of this report for precise community definitions.

Also occurring on Bear Island is a variant of the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest with *Fagus grandifolia* and *Asimina triloba* being more prevalent. This variant is further defined in Vegetation Description of this report under the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Other non-native plants documented in this community occurrence, but currently less threatening, include *Glechoma hederacea, Ailanthus altissima, Rosa multiflora,* and *Lonicera morrowii.* Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Bear Island is part of the Chesapeake and Ohio Canal National Historical Park and partly owned by The Nature Conservancy, thus receiving some conservation attention. It is a mature forest that should be protected from any development or clearing of trees. Further research at this site should require a review of impacts to site integrity by The Nature Conservancy and will require permission from The National Park Service.

OCCURRENCE RANK

These Bear Island occurrences of the *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest and the *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest rank as "A" or excellent examples when compared to all other known Maryland examples of these community types. The other forested communities, the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest and *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland are "B" and "A/B" ranked, respectively. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Chesapeake and Ohio Canal National Historical Park owned by the National Park Service and part of Bear Island is also owned by The Nature Conservancy

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources
Maryland / DC Field Office, The Nature Conservancy

LAND MANAGER

Natural Resources Biologist, Chesapeake and Ohio Canal National Historical Park, The National Park Service

BOUNDARY JUSTIFICATION

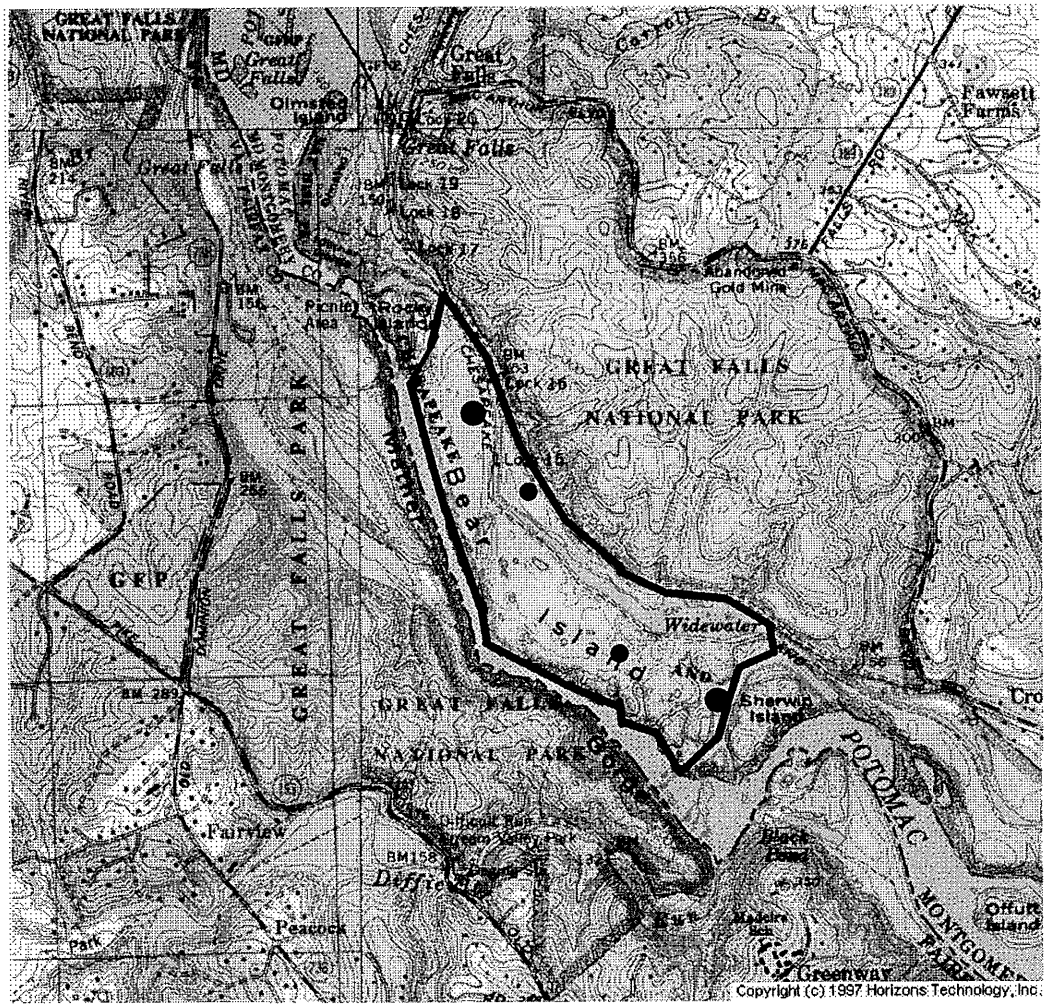
Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 59 17 N, 77 14 34 W and 38 58 58 N, 77 14 21 W -- precise coordinates for *Acer rubrum - Nyssa sylvatica - Betula nigra* Forest at this site

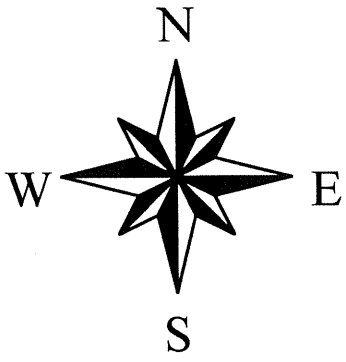
38 59 27 N, 77 14 43 W and 38 58 53 N, 77 14 07 W -- precise coordinates for *Quercus (prinus, rubra, alba) - Carya glabra / Ostrya virginiana* Forest this site

Bear Island



0.6 0 0.6 1.2 Miles

Falls Church Quad, Montgomery County



The two larger dots represent:

Quercus (alba, prinus, rubra) - Carya glabra / Ostrya virginiana

Forest

The two smaller dots represent:

Acer rubrum - Nyssa sylvatica - Betula nigra

Saturated Forest

Dickerson Floodplain

COUNTY Montgomery County, Maryland

USGS QUAD Poolesville, MD

PRIMARY REASON FOR SELECTION

Dickerson Floodplain contains a high quality occurrence and one of Maryland's best examples of the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest (2586).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Dickerson Floodplain is a large floodplain on the main stem of the Potomac in the Piedmont physiographic province, approximately 90 acres in size. It's soils are alluvial silt loam due to annual flooding. The floodplain is bordered by the Potomac River to the west, a power plant to the north, and the Chesapeake and Ohio Canal and Towpath, agricultural fields, parking, and picnicking areas to the east.

Acer saccharinum - Ulmus americana - (Populus deltoides) Forest occupies the majority of the floodplain, approximately 75 acres. *Platanus occidentalis - Acer negundo / Asarum canadense* Forest occupies an additional 15 acres at this site. A small patch variant of *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest dominated by *Fraxinus pennsylvanica* and *Ulmus americana* comprises less than one acre at this site, as well. All three of these forest types are influenced by temporary flooding regimes.

COMMUNITY DESCRIPTION

Dickerson Floodplain was chosen as a reference site primarily because it is habitat to one of the best examples of *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest known in Maryland. This occurrence varies only slightly from the typical, defined in the Vegetation Description section of this report, in that the non-native *Alliaria petiolata* can dominate in the herbaceous cover in early spring, thus altering species diversity. This community type is common in Maryland and preliminarily ranked as S5, a designation meaning that the community is demonstrably secure within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for the precise community definition.

This *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest is closely associated with the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest at this site.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. One other non-native plant documented in this community occurrence, but currently less threatening, is *Lysimachia nummularia*. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors. PROTECTION COMMENTS Dickerson Floodplain is part of the Chesapeake and Ohio Canal National Historical Park, thus receiving some protection and conservation attention. Further research at this site should require a review of impacts to site integrity and will require a permit from the National Park Service.

OCCURRENCE RANK

This Dickerson Floodplain occurrence of *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of the same community type. The *Platanus occidentalis - Acer negundo / Asarum canadense* Forest is not highly representative and therefore only receives a rank of "B/C". See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Chesapeake and Ohio Canal National Historical Park owned by the National Park Service

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Natural Resources Biologist, Chesapeake and Ohio Canal National Historical Park, National Park Service.

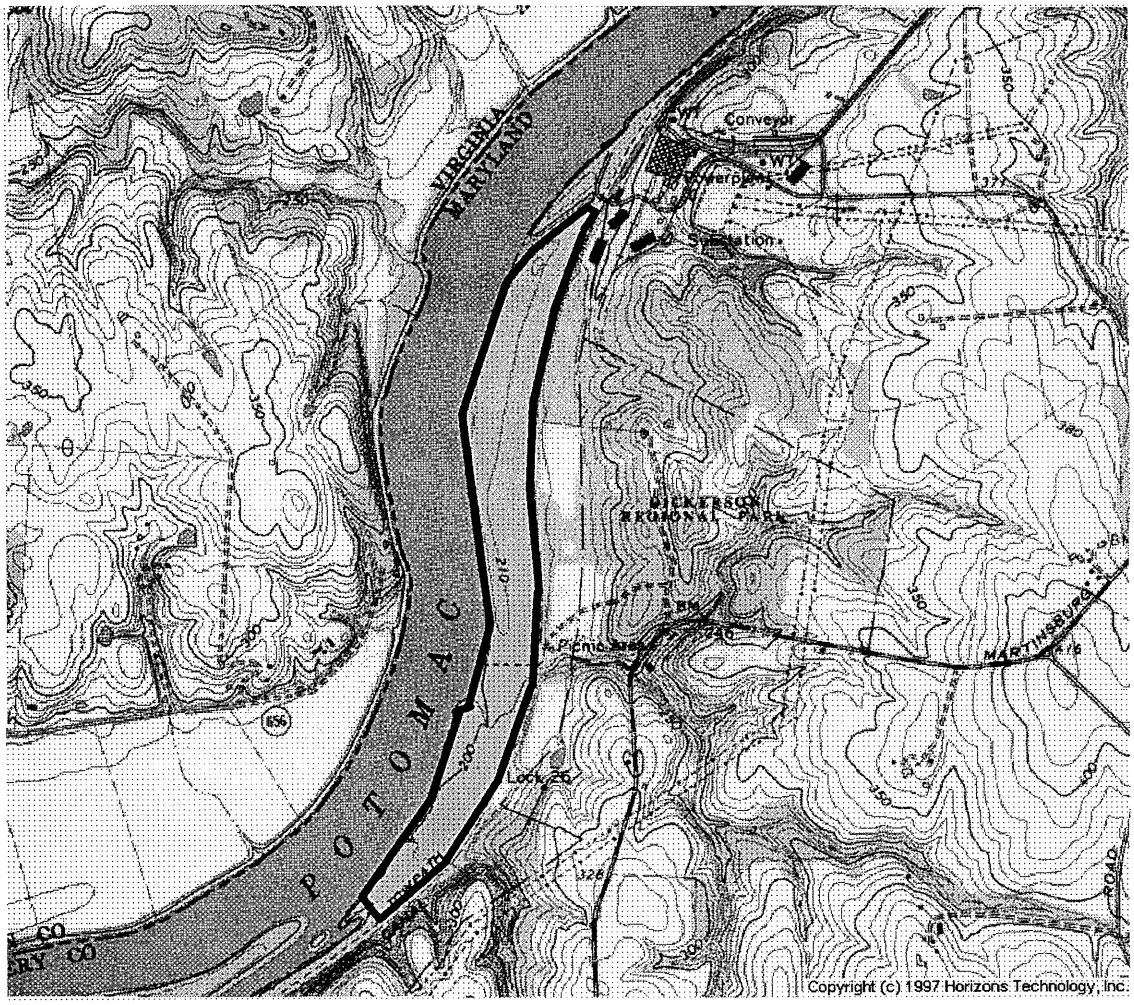
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

39 11 53 N, 77 28 17 W -- precise coordinates for site only and not necessarily for the *Acer saccharinum - Ulmus americana - (Populus deltoides)* Forest occurrence

Dickerson Floodplain



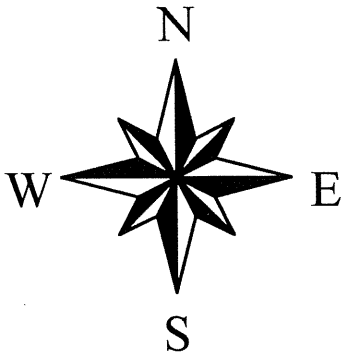
0.6 0 0.6 1.2 Miles

Poolesville Quad, Montgomery County

This site is dominated by:

Acer saccharinum - Ulmus americana - (Populus deltoides)

Temporarily Flooded Forest



Blockhouse Point

COUNTY Montgomery County, Maryland

USGS QUAD Seneca, MD

PRIMARY REASON FOR SELECTION

Blockhouse Point contains a high quality occurrence and one of Maryland's best examples of the *Fagus grandifolia - Liriodendron tulipifera* Forest (6807).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Blockhouse Point has ravines with small streams that have small areas of floodplain forest along side them, each approximately 200 square meters in size. The uplands surrounding these small patch floodplains are dominated by *Quercus rubra*, *Q. alba*, and *Q. prinus*. One old road leads into the site from the parking lot. Trails are used for hiking and horse-back riding.

The majority of this site is 100 to 200 acres in size and consists of upland forest dominated by various *Quercus* species. The narrow floodplains along streams total 10-20 acres and are dominated by the *Fagus grandifolia - Liriodendron tulipifera* Forest. This floodplain forest is influenced by a temporary flooding regime.

COMMUNITY DESCRIPTION

Blockhouse Point was chosen as a reference site primarily because it is habitat to one of the best examples of the *Fagus grandifolia - Liriodendron tulipifera* Forest. This wetland community may be uncommon in Maryland and is preliminarily ranked as S3, a designation meaning that between 21 to 100 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Other non-native plants documented in this community occurrence, but currently less threatening, include *Glechoma hederacea* and *Ailanthus altissima*. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Blockhouse Point is part of Blockhouse Point Park, a Montgomery County Park, thus receiving some protection. Further research at this site should require a review of impact to site integrity and will require permission from Montgomery County Parks.

OCCURRENCE RANK

This Blockhouse Point occurrence of *Fagus grandifolia - Liriodendron tulipifera* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP
Blockhouse Point Park owned by Montgomery County Parks

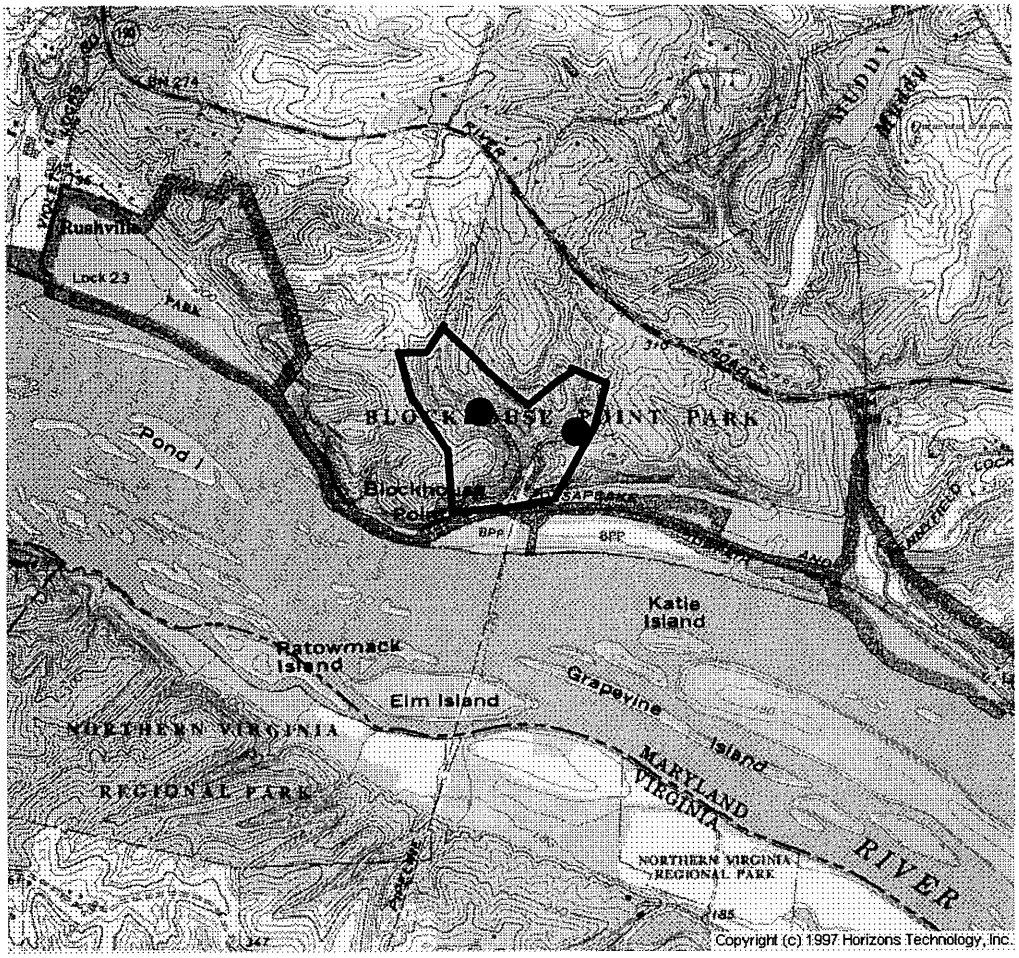
BEST INFORMATION SOURCE
Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER
Land Manager, Montgomery County Parks

BOUNDARY JUSTIFICATION
Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE
39 03 44 N, 77 18 23 W and 39 03 46 N, 77 18 41 W -- precise coordinates for *Fagus grandifolia - Liriodendron tulipifera* Forest at this site

Blockhouse Point



0.7 0 0.7 1.4 Miles

Seneca Quad, Montgomery County

The points represent:

Fagus grandifolia - Liriodendron tulipifera

Temporarily Flooded Forest

N

W E

S

Cabin John Island

COUNTY Montgomery County, Maryland

USGS QUAD Falls Church, VA

PRIMARY REASON FOR SELECTION

Cabin John Island contains a high quality occurrence and one of Maryland's best examples of the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest (6815).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Cabin John Island is approximately 50 acres in size along the main stem of the Potomac River in the Piedmont physiographic province and is occupied by a *Platanus occidentalis - Acer negundo / Asarum canadense* Forest. It's alluvial soils indicate temporary annual flooding. The floodplain is bordered by the Potomac River to the southwest and the Chesapeake and Ohio Canal and Towpath, a highway, and residential areas to the northeast. Currently, the site has foot paths and is used by hikers and nature enthusiasts.

There are small portions of this site that appear to have more disturbance in their history. This is indicated by more cover of *Acer negundo*, *Liriodendron tulipifera*, and non-native species. In addition, just downstream of Cabin John Island is Chautauqua Island which is likely a former house site indicated by the presence of a small slab of concrete and many non-native species.

At least 12 plant species considered rare, threatened or endangered in Maryland are known to occur at Cabin John Island.

COMMUNITY DESCRIPTION

Cabin John Island was chosen as a reference site primarily because it is habitat to one of the best examples of *Platanus occidentalis - Acer negundo / Asarum canadense* Forest known in Maryland. This wetland community type is common in Maryland and preliminarily ranked as S4, a designation meaning that the community is apparently secure within the State. The northwest end of Cabin John Island varies slightly from that typically defined for a *Platanus occidentalis - Acer negundo / Asarum canadense* Forest in that it has a higher prevalence of shrubs. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for the precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Lonicera japonica*, and *Alliaria petiolata* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. One other non-native plant documented near this community occurrence, but currently less threatening, is *Hemerocallis fulva*. Monitoring and control of these non-native species is recommended.

PROTECTION COMMENTS

Cabin John Island is part of the Chesapeake and Ohio Canal National Historical Park, thus receiving some protection and conservation attention. Further research at this site should require a review of impacts to site integrity and will require a permit from the National Park Service.

OCCURRENCE RANK

This Cabin John Island occurrence of *Platanus occidentalis - Acer negundo / Asarum canadense* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Chesapeake and Ohio Canal National Historical Park owned by the National Park Service

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Natural Resources Biologist, Chesapeake and Ohio Canal National Historical Park, National Park Service

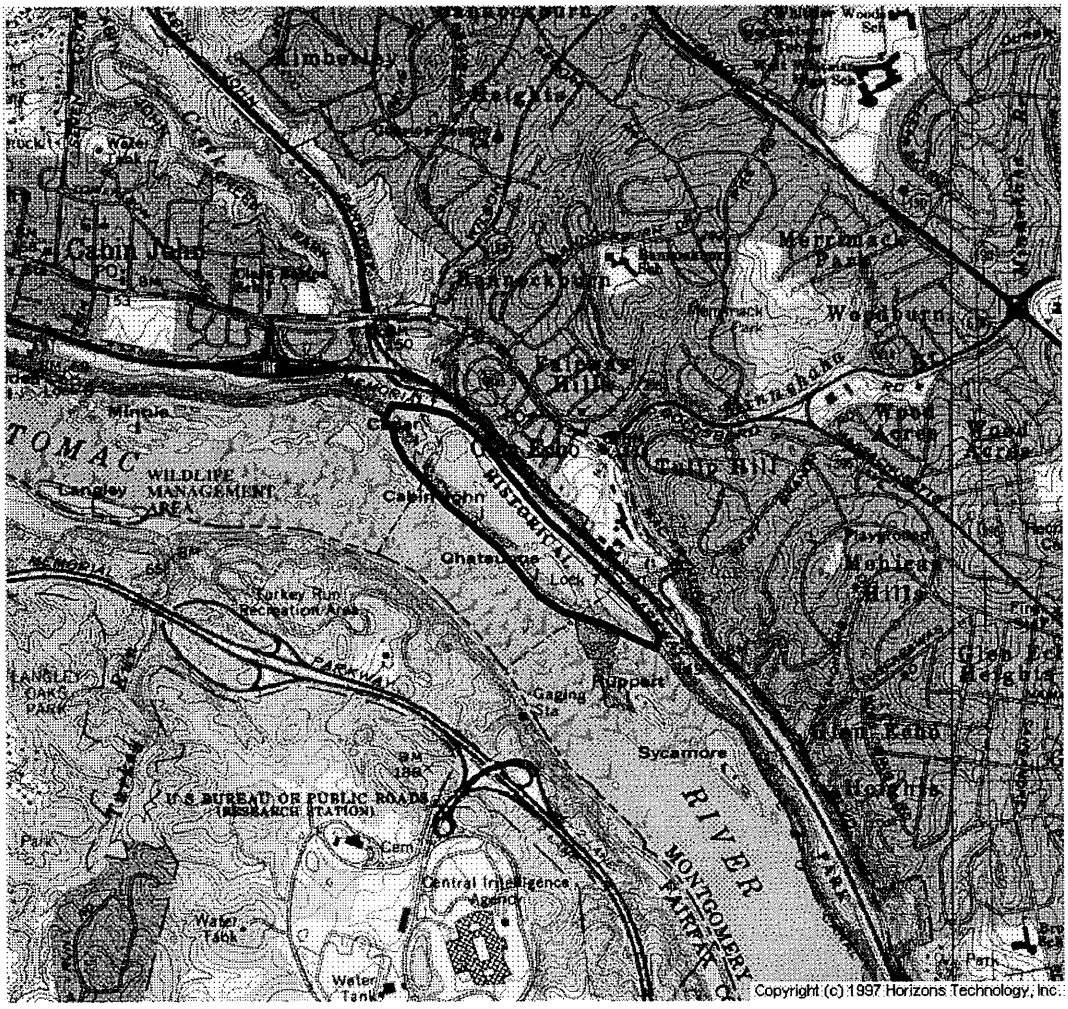
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 57 56 N, 77 08 33 W -- precise coordinates for site only and not necessarily for the *Platanus occidentalis - Acer negundo / Asarum canadense* Forest occurrence

Cabin John Island



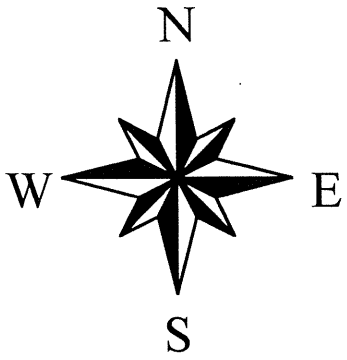
0.6 0 0.6 1.2 Miles

Falls Chruch Quad, Montgomery County

This site is dominated by:

Platanus occidentalis - Acer negundo / Asarum canadense

Temporarily Flooded Forest



St. Mary's River Floodplain

COUNTY St. Mary's County, Maryland

USGS QUAD Hollywood, MD

PRIMARY REASON FOR SELECTION

St. Mary's River Floodplain contains a high quality occurrence and one of Maryland's best examples of the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest (6812).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

St. Mary's River Floodplain contains floodplain forest along the St. Mary's River in the Coastal Plain physiographic province, approximately 150 acres in size. It's alluvial soils indicate that temporary flooding occurs annually or more frequently. The floodplain is bordered by state park land, rural roads, and residential areas. Also within this floodplain forest, near Norris Road, are the remains of an old homesite, barn, and road.

The *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest occupies 25 to 50 acres of the floodplain. At least 50 other acres on the floodplain are forested by other different communities. *Pinus taeda - Quercus (michauxii - falcata) Liquidambar styraciflua - Ilex opaca* Forest occurs up slope of the *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest while *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest occurs at the edge of an open wetland.

At least one plant species and one animal species considered rare, threatened or endangered in Maryland are known to occur at St. Mary's River Floodplain.

This site is designated a Maryland State Wildland and a Nontidal Wetland of Special State Concern.

COMMUNITY DESCRIPTION

St. Mary's River Floodplain was chosen as a reference site primarily because it is habitat to one of the best examples of *Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba* Forest known in Maryland. This wetland community type is uncommon in Maryland and preliminarily ranked as S3, a designation meaning that between 21 and 100 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition. *Pinus taeda - Quercus (michauxii - falcata) - Liquidambar styraciflua - Ilex opaca* Forest and *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest are also described in the Vegetation Description section of this report.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum* and *Lonicera japonica* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

St. Mary's River Floodplain is part of St. Mary's River State Park, is designated a Maryland State Wildland, and a Maryland Nontidal Wetland of Special State Concern thus receiving some protection and conservation attention. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This St. Mary's River Floodplain occurrence of *Platanus occidentalis* - (*Liquidambar styraciflua* - *Liriodendron tulipifera*) / *Asimina triloba* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

St. Mary's River State Park owned by the Maryland Department of Natural Resources

BEST INFORMATION SOURCE /

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, St. Mary's River State Park

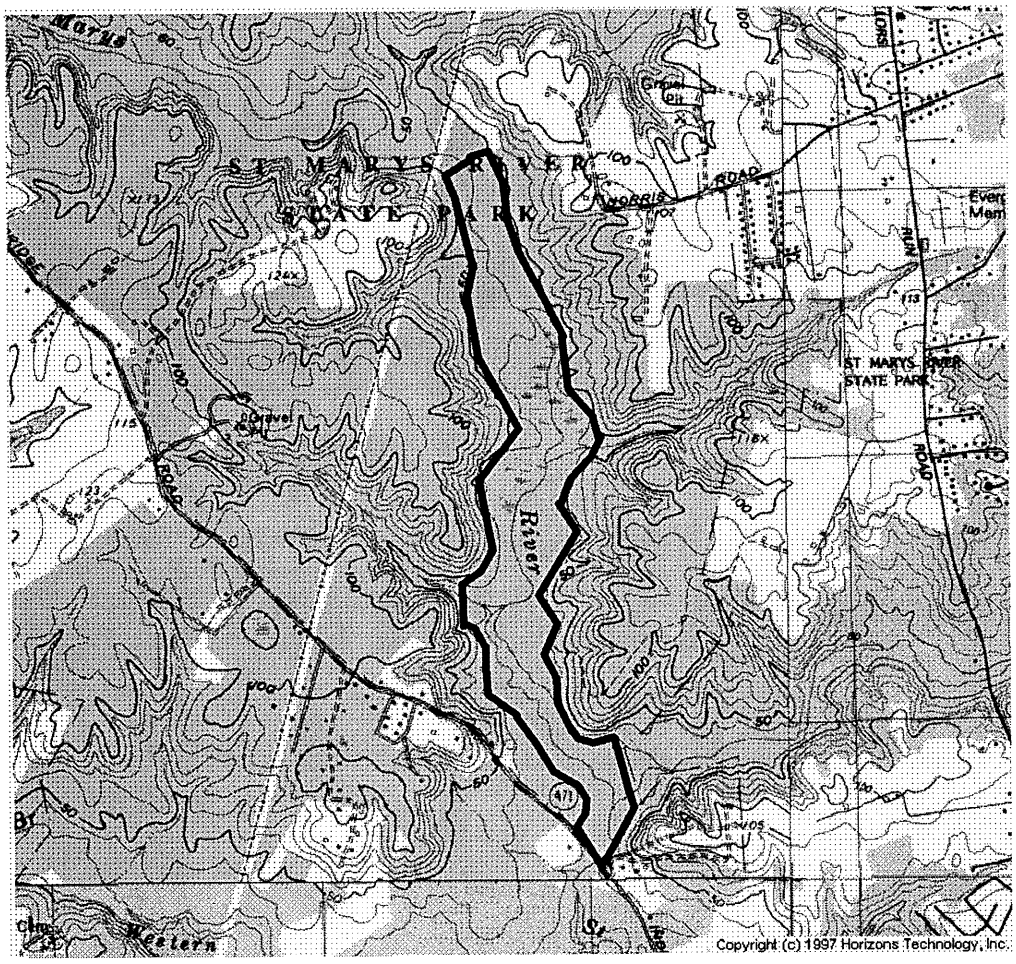
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 15 10 N, 76 30 30 W -- precise coordinates for *Platanus occidentalis* - (*Liquidambar styraciflua* - *Liriodendron tulipifera*) / *Asimina triloba* Forest at this site

St. Mary's River Floodplain



0.7 0 0.7 1.4 Miles

Hollywood Quad, St. Mary's County

This site is dominated by:

Platanus occidentalis - (Liquidambar styraciflua - Liriodendron tulipifera) / Asimina triloba

Temporarily Flooded Forest

N
W E
S

Pomfret Swamp

COUNTY Charles County, Maryland

USGS QUAD Port Tobacco, MD

PRIMARY REASON FOR SELECTION

Pomfret Swamp contains a high quality occurrence and one of Maryland's best examples of the *Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea* Forest (6811).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Pomfret Swamp is a floodplain forest along Mattawoman Creek in the Coastal Plain physiographic province, approximately 150 acres in size. Alluvial soils indicate an annual temporary flooding regime. The floodplain is bordered by railroad tracks, steep slopes, and Route 227. A sewer line right-of-way cuts through the site.

Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea Forest is interspersed within the *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest which is the dominant community on the site, as well as a more common community in the state of Maryland.

At least two plant species considered rare, threatened, or endangered are known from this site.

COMMUNITY DESCRIPTION

Pomfret Swamp was chosen as a reference site primarily because it is habitat to one of the best examples of *Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea* Forest in Maryland. This wetland community type may be uncommon in Maryland and is preliminarily ranked as S2, a designation meaning that between 6 to 20 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition. *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest is also described in the vegetation Description section of this report .

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, *Polygonum perfoliatum*, and *Lonicera japonica* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Pomfret Swamp is part of Mattawoman Natural Environment Area, thus receiving some protection and conservation attention from the Maryland Department of Natural Resources. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Pomfret Swamp occurrence of *Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Mattawoman Natural Environment Area owned by the Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Mattawoman Natural Environment Area

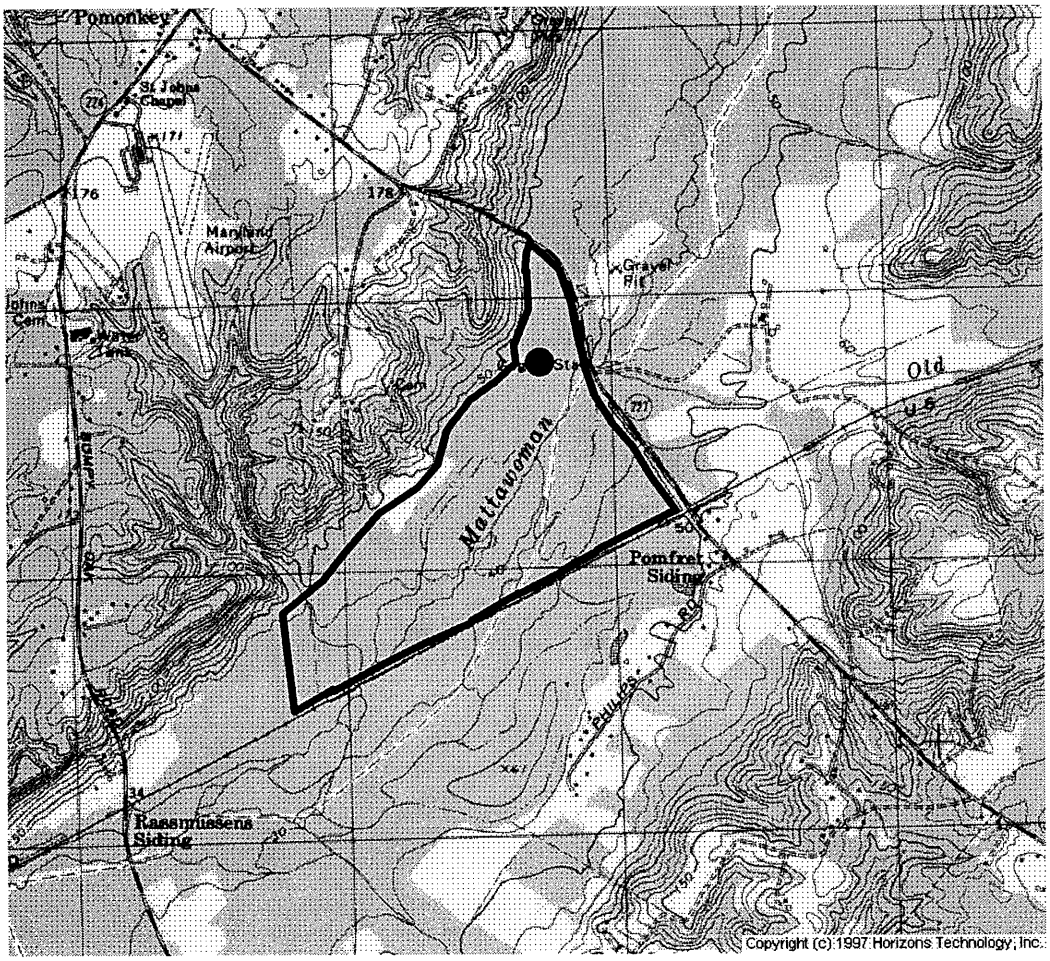
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 35 45 N, 77 03 30 W -- precise coordinates for *Quercus (palustris, phellos) - Acer rubrum - Cinna arundinacea* Forest at this site

Pomfret Swamp



0.7 0 0.7 1.4 Miles

Port Tobacco Quad, Charles County

This dot represents:

Quercus (palustris, phellos) - Acer rubrum / Cinna arundinacea

Saturated Forest

N
W E
S

Mattawoman Creek at Bumpy Oak Road

COUNTY Charles County, Maryland

USGS QUAD Port Tobacco, MD

PRIMARY REASON FOR SELECTION

Mattawoman Creek at Bumpy Oak Road contains a high quality occurrence and one of Maryland's best examples of the *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest (6810).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Mattawoman Creek at Bumpy Oak Road contains a floodplain forest approximately 60 acres in size along Mattawoman Creek in the Coastal Plain physiographic province. The site contains active stream braiding and old stream channels, in addition to the main channel of Mattawoman Creek and is subject to temporary annual flooding. The floodplain is bordered by railroad tracks, a sewer line right-of-way, and Bumpy Oak Road.

The *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest is the only forested community on the site. Open flooded herbaceous wetlands are also on site.

This site is falls within a designated Maryland Nontidal Wetland of Special State Concern and within a Maryland Natural Environmental Area. This site also falls within the Chesapeake Bay Critical Area and is subject to additional protection regulations.

COMMUNITY DESCRIPTION

Mattawoman Creek at Bumpy Oak Road was chosen as a reference site primarily because it is habitat to one of the best examples of *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest known in Maryland. This occurrence varies slightly from that typically defined for a *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest in that it has a higher prevalence of mature *Quercus* species. This wetland community type may be uncommon in Maryland and is preliminarily ranked as S3, a designation meaning that between 21 and 100 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum*, and *Lonicera japonica* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Mattawoman Creek at Bumpy Oak Road is part of Mattawoman Natural Environment Area, thus receiving some protection and conservation attention. It also falls within the Chesapeake Bay Critical Area and is subject to additional protection regulations. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Mattawoman Creek at Bumpy Oak Road occurrence of *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Mattawoman Natural Environment Area owned by The Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Mattawoman Natural Environment Area

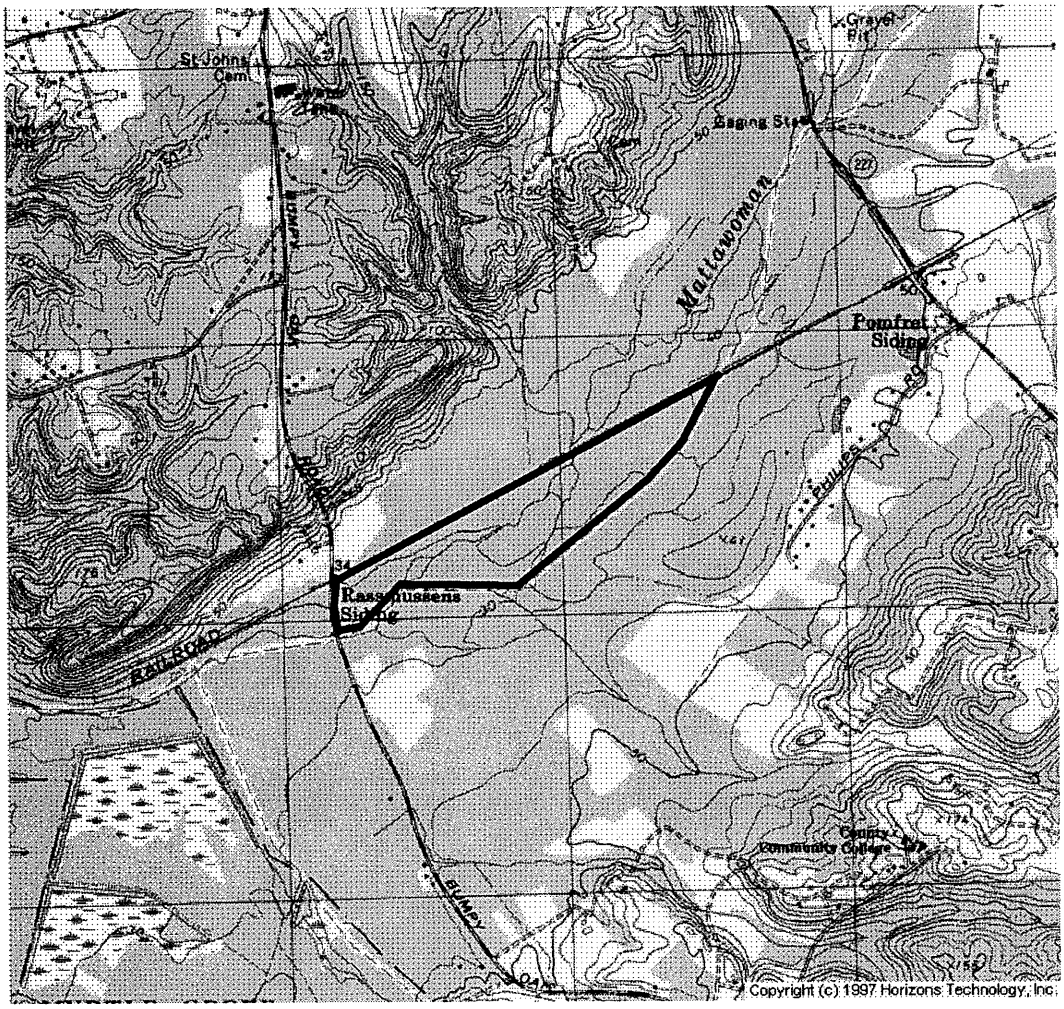
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 34 53 N, 77 04 17 W -- precise coordinates for *Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana* Forest at this site

Mattawoman Creek at Bumpy Oak Road



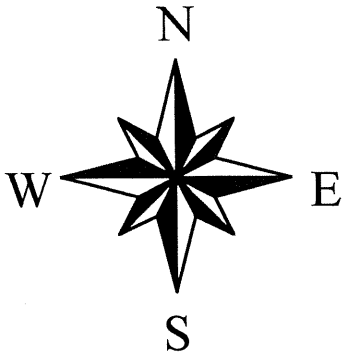
0.6 0 0.6 1.2 Miles

Port Tobacco Quad, Charles County

This site is dominated by:

Liriodendron tulipifera - Acer rubrum - Liquidambar styraciflua / Medeola virginiana

Temporarily Flooded Forest



Piscataway and Potomac Confluence

COUNTY Prince Georges County, Maryland

USGS QUAD Mount Vernon, MD - VA

PRIMARY REASON FOR SELECTION

Piscataway and Potomac Confluence contains a high quality occurrence and one of Maryland's best examples of the *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest (6808) .

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Piscataway and Potomac Confluence contains floodplain forests at the mouth of small tributaries entering Piscataway Creek and the Potomac River near their confluence. Each pocket of forest is two to ten acres in size. The sandy or silty clay loam soils are seasonally and permanently flooded (or saturated). The floodplain forests are bordered by agricultural fields, open fields, rural parking lots, trails, boardwalks, and upland forests, which are all on National Park Service land.

At least six plant species considered rare, threatened, or endangered in Maryland are known to occur at Piscataway and Potomac Confluence in or near the *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest.

COMMUNITY DESCRIPTION

Piscataway and Potomac Confluence was chosen as a reference site primarily because it is habitat to one of the best examples of the *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest in Maryland. This wetland community type may be uncommon in Maryland and is preliminarily ranked as S2, a designation meaning that between 6 to 20 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

Upland forests surrounding this wetland forest include species such as *Quercus falcata, Q. alba, Q. velutina, Q. stellata, Liriodendron tulipifera, Nyssa sylvatica, Fagus grandifolia, Juglans nigra, Prunus serotina, Pinus virginiana, Ilex opaca, Juniperus virginiana,* and *Sassafras albidum.*

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Lonicera japonica* is a non-native species that threatens community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of this non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Piscataway and Potomac Confluence is part of Piscataway Park and National Colonial Farm, thus receiving some protection from the National Park Service. This site also falls within the Chesapeake Bay Critical Area and is subject to additional protection regulations. Further research and additional recreational development at this site should require a review of impacts to site integrity and will require permission from the National Park Service, National Capital Parks - East Region.

OCCURRENCE RANK

This Piscataway and Potomac Confluence occurrence of *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Piscataway Park and National Colonial Farm owned by the National Park Service

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Natural Resources Biologist, National Capital Parks - East Region

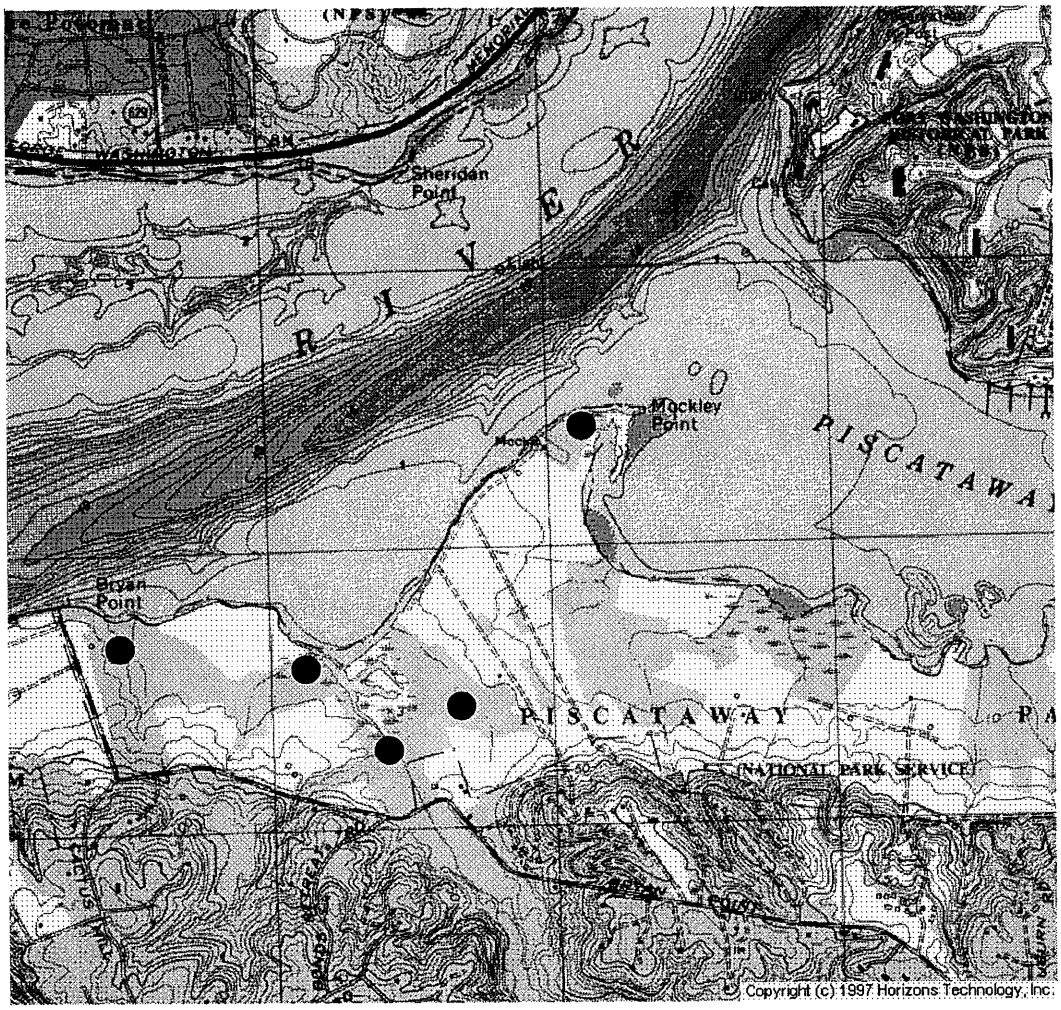
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 41 36 N, 77 03 23 W and 38 42 03 N, 77 02 46 W -- precise coordinates for *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest at this site

Piscataway and Potomac Confluence



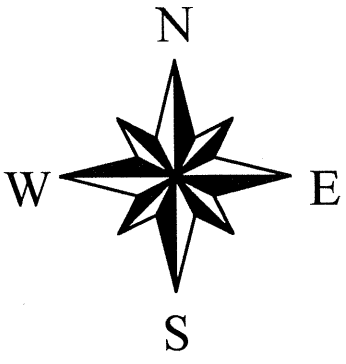
0.6 0 0.6 1.2 Miles

Mount Vernon Quad, Prince Georges County

This site is dominated by:

Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus

Seasonally Flooded Forest



Brushy Ridge Floodplain

COUNTY Allegany and Washington Counties, Maryland

USGS QUAD Bellegrove, MD

PRIMARY REASON FOR SELECTION

Brushy Ridge Floodplain contains a high quality occurrence and one of Maryland's best examples of the *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest (6817)that occurs on a floodplain.

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Brushy Ridge Floodplain occurs along Sideling Hill Creek in the Ridge and Valley physiographic province and contains one of the best examples of *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest. Brushy Ridge Floodplain is dominated by this one forest community and is approximately eight acres in size. Brushy Ridge Floodplain is one-half mile long, generally 50 meters in width, and typically floods every one to five years. On the west facing slope above this floodplain are shale barren woodlands whose dominant species are typical for those communities including *Pinus virginiana*, *Juniperus virginiana*, *Celtis tenuifolia*, and *Quercus prinus*. This *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest extends up onto nearby north facing slopes which are similar in their mesic conditions and shorter daily and annual exposure to the sun (due to the northerly aspect). Similarly, these floodplains receive shorter daily and annually exposure to sunlight because they are sheltered by steep-sided slopes.

At least three species considered rare, threatened or endangered in Maryland are known to occur at this site including one plant species, one bird, and one invertebrate.

This site is designated a Maryland State Wildland.

COMMUNITY DESCRIPTION

Brushy Ridge Floodplain was chosen as a reference site primarily because it is habitat to one of the best examples of *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest known in Maryland. This community may be rare in Maryland and is preliminarily ranked as S2, a designation meaning that between 6 to 20 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum, Rosa multiflora,* and *Dioscorea batatas* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Brushy Ridge Floodplain is partly under protection as part of Sideling Hill Wildlife Management Area. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Brushy Ridge Floodplain occurrence of *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest ranks as an "A/B" or excellent example when compared to all other known Maryland examples of this community type. The community would rank as an "A" if not for the occurrence of *Microstegium vimineum*, a non-native invasive plant threatening site integrity. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Sideling Hill Wildlife Management Area is owned by the Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Sidling Hill Wildlife Management Area

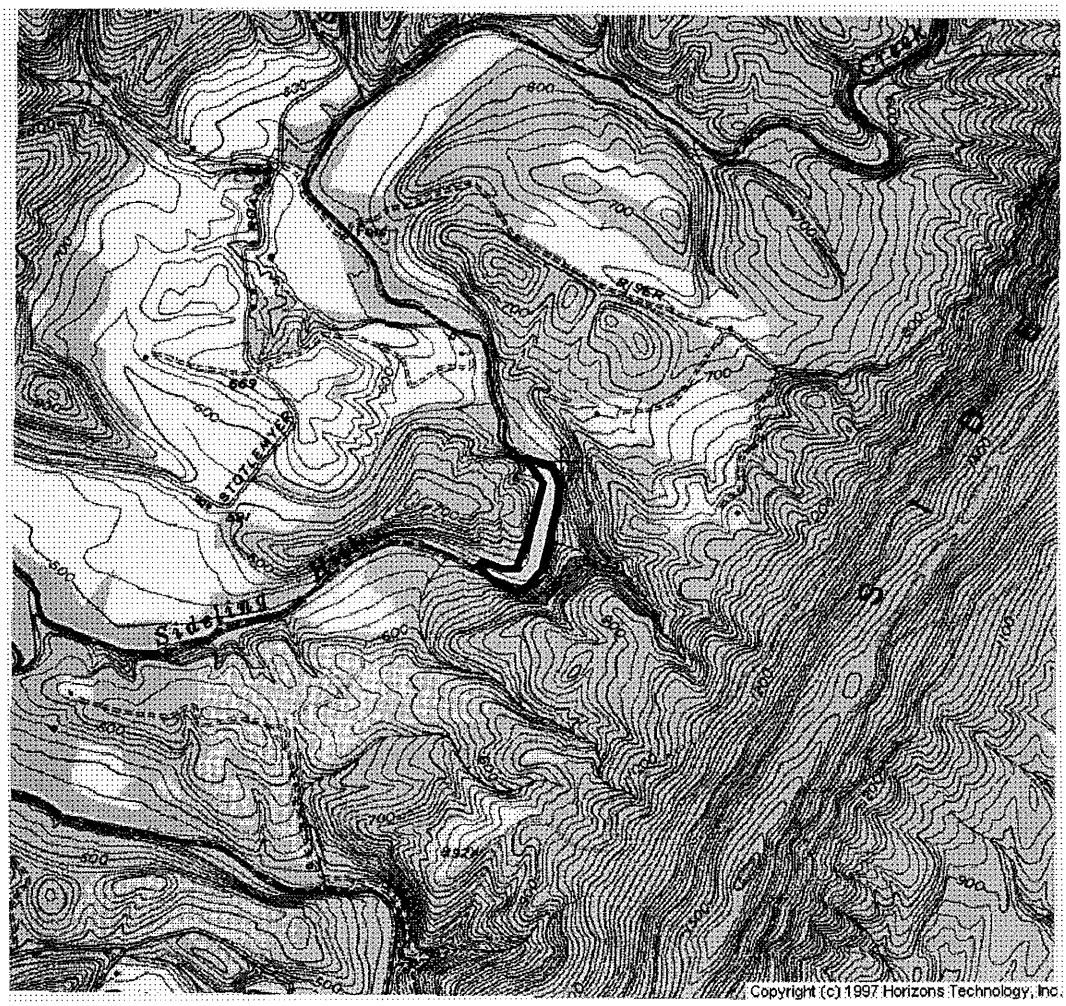
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

39 39 55 N, 78 20 02 W -- precise coordinates for *Tsuga canadensis - Liriodendron tulipifera / Rhododendron maximum / Dryopteris intermedia* Forest at this site

Brushy Ridge Floodplain



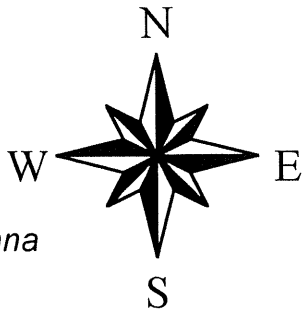
0.6 0 0.6 1.2 Miles

Bellegrove Quad, Allegheny County

This site is dominated by:

Quercus rubra - Tsuga canadensis - Pinus strobus - Liriodendron tulipifera / Hamamelis virginiana

Forest



Savage River Floodplain

COUNTY Garrett County, Maryland

USGS QUAD Barton, MD

PRIMARY REASON FOR SELECTION

Savage River Floodplain contains a high quality occurrence and one of Maryland's best examples of the *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest (6206).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Savage River Floodplain contains a temporarily flooded forest along the Savage River on the Allegheny Plateau physiographic province. This forested floodplain is approximately 100 acres in size but only 200 meters wide at it's widest point. This forest probably floods every one to two years. It is bordered by a paved rural road and homes to the west and upland forest (State Forest land) to the east.

All the floodplain at this site is the *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest. There is also a scour community along the river's edge that has not yet been described.

At least one plant species and one animal species considered rare, threatened, or endangered in Maryland is known to occur on Savage River Floodplain.

Part of this site is designated as a Maryland State Wildland.

COMMUNITY DESCRIPTION

Savage River Floodplain was chosen as a reference site primarily because it is habitat to one of the best examples of the *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest known in Maryland. This occurrence varies slightly from that typically defined in the Vegetation Description of this report in that it contains a greater prevalence of *Tsuga canadensis.* This additional *Tsuga* cover results in greater shade and, therefore, lower herb density on the ground cover. This wetland community may be uncommon in Maryland and is preliminarily ranked as S2, a designation meaning that between 6 to 20 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Microstegium vimineum,* and *Lysimachia nummularia* are non-native species that threaten community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of these non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Savage River Floodplain is part of Savage River State Forest, thus receiving some protection. This site should be protected from any additional recreational development or clearing of trees. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Savage River Floodplain occurrence of *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Savage River State Forest owned by the Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Savage River State Forest

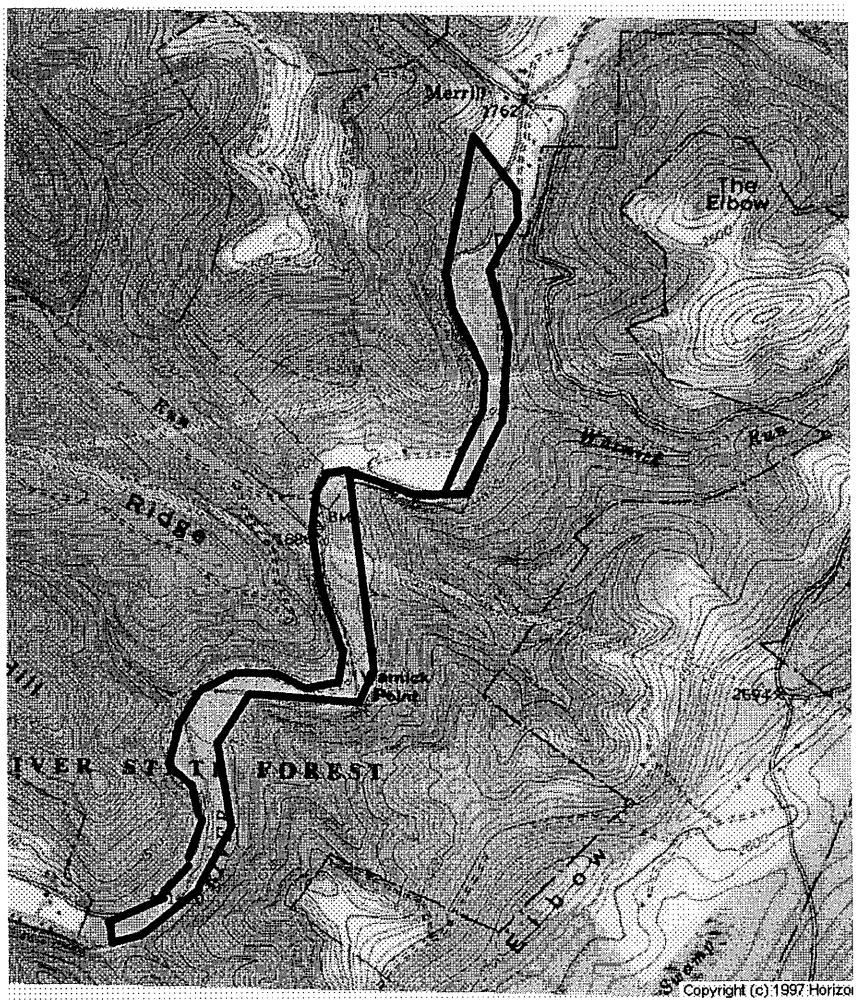
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

39 34 42 N, 79 05 49 W -- precise coordinates for *Tsuga canadensis - Betula alleghaniensis - Prunus serotina / Rhododendron maximum* Forest at this site

Savage River Floodplain



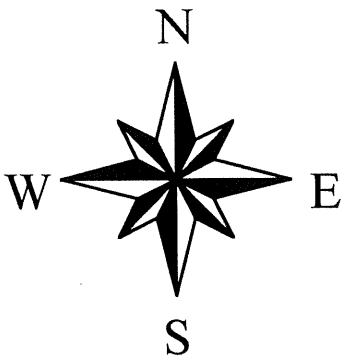
0.8 0 0.8 1.6 Miles

Barton Quad, Garrett County

This site is dominated by:

Tsuga canadensis - Acer rubrum - Liriodendron tulipifera

Temporarily Flooded Forest



Point Lookout Woods

COUNTY St. Mary's County, Maryland

USGS QUAD Point Lookout, MD

PRIMARY REASON FOR SELECTION

Point Lookout Woods contain a high quality occurrence and one of Maryland's best examples of the *Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca* Forest (6816).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

Point Lookout Woods is along the Potomac River very near the confluence with the Chesapeake Bay. It is a narrow floodplain which is bordered by Point Lookout Creek to the north and summer cottages to the west. The site is approximately 40 acres in size and occupied by *Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca* Forest which is influenced by a temporary flooding regime. There is also an early successional forest dominated only by *Pinus taeda* on the opposite side of Point Lookout Creek which is approximately thirty acres in size. These forest types appear to flood annually.

At least two plant species considered rare, threatened, or endangered in Maryland are known to occur at Point Lookout Woods.

COMMUNITY DESCRIPTION

Point Lookout Woods was chosen as a reference site primarily because it is habitat to one of the best examples of the *Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca* Forest in Maryland. This wetland community type may be uncommon in Maryland and is preliminarily ranked as S2, a designation meaning that between 6 to 20 occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

This Point Lookout Woods occurrence varies slightly from that typically defined in the Vegetation Description section of this report in that there are more areas of sandy alluvium present. These areas are typically better drained and drier and may contain species such as *Opuntia humifusa* and *Vaccinium vacillans.*

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Lonicera japonica* is a non-native species that threatens community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of this non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

Point Lookout Woods is part of Point Lookout State Park. This site receives some conservation protection, as it is set aside as a unique natural area within the park. Further research at this site should require a review of impacts to site integrity and will require permission from the Maryland Department of Natural Resources.

OCCURRENCE RANK

This Point Lookout Woods occurrence of *Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca* Forest ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

Point Lookout State Park owned by Maryland Department of Natural Resources

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resources

LAND MANAGER

Land Manager, Point Lookout State Park

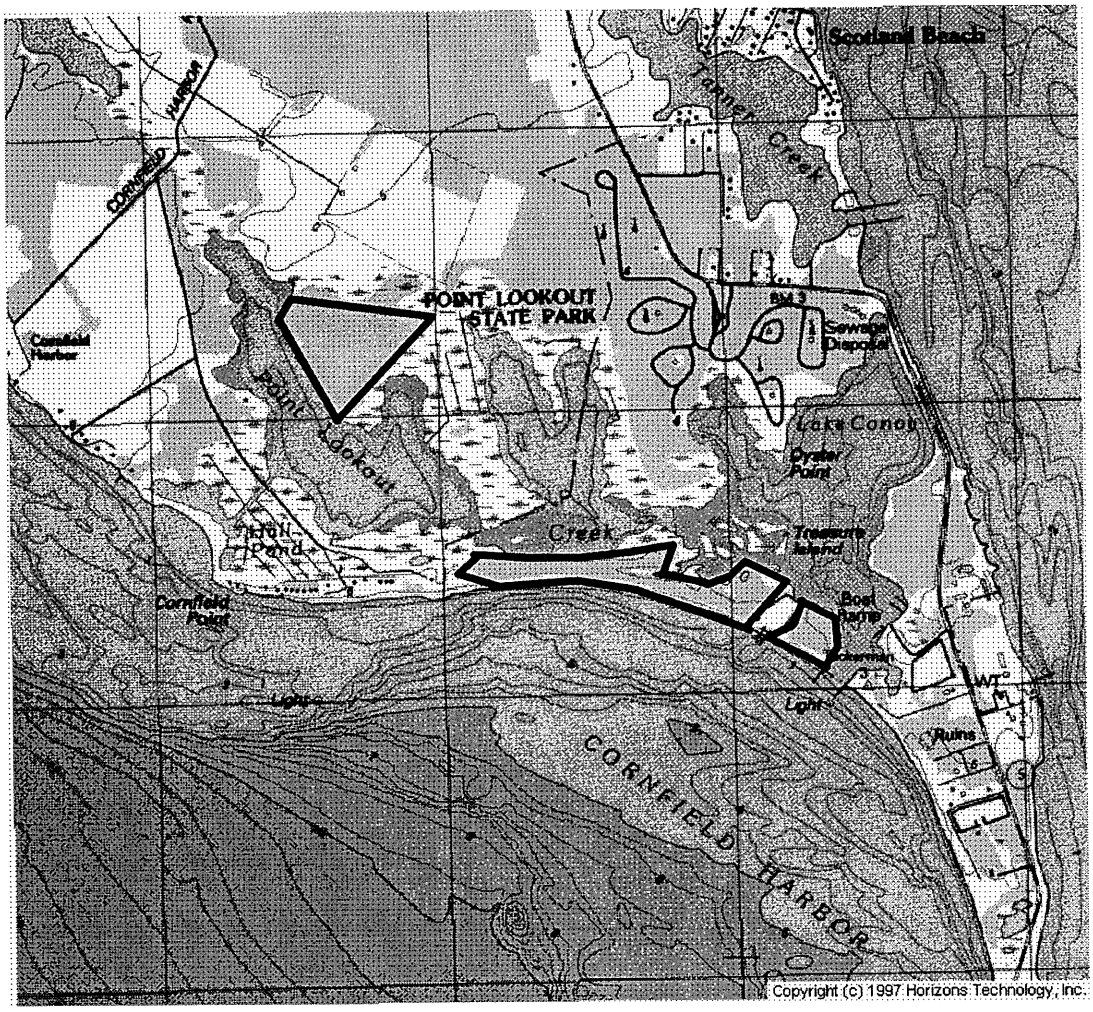
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 03 45 N, 76 20 52 W -- precise coordinates for *Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua / Ilex opaca* Forest at this site

Point Lookout Woods



0.6 0 0.6 1.2 Miles

Point Lookout Quad, St. Mary's County

This site is dominated by:

Pinus taeda - Quercus (michauxii, falcata) - Liquidambar styraciflua - Ilex opaca

Temporarily Flooded Forest

N W E S

Olmstead Island Complex

COUNTY Montgomery County, Maryland

USGS QUAD Vienna, VA

PRIMARY REASON FOR SELECTION

The Olmstead Island Complex (survey sites Olmstead Island and Lock # 17 combined) contains a high quality occurrence and one of Maryland's best examples of the *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland (6813).

High quality occurrences are determined by four factors: 1) the site includes a very representative example of the vegetation type as defined in the Maryland Vegetation Classification, 2) the occurrence is in good to excellent condition -- the habitat supporting this community type is less degraded than other known occurrences, 3) the occurrence has good to excellent viability -- long term prospects for the continued existence of this occurrence are high, and 4) the occurrence has good to excellent defensibility -- this occurrence can be protected from extrinsic human factors. Quality occurrence rank is a relative evaluation considering all the above criteria and designated an A, B, C, or D. An "A" rank describes an excellent or high quality site; a "D" rank describes a low or degraded quality site. See Occurrence Rank below.

SITE DESCRIPTION

The Olmstead Island Complex is a rocky floodplain terrace in the Potomac Gorge on Olmstead Island, Falls Island, and adjacent to Lock # 17 of the Chesapeake and Ohio Canal. This dynamic site occurs on the Fall Line between the Piedmont and Coastal Plain physiographic provinces. In the gorge, the Potomac River flows over resistant rocks at Great Falls, at which point the river narrows causing flooding velocity (and scouring) to intensify. The Olmstead Island Complex occurs within the thirty year flood zone. Soils are thin (depth averaging less than 20 cm) in areas where bedrock has greater exposure, averaging 40 percent at the surface. Thin soils contribute to xeric conditions which are the likely cause of stunted and sparse tree cover. In addition, thin soils do not allow deep rooting, therefore, trees are more susceptible to flood damage such as uprooting. *Pinus virginiana* may be particularly susceptible as it grows on the more shallow soils. Typically, soils are extremely well drained sandy loams, but silt loam and fine organic matter also occur in places. The islands are accessible by bridges and a boardwalk that lead to an overlook of Great Falls. The Olmstead Island Complex is bordered by the Potomac River to the west and the Chesapeake and Ohio Canal, a visitor's center, and large parking lot to the east.

Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium Woodland occupies 75 percent of the survey sites. Undescribed river scour communities compose the remaining 25 percent.

At least eleven plant species considered rare, threatened, or endangered in Maryland are known to occur at Olmstead Island Complex.

COMMUNITY DESCRIPTION

The Olmstead Island Complex was chosen as a reference site primarily because it is habitat to one of the best examples of the *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodlands in Maryland. This community uncommon in Maryland and is preliminarily ranked as S1, a designation meaning that between one and five occurrences are known or suspected within the State. This particular occurrence is one of a set of similar communities used to define and classify this community type for the Maryland Vegetation Classification, thus a type locality. See the Vegetation Description of this report for a precise community definition.

MANAGEMENT COMMENTS / MONITORING NEEDS

The natural disturbance of flooding, past land use, and general landscape fragmentation promotes the occurrence of some invasive non-native species. At this site *Lonicera japonica* is a non-native species that threatens community composition by out-competing native species, thereby lowering species diversity. Monitoring and control of this non-native species is recommended. Access to this site should remain limited to existing trails due to trampling and compaction of vegetation by visitors.

PROTECTION COMMENTS

The Olmstead Island Complex is part of the Chesapeake and Ohio Canal National Historic Park, thus receiving some protection and conservation attention from the National Park Service. Further research at this site should require a review of impacts to site integrity and will require permission from the National Park Service.

OCCURRENCE RANK

This Olmstead Island Complex occurrence of *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland ranks as an "A" or excellent example when compared to all other known Maryland examples of this community type. See above definition for quality occurrence rank.

MANAGED AREA NAME / TRACT OWNERSHIP

The Chesapeake and Ohio Canal National Historical Park owned by the National Park Service

BEST INFORMATION SOURCE

Wildlife and Heritage Division, Maryland Department of Natural Resource

LAND MANAGER

Natural Resources Biologist, National Park Service

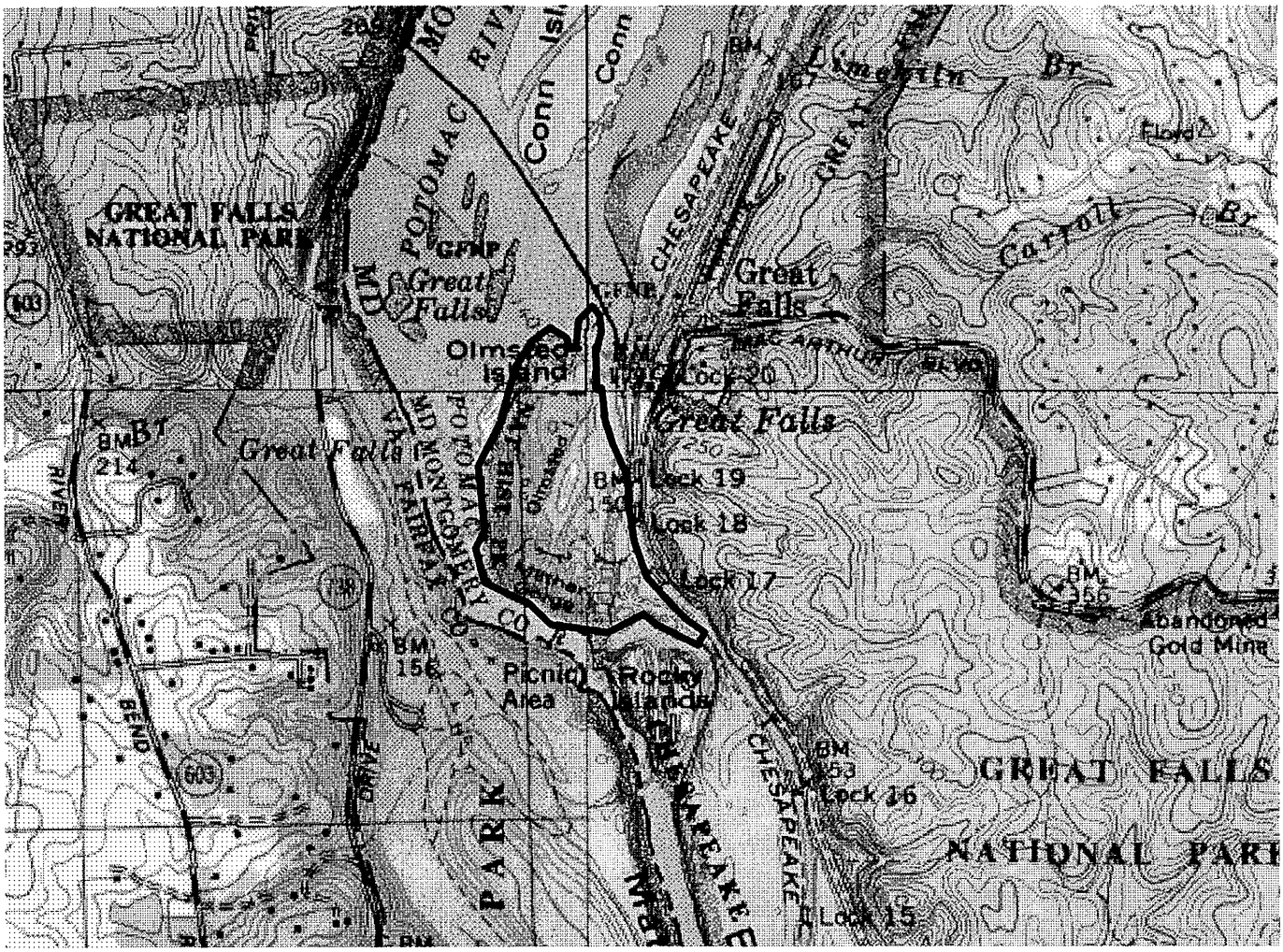
BOUNDARY JUSTIFICATION

Boundary shown on map only as a general reference to site location.

LATITUDE / LONGITUDE

38 59 51 N, 77 15 08 W -- precise coordinates for *Pinus virginiana - Carya glabra - Quercus (rubra, stellata) / Chasmanthium latifolium* Woodland at this site

Olmstead Island Complex



0.4 0 0.4 0.8 Miles

N

W E

S

Vienna & Falls Church Quads, Montgomery County

This site is dominated by:

Pinus virginiana - Carya glabra -
Quercus (rubra, stellata) / Chasmanthium latifolium

Woodland

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APPENDIX 1

The following pages are sample field forms used by The Nature Conservancy and the network of Natural Heritage Programs for collecting quantitative data on the survey of natural communities.

SITE SURVEY SUMMARY (The Nature Conservancy, 1990)

Site Name: _____ Macrosite/ Megasite Name: _____

SITE VISIT CHRONOLOGY:

Date (year) (mo) (day)	Time	Surveyor	Source Code
____-____-____	____to____	_____	F____
____-____-____	____to____	_____	F____
____-____-____	____to____	_____	F____
____-____-____	____to____	_____	F____
____-____-____	____to____	_____	F____

LOCATION: State:_____ County:_____ Quad:_____

Townrange:_____ Section:_____ Meridian:_____ / Town/Township:_____

Precise Location:
(distance and direction from a prominent feature shown on the topographic map, or some other map)

Road Directions to Site:

Location of Site Access Point:
(where to park, location of important trail)

ELEMENT OCCURRENCES:

Under "Element Name" list all elements sought, reported, or confirmed from the site. If known, record the Occurrence Numbers for each. Generate simple letter or number codes which identify each element occurrence on the base map; these codes help keep the base map uncluttered. Indicate whether the element was found (Y, N, N/A) on the date of the site visit, and whether a return visit is needed.

			Date:				
Element Name	Occ. Number	Code on Base Map	Found?	Found?	Found?	Found?	Found?	Revisit needed?

SITE DESCRIPTION:

PROTECTION URGENCY: (circle one)
- U1 immediately threatened
- U2 threat expected within 5 yrs.
- U3 threatened, but not in next 5 yrs.
- U4 no threats imminent
- U5 land protection complete

Protection Urgency Comments (& date):

MANAGEMENT URGENCY: (circle one)
- M1 management needed this year
- M2 management needed within 5 yrs. to prevent loss of EOs
- M3 management needed within 5 yrs. to maintain current EO quality
- M4 management may be needed in future
- M5 no management needed

Management Urgency Comments (& date):

TOPOGRAPHIC BASE MAP:
Attach a photocopy of the topographic map and/or aerial photograph showing the site. Complete steps 1 to 3 below.

Completed?

____yes ____no 1. Indicate precise element locations and/or boundaries (use solid lines). Identify each element with the codes you used on page 1.

____yes ____no 2. If knowledge of the site permits, draw primary (—|—|—) and secondary (=||=||=) ecological site boundaries. Within the primary site boundary include all known element occurrences and lands necessary for the immediate protection of the EOs. The secondary boundary (or buffer) includes lands intended to mitigate future unforeseen negative impacts to the EOs (e.g. to control erosion, trespass related damage, natural succession, exotic species, urban sprawl). Use (—||—|—||—) where primary and secondary boundaries coincide. Below, provide a brief written justification of the boundary locations.

Boundary Justification:

____yes ____no 3. If known, indicate tract ownership boundaries, using dashed lines (- - - - -).

Tract Ownership or Managed Area Name (names, addresses, phone #):

STEWARDSHIP:

Land Use Comments:
Describe current and past land use, improvements, and structures, and possible stewardship implications.

Potential Hazards:
Describe any potential hazards, both natural (e.g. cliffs, caves, venomous snakes, etc.), and of human origin (e.g. mine shafts, old wells, dangerous structures). Prescribe appropriate precautions.

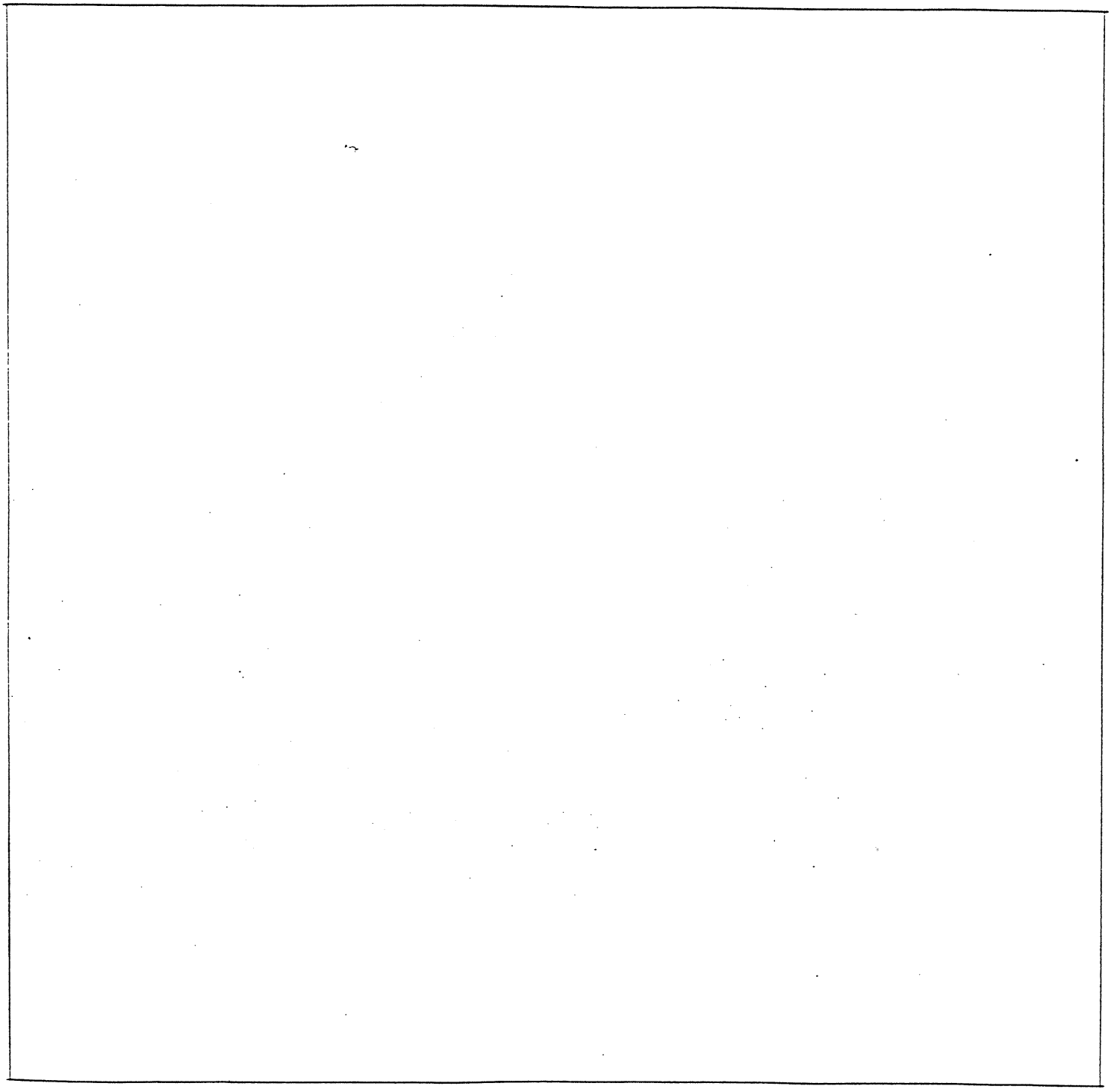
Exotic Flora/Fauna Comments:
List problem exotic species, describe their effects on the EOs, and, if possible, prescribe control methods.

Off-site Considerations:
Describe off-site land uses (e.g. farming, grazing, mining, urban development, stream perturbations) and how these uses might affect the EOs on the site and their future management.

Site and Element Management Needs:
Summarize the expected management needs for the site and its EOs.

DETAILED SKETCH MAP:

The purpose of this map is to show fine details of the site which are not shown on the topographic base map. This map can be used to show: (1) EO locations, (2) study plots or marked individuals, (3) natural landmarks, and (4) disturbance features, such as structures, dumps, trails, etc. Include scale and indicate north.



Identifiers

.Site name:_____

.Survey site name:_____

.Quad name(s):_____ 4.Quad code(s):_____

.County name(s):_____ 6.County code(s):_____

.Town (LOCALJURIS):_____

.Directions:_____

.Sourcecode:_____ 10.Survey date:_____.____.____ 11.State:_____

2.Surveyors:_____

Topography

13. Transect____

4.Reconnaissance diagram: Scale:

Vegetation / Habitat

5. Observation point 1____	Observation point 2____	Observation point 3____
5.Community name:_____	Community name:_____	Community name:_____
7.Additional data: form 2___ form 3___	Additional data: form 2___ form 3___	Additional data: form 2___ form 3___
8.General description (physiognomy, char./dom. spp. of tree, shrub, herb, cryophyte layers)	General description:	General description:

Reconnaissance Diagram: Scale:

Observation Point 4___	Observation Point 5___	Observation Point 6___	Observation Point 7___
Community name:_____	Community name:_____	Community name:_____	Community name:_____
Additional data: form 2___ form 3___	Additional data: form 2___ form 3___	Additional data: form 2___ form 3___	Additional data: form 2___ form 3___
General Description:	General Description:	General Description:	General Description:

Form 2: Community Ranking and General Description Draft: Spring, 1993

Identifiers (general EOR information)

1.name: 1. SNAME_____ 2.GNAME:_____

Site name:_____

Survey site name:_____

Quad name(s):_____ 6.Quad code(s):_____

County name(s):_____ 8.County code(s):_____

Town (LOCALJURIS):_____

.Directions:_____

.Sourcecode:_____ 12.Survey date:_____.____.____

.Last obs:_____.____.____ 14.First obs:_____.____.____ 15.State:_____

.Surveyors:_____

General Community Description (General EOR information)

.Transect:_____ 18.Observation point number:_____

.Community Description (EODATA):(brief word picture of community; include characteristic spp., inclusion of other communities. If community occurs as mosaic, depict spatial distribution and associated community types)_____

.Fauna (EODATA):_____

.Evidence of community processes (EODATA):_____

2.Minimum elevation:_____ft. 23.Maximum elevation:_____ft. 24.Size:_____acres (0=unknown)

5.General description (Describe landscape context of EO (GEN DESC):_____

6.Management comments and monitoring needs (threats are described in #51) (MGMTCOM):_____

7.Protection comments (PROTCOM):_____

8.Owners:_____

9.Owner comments (OWNERCOM):_____

0.Comments:_____

Specific community description (EOR-6 information)

1. Survey type: _____ Qualitative _____ Quantitative
2. Landform: _____
3. Geology comments: _____
4. Soil type: _____
5. Hydrological influence: _____
6. System: ____ Terrestrial ____ Palustrine ____ Estuarine 37. Physiognomic type: _____
8. Strata/life form:

Strata/life form	height	% cover	most abundant / characteristic species
nergent tree			
ree canopy			
ree sub-canopy			
all shrub			
nort shrub			
erbaceous			
on-vascular			
piphyte / liana			

Element occurrence ranking information

9. Size, relative to other occurrences (state whether full extent of occurrence is known): _____
0. Age, successional stage: _____
41. Quality Rank: ____
2. Known land use history: _____
3. Inferred land use history: _____
4. Other anthropogenic or unnatural disturbance: _____
5. Pesticides (known or suspected): _____
46. Condition rank: ____
7. Presence of invasives: _____
8. Alterations in natural processes: _____
9. Integrity / fragmentation of community: _____
50. Viability Rank: ____
0. Threats (on-site): _____
1. Threats (off-site): _____
53. Defensibility rank: ____
2. EO Rank comments: _____

5. (Overall) Element Occurrence Rank: _____

Form 3: Quantitative Community Characterization Draft: Spring, 1993

Identifiers (general EOR information)

ci. name: 1.SNAME:_____ 2.GNAME:_____

.Site name:_____

.Survey site name:_____

.Quad name(s):_____ 6.Quad code(s):_____

.County name(s):_____ 8.County code(s):_____

.Town (LOCALJURIS):_____

0.Lat:__ __ __ __ __ __ N 11.Long: 0 __ __ __ __ __ __ W 12.Directions:_____

3.Sourcecode:_____ 14.Survey date:_____.____.____

5.Last obs:_____.____.____ 16.First obs:_____.____.____ 17.State:_____

8.Surveyors:_____

Environmental Description

9.Transect / Observation point #

20.Image annotation #

21.Elevation:

2.Topographic position:
_Interfluve __Backslope
_High slope __Step in slope
_High level __Lowslope
_Midslope __Toeslope
_Low level __Channel wall
_Channel bed __Basin floor
_Other

23.Topographic sketch:

24.Slope degrees:_____

25.Slope aspect:_____

26.Parent material:

7.Soil profile description: note depth, exture, and color of each horizon. Note ignificant changes such as depth to ottling, depth to water table, root enetration depth (SOILCOM)

8.Organic horizon depth:_____

9.Organic horizon type:_____

0.Average pH of mineral soil:_____

31.Soil moisture regime:
__Extremely dry __Somewhat wet
__Very dry __Wet
__Dry __Very wet
__Somewhat moist __Permanently inundated
__Moist __Periodically inundated

32.Stoniness:
__Stone free <0.1%
__Moderately stony 0.1-1%
__Stony 3-15%
__Very stony 15-50%
__Exceedingly stony 50-90%
__Stone piles >90%

33.Soil drainage:
__Rapidly drained __Somewhat poorly drained
__Well drained __Poorly drained
__Moderately well drained __Very poorly drained

34.Average texture:
__ sand __ clay loam
__ sandy loam __ clay
__ loam __ peat
__ silt loam __ muck
__ other _____

35.Unvegetated surface:
____ % Bedrock
____ % Large rocks (cobbles, boulders > 10 cm)
____ % Small rocks (gravel, 0.2-10 cm)
____ % Sand (0.1-2 mm)
____ % Bare soil
____ % Litter, duff
____ % Wood (> 1 cm)
____ % Water
____ % Other:_____

36.Environmental Comments: Note homogeneity of vegetation, erosion / sedimentation, inundation, etc.

37.Plot representativeness:

41.Leaf type:
__Broad-leaf
__Semi-broad-leaf
__Semi-needle-leaf
__Needle-leaf
__Graminoid
__Broad-leaf herbaceous
__Pteridophyte

42.Leaf phenology:
__Deciduous
__Semi-deciduous
__Semi-Evergreen
__Evergreen
__Perennial
__Annual

43.Physiognomic type:
__Forest
__Sparse woodland
__Shrubland
__Dwarf shrubland
__Sparse dwarf shrubland
__Non-vascular
__Woodland
__Scrub thicket
__Sparse shrubland
__Dwarf scrub thicket
__Herbaceous
__Sparsely vegetated

44.

	height	% cover
T1 Emergent tree		
T2 Tree canopy		
T3 Tree sub-canopy		
S1 Tall shrub		
S2 Short shrub		
H Herbaceous		
N Non-vascular		
E Epiphyte		
V Vine / liana		

45.Species / percent cover: starting with uppermost stratum, list all species and % cover for each in the stratum. For forests and woodlands, list on a separate line below each tree species the DBH of all trees above 10 cm diameter. Separate the measurements with a comma and note whether in cm or inches.

APPENDIX 2

The following are definitions of the state and global rankings of rare species utilized in this report. Originally developed and instituted by The Nature Conservancy, an international conservation organization, the global and state ranking system is used by all 50 state Natural Heritage Programs and numerous Conservation Data Centers in other countries in this hemisphere. Because they are assigned based upon standard criteria, the ranks can be used to assess the range-wide status of a species as well as the status within portions of the species' range. The primary criterion used to define these ranks are the number of known distinct occurrences with consideration given to the total number of individuals at each locality. Additional factors considered include the current level of protection, the types and degree of threats, ecological vulnerability, and population trends. Global and state ranks are used in combination to set inventory, protection, and management priorities for species both at the state as well as regional level.

GLOBAL RANK

G1 Highly globally rare. Critically imperiled globally because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 Globally rare. Imperiled globally because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range or distributed locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; typically with 21 to 100 estimated occurrences.

G4 Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.

GH No known extant occurrences (i.e., formerly part of the established biota, with the expectation that it may be rediscovered).

GU Possibly in peril range-wide, but its status is uncertain; more information is needed.

GX Believed to be extinct throughout its range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.

G? The species has not yet been ranked.

_Q Species containing a "Q" in the rank indicates that the taxon is of questionable or uncertain taxonomic standing (i.e., some taxonomists regard it as a full species, while others treat it at an infraspecific level).

_T Ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species.

STATE RANK

S1 Highly State rare. Critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation. Species with this rank are actively tracked by the Natural Heritage Program.

S2 State rare. Imperiled in Maryland because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres in the State) or because of some factor(s) making it vulnerable to becoming extirpated. Species with this rank are actively tracked by the Natural Heritage Program.

S3 Watch List. Rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Natural Heritage Program.

S3.1 A "Watch List" species that is actively tracked by the Natural Heritage Program because of the global significance of Maryland occurrences. For instance, a G3 S3 species is globally rare to uncommon, and although it may not be currently threatened with extirpation in Maryland, its occurrences in Maryland may be critical to the long term security of the species. Therefore, its status in the State is being monitored.

S4 Apparently secure in Maryland with typically more than 100 occurrences in the State or may have fewer occurrences if they contain large numbers of individuals. It is apparently secure under present conditions, although it may be restricted to only a portion of the State.

S5 Demonstrably secure in Maryland under present conditions.

SA Accidental or a vagrant in Maryland.

SE Established, but not native to Maryland; it may be native elsewhere in North America.

SH Historically known from Maryland, but not verified for an extended period (usually 20 or more years), with the expectation that it may be rediscovered.

SP Potentially occurring in Maryland or likely to have occurred in Maryland (but without persuasive documentation).

SR Reported from Maryland, but without persuasive documentation that would provide a basis for either accepting or rejecting the report (e.g., no voucher specimen exists).

SRF Reported falsely (in error) from Maryland, and the error may persist in the literature.

SU Possibly rare in Maryland, but of uncertain status for reasons including lack of historical records, low search effort, cryptic nature of the species, or concerns that the species may not be native to the State. Uncertainty spans a range of 4 or 5 ranks as defined above.

SX Believed to be extirpated in Maryland with virtually no chance of rediscovery.

S? The species has not yet been ranked.

_B This species is a migrant and the rank refers only to the breeding status of the species. Such a migrant may have a different rarity rank for non-breeding populations.

FEDERAL STATUS

This is the status of a species as determined by the U.S. Fish and Wildlife Service's Office of Endangered Species, in accordance with the Endangered Species Act. Definitions for the following categories have been modified from 50 CRF 17.

LE Taxa listed as endangered; in danger of extinction throughout all or a significant portion of their range.

LT Taxa listed as threatened; likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

PE Taxa proposed to be listed as endangered.

PT Taxa proposed to be listed as threatened.

C Candidate taxa for listing for which the Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened.

STATE STATUS

This is the status of a species as determined by the Maryland Department of Natural Resources, in accordance with the Nongame and Endangered Species Conservation Act. Definitions for the following categories have been taken from Code of Maryland Regulations (COMAR) 08.03.08.

E Endangered; a species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.

I In Need of Conservation; an animal species whose population is limited or declining in the State such that it may become threatened in the foreseeable future if current trends or conditions persist.

T Threatened; a species of flora or fauna which appears likely, within the foreseeable future, to become endangered in the State.

X Endangered Extirpated; a 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.

* A qualifier denoting the species is listed in a limited geographic area only.

APPENDIX 3

The following are definitions of official wetland designations used in this report.

Non-tidal Wetlands of Special State Concern

Nontidal wetlands of special state concern (NTWSSC) are defined in the Code of Maryland Regulations (26.23.06) as wetlands that meet the following criteria:

a) Provide habitat of ecologically important buffers for the habitat of plant of animal species that are:

I) Listed as endangered or threatened by the U. S. Fish and Wildlife Service,

ii) Listed as endangered or threatened, or species listed as in need of conservation by the Maryland Department of Natural Resources or,

iii) Considered to be a candidate for listing by the U. S. Fish and Wildlife Service, or considered to by locally unusual or rare by the Maryland Department of Natural Resources or,

b) Are unique natural areas or contain ecologically unusual natural communities.

Wetlands that are defined as nontidal wetlands of special state concern have restrictions placed on the wetlands and an expanded 100 foot buffer for the following activities: excavating, dredging, changing drainage patterns, disturbing water level or water table, filling, grading, and removing vegetation. This regulation exempts agriculture and forestry but requires the use of "best management practices".

Geographic Areas of Particular Concern

The Federal Costal Zone Management Act requires the designation of Geographic Areas of Particular Concern. Costal states are required to inventory and develop management measures to protect the integrity of "areas of unique, scarce, fragile, or vulnerable natural habitats" 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". Although this does not provide any regulatory protection mechanisms, it is a directive to the state to protect these areas under existing regulations.