



MONTGOMERY COUNTY DEPARTMENT OF PARKS

THE MARYLAND - NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MCPB Item # 4

February 21, 2013

MEMORANDUM

February 11, 2013

TO: Montgomery County Planning Board

VIA: Mary Bradford, Director of Parks *M Bradford*
 Mike Riley, Deputy Director of Parks *MR*
 John E. Hench, Ph.D., Chief, Park Planning & Stewardship Division *J Hench*

FROM: Doug Redmond, Natural Resources Manager, Park Planning and Stewardship Division *D Redmond*
 Rob Gibbs, Natural Resources Manager, Park Planning and Stewardship Division *Rob Gibbs*

Subject: Natural Resources Management Plan

Staff Recommendation: Information and Discussion

Background:

Park staff will provide an overview and POWERPOINT presentation of the new Natural Resources Management Plan; the plan is attached. This document is intended to provide a general framework for park managers and other park staff on the management of approximately 26,000 acres of natural areas on M-NCPPC parkland in Montgomery County. (Note: the park system contains approximately 35,000 acres of which about 9,000 acres are improved for recreational use.) Natural areas are defined in the *2012 Park Recreation and Open Space Master Plan* (i.e., the *PROS Plan*) as “the sum total of acres of land not developed for public use, and encompassing those natural resources being preserved to maintain a diversity of native natural communities as a legacy for future generations.” As noted in the *2012 PROS Plan*, Natural areas include Best Natural Areas, Biodiversity Areas, and other areas of undeveloped parkland. Both the *Vision 2030 Strategic Plan* (M-NCPPC, 2011) and the *PROS Plan* call for the development of a park system-wide Natural Resources Management Plan.

The Natural Resources Management Plan primarily focuses on the management of environmentally sensitive areas as defined in Maryland’s Land Use Article. These areas include: *streams, wetlands, and their buffers; 100-year floodplains; habitats of threatened and endangered species; steep slopes; agricultural and forest lands intended for resource protection or conservation; and other areas in need of special protection.*

Park staff has recognized 13 Best Natural Areas (totaling 9,300 acres) and 33 Biodiversity Areas (totaling 4,500 acres) among the park system's 26,000 acres of natural areas. As noted in the *PROS Plan*, Best Natural Areas are areas of parkland which contain one or more of the following:

- Large areas of contiguous, high quality forest and/or wetland which are generally more than 100 acres, and show little evidence of past land-use disturbance.
- Rare, threatened, endangered, or watch-list species.
- The best examples of notable plant communities found in Montgomery County.
- High quality wetlands, including those of Special State Concern as noted in COMAR, Title 26.
- Aquatic communities rated as good or excellent in the Countywide Stream Protection Strategy.
- Special Trout Management Areas as noted in COMAR, Title 08.
- Areas of exceptional scenic beauty.

Biodiversity Areas are areas of parkland which contain one or more of the following:

- Areas of contiguous, high quality forest and/or wetland which show little evidence of past land-use disturbance.
- Rare, threatened, endangered, or watch-list species.
- Exceptional examples of notable plant community types found in Montgomery County.
- Areas of exceptional scenic beauty.

The Natural Resources Management Plan focuses active resource management efforts on 10 major terrestrial natural community types found in Montgomery County, as well as other significant habitat types and microhabitat features that contribute to the biodiversity and biological integrity of the park system. These natural community types were developed by our staff and are similar to the *Key Wildlife Habitats* described in the Maryland Department of Natural Resources' (DNR's) *Maryland Wildlife Diversity Conservation Plan* and to the *Ecological Community Groups* described in DNR's *Natural Communities of Maryland*. The 10 major natural community types are:

- Potomac River Over-wash Savannah
- Riverside Outcrops of the Potomac Basin
- Mixed Forest on Serpentine Bedrock
- Mixed Forest on Triassic Shale Bedrock
- Mixed Forest on Diabase Bedrock
- Dry Forest on Acidic Bedrock
- Mesic Forest on Acidic Bedrock
- Central Maryland Floodplain Forest
- Central Maryland Swamp Forest
- Coastal Plain Forest Complex

The specific natural community which would develop in any given area is determined primarily by the underlying bedrock, soils, and hydrology. A model was developed by park staff which predicts where these community types should occur if the areas were not subjected to significant past disturbance. Field work has shown that the model correctly predicts which communities will occur in the vast majority of park areas.

The Natural Resources Management Plan is but one part of the Department of Parks' comprehensive Natural Resources Management Program. The other parts include a series of existing management plans (e.g., the *Comprehensive Management Plan for White-tailed Deer*), various standard operating procedures, and a wide variety of best management practices for the management of vegetation, wildlife, and aquatic resources. Information from the Natural Resources Management Plan and the other plans, procedures, and practices has been used to start developing a series of park-specific Operation and Use Plans. The Operation and Use Plan for the natural areas in Black Hill Regional Park has been completed whereas a number of others are in draft form. More detail on various aspects of the program will be provided during the POWERPOINT presentation.

Operation and Use Plans provide general information about each park (e.g., park classification, acreage), detailed information about the park's natural areas (including staff recognized Best Natural Areas and Biodiversity Areas), natural community types, management goals and objectives, management prescriptions and schedules, and performance measures. The principal management tool found in each Operation and Use Plan is the "natural resources management map." These park-specific maps illustrate where and when each individual management action is intended to take place. Operation and Use Plans also provide information on a variety of natural resource-based recreational activities (e.g., trail use, bird-watching, wildflower viewing, boating, and fishing) available in each park.

An additional note – During the POWERPOINT presentation, Volunteer Services staff will present information on various volunteer activities that support the Department's resource management efforts.



**Natural Resources Management Plan
for Natural Areas in M-NCPPC Parkland
in Montgomery County, Maryland
February 2013**



**Park Planning and Resource Stewardship Division
Resource Analysis Section**

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MONTGOMERY PARKS



Document Description

Title

Natural Resources Management Plan for Natural Areas in M-NCPPC Parkland in Montgomery County, Maryland

Author

M-NCPPC Montgomery Parks | mongtomeryparks.org

Park Planning and Resource Stewardship Division | parkplanningandstewardship.org

Natural Resources Stewardship Section | parksnaturalresources.org

Date

February 2013

Agency

Maryland-National Capital Park & Planning Commission (M-NCPPC)

Source of Copies

Maryland-National Capital Park & Planning Commission (M-NCPPC)

8787 Georgia Ave, silver spring, MD 20910-3760

301-495-4568

Number of pages

71 including cover pages

Abstract

To fulfill the mission of M-NCPPC, Department of Parks, Montgomery County, to protect and interpret our valuable natural resources, this document provides general guidance to park management staff for the management of natural areas in parks. The Montgomery Park system contains over 35,000 acres, mostly within the piedmont physiographic province. Natural areas within the park system fall into ten different major terrestrial natural communities with smaller areas of eight different key terrestrial wildlife habitats throughout. Natural resource and aquatic habitat management guidance is outlined in the plan to assist park management staff, especially for the management of Best Natural Areas, Biodiversity Areas, and other Environmentally Sensitive Areas.

**Natural Resources Management Plan
for Natural Areas in M-NCPPC Parkland
in Montgomery County, Maryland**

February 2013

Park Planning and Stewardship Division

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Mission, Vision, and Values of Department of Parks

Mission

The mission of the Montgomery County Department of Parks is: *“Protect and interpret our valuable natural and cultural resources; balance the demand for recreation with the need for conservation; offer a variety of enjoyable recreational activities that encourage healthy lifestyles; and provide clean, safe, and accessible places for leisure-time activities.”*

Vision

The Department’s vision is: *“An enjoyable, accessible, safe and green park system that promotes a strong sense of community through shared spaces and experiences and is treasured by the people it serves.”*

Values

The Department’s values are:

Stewardship: Manage the county park system so it best meets the needs of current and future generations.

Recreation: Offer a range of leisure activities that strengthen the body, sharpen the mind, and renew the spirit.

Excellence: Deliver the highest quality product, service and experience possible.

Integrity: Operate with an objective, honest, and balanced perspective.

Service: Be courteous, helpful and accessible to each other and the public we serve.

Education: Promote opportunities for continuous learning among staff and the public we serve.

Collaboration: Work in cooperation with all stakeholders including residents, communities, public and private organizations, and policymakers, as well as interdepartmentally.

Diversity: Support and embrace the differences among our employees and the public we serve, and offer suitable programs, activities and services.

Dedication: Commit to getting the job done the right way, no matter what it takes.

http://www.montgomeryparks.org/about/vision_mission_values.shtm

Physical Description of the County

Most of the approximately 34,000 acre park system is located within the piedmont physiographic province; a small portion on the eastern side of the County is located in the coastal plain physiographic province. Of the 34,000 acres, approximately 26,000 acres are classified as natural areas. A description of this area, from Hench (1988) follows (note that the description was written in 1988 and some factors have changed since then):

Montgomery County covers approximately 316,160 acres (127,950 ha), lies adjacent to Washington, D.C., and is bounded on the west and southwest by the Potomac River. About 97% of the county lies on Maryland's Piedmont; a small area along the county's eastern boundary lies on the Coastal plain. Long, narrow stream valleys drain the gently rolling topography. Montgomery County is included in the Piedmont Section of the oak-chestnut (now oak-hickory) forest region (Braun, 1950). Estimates of the county's forest cover range from 22% (Whitcomb et al., 1981) to 29% (Powell and Kingsley, 1980).....

Montgomery County's soils have been organized into three groups according to their position on the landscape: upland soils, old-stream terrace soils, and floodplain soils (Matthews et al., 1961). Within these topographic groups, soils vary due to drainage and the parent material from which they developed. Matthews et al. (1961) mapped the county's soils at a scale of 1:15,840.

Upland soils are predominately excessively drained or well drained, account for 91.7% of the county's area, and include soils of the Piedmont Plateau (282,405 acres, 114,289.3 ha) and Coastal Plain (7,624 acres, 3,085.5 ha). The former soils developed from material weathered from igneous and metamorphic rocks (244,037 acres, 98,761.8 ha), or old sedimentary rocks, mostly shale or sandstone (38,368 acres, 15,527.5 ha). The latter soils occur in the eastern part of the county on the edge of the Coastal plain, and in small areas in the western part of the county within the big bend of the Potomac River. About 5% of the upland soils (13,622 acres, 5,152.8 ha) are classified as hydric.

Old stream terrace soils are predominately well drained, account for less than 1.0% of the county's area (2,133 acres, 863.2 ha), are well above present stream channels, and occur mostly along the Potomac River. These soils consist of old alluvium that washed from soils underlain by limestone or crystalline rocks. About 12% of the old-stream terrace soils (260 acres, 105.2 ha) are classified as hydric.

Floodplain soils account for 7.6% of the county's area (23,998 acres, 9,712.0 ha), are poorly drained to moderately drained, and consist of recent alluvial deposits underlain by marble. The kinds of soils that are present depend primarily on the kinds of rocks and soils from which the material washed. Most floodplain soils are periodically flooded. About 61% of the floodplain soils (14,553 acres, 5,899.6 ha) are classified as hydric.

Brush et al. (1980) mapped Maryland's forest associations at a scale of 1:250,000. According to the vegetation map (Brush et al. 1980), four upland deciduous forest assemblages occur in Montgomery County: tulip poplar association, chestnut oak association, shingle oak association, and chestnut oak-post oak-blackjack oak association. The tulip poplar association predominates, followed by the other associations as listed.

The tulip poplar association occurs in the central, eastern, and southern sections of the county on moderately deep to deep, well-drained soils that developed from material weathered from fine-grained schist, gabbro, granite, and gneiss. This association is composed of the following common tree species in addition to the characteristic tulip poplar: red maple, flowering dogwood, black gum, white oak, sassafras, black cherry, mockernut hickory, pignut hickory, black oak, American beech, and red oak.

The chestnut oak association occurs in the northern section of the county on well-drained soils that developed from material weathered from coarse-grained schist, and quartzited ridges surrounding gneiss. This association is composed of the following common tree species in addition to the characteristic chestnut oak: red maple, white oak, sassafras, red oak, black cherry, black gum, black oak, pignut hickory, flowering dogwood, serviceberry, blueberry, mountain laurel, and root sprouts of American chestnut.

The shingle oak association occurs in the western section of the county on shallow to moderately deep, moderately well drained soils that developed from materials weathered from diabase. This association is composed of the following common woody plant species in addition to the characteristic shingle oak: black cherry, poison ivy, Virginia creeper, grape, white ash, mockernut hickory, white oak, flowering dogwood, red maple, sassafras, black gum, and green brier.

The chestnut oak-post oak-blackjack oak association occurs in two small areas on soils that are temporarily arid. One is in the eastern part of the county on soils underlain by gravel and fragipan, the other is in the western part of the county on soils that developed from materials weathered from serpentinite. This association is characterized by any two of chestnut oak, post oak, or blackjack oak. However, chestnut oak and blackjack oak rarely intermix in stands. This association also includes chinquapin, sassafras, Virginia pine, red cedar, pitch pine, blueberry, huckleberry, and mountain laurel. Stands often appear with a stunted canopy.

The vegetation map (Brush et al., 1980) also shows two floodplain deciduous forest assemblages: sycamore-green ash-box elder-silver maple association, and river birch-sycamore association. Both floodplain associations occur on alluvial deposits underlain by marble. The former association occurs in the upper stream valleys and changes to the tulip poplar association where streams are of first or second order. The latter association occurs in the lower stream valleys and along the Potomac River. The sycamore-green ash-box elder-silver maple association is characterized by any two of sycamore, green ash, box elder, or silver maple. This association also includes flowering dogwood, grape, red maple, white oak, Virginia creeper, poison ivy, and spicebush. Tulip poplar, black walnut, and poison ivy are associated with sycamore. Slippery elm and green ash are associated with box elder. The river birch-sycamore association is characterized by river birch and/or sycamore. This association also includes slippery elm, green ash, spicebush, poison ivy, red maple, Virginia creeper, green briar, southern arrow-wood, tulip poplar, and black gum.

In addition to bedrock, soils, and vegetation, habitat is influenced by climate. Montgomery County is in a region of merging climates, with cooler humid continental climate to the north and humid subtropical climate to the south, and the county receives an average of about 39 inches of precipitation annually.

Identified Special Habitat Areas within the Park System

One of the broad goals of the Parks and Recreation Vision 2030 is *“Manage healthy, ecologically diverse natural areas”*. More specifically, Goal 11 of the Vision 2030 Strategic Plan (M-NCPPC/MCRD 2011) is: *“Inventory, conserve, and enhance ecologically healthy and biologically diverse natural areas with a focus on Park Best Natural Areas, Biodiversity Areas, and Environmentally Sensitive Areas as defined in the Land Preservation, Parks, and Recreation Plan (M-NCPPC, 2005), and Objective 11.2 is: “Develop a countywide natural resources management plan.”*

Best Natural Areas (BNAs)

Best Natural Areas (BNAs) are defined in the Park, Recreation, and Open Space Master Plan (PROS Plan, M-NCPPC, 2012) as areas of parkland which contain one or more of the following:

1. Large areas of contiguous, high quality forest and/or wetland which are generally more than 100 acres, and show little evidence of past land-use disturbance.
2. Rare, threatened, endangered, or watch-list species.
3. The best examples of notable plant communities found in Montgomery County (i.e. mesic forest on acidic bedrock, central Maryland floodplain forest, dry forest on acidic bedrock, central Maryland swamp forest, mixed forest on diabase bedrock, riverside outcrops of the Potomac basin, mixed forest on Triassic shale bedrock, mixed forest on serpentine bedrock, Potomac River over-wash savannah, and coastal plain forest complex).
4. High quality wetlands, including those of Special State Concern as noted in the Code of Maryland Regulations (COMAR) Title 26.
5. Aquatic communities rated as good or excellent in the Countywide Stream Protection Strategy.
6. Special Trout Management Areas as noted in COMAR Title 08.
7. Areas of exceptional scenic beauty.

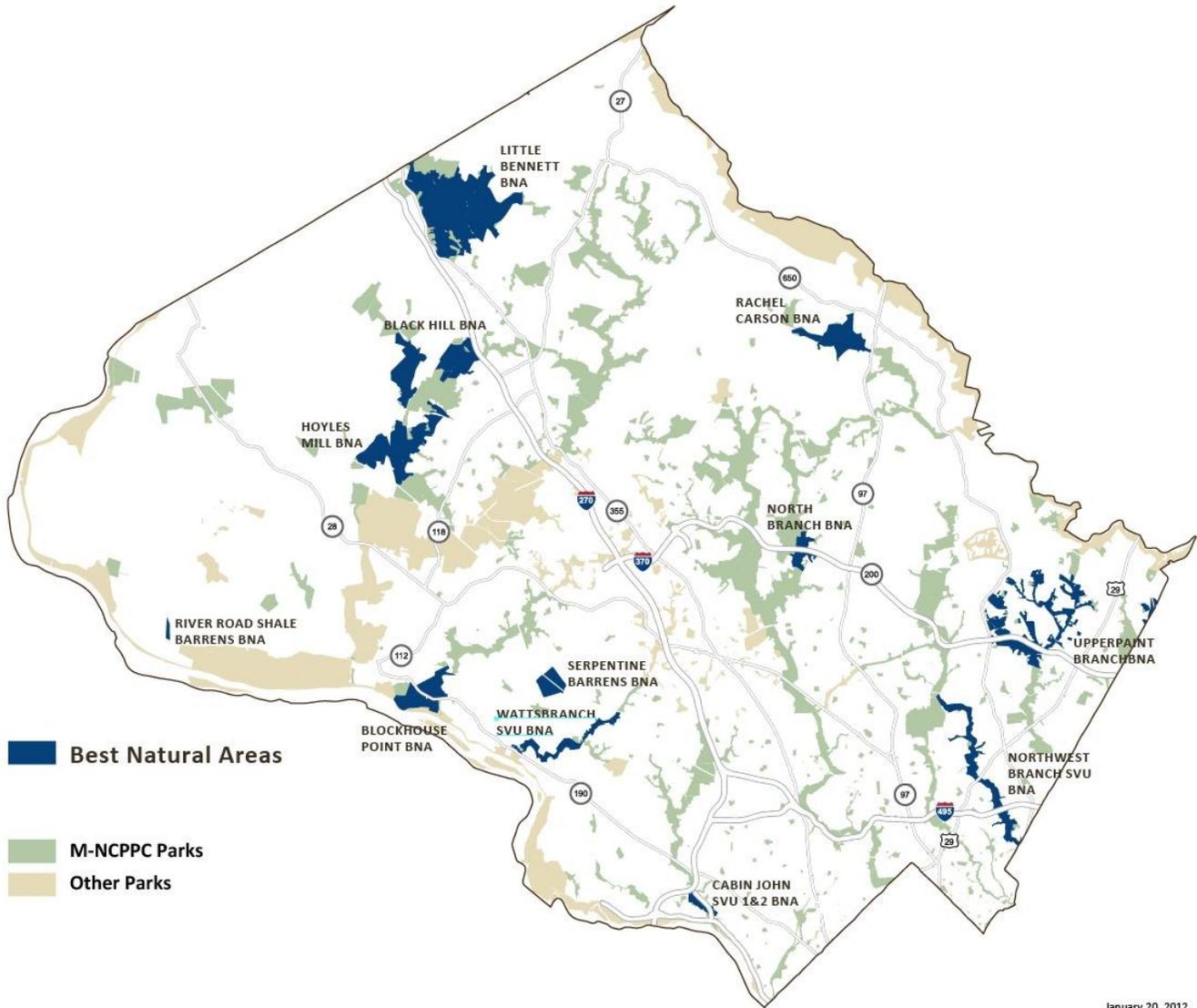
There are currently 13 BNAs. They are designated areas of the following parks:

1. Little Bennett Regional Park
2. Black Hill Regional Park
3. Hoyles Mill Conservation Park (plus portions of adjoining parks)
4. River Road Shale Barrens Conservation Park
5. Blockhouse Point Conservation Park
6. Serpentine Barrens Conservation Park
7. Watts Branch Stream Valley Park
8. Rachel Carson Conservation Park
9. North Branch Stream Valley Park
10. Cabin John Regional Park
11. Upper Paint Branch Stream Valley Park (plus other smaller parks in the watershed)
12. Northwest Branch Stream Valley Park (plus portions of adjoining parks)

13. McKnew Conservation Park (plus portions of adjoin parks)

See **Figure 1** for a map of the 13 BNAs. See **Appendix A** for a table which provides additional information (e.g. size, significant features, and watersheds).

Figure 1 - Best Natural Areas (BNAs) map of Montgomery County, MD



January 20, 2012

Biodiversity Areas (BDAs)

Biodiversity Areas (BDAs) are defined in the PROS Plan as areas of parkland containing one or more of the following:

1. Large areas of contiguous, high quality forest and/or wetland which show little evidence of past land-use disturbance.
2. Rare, threatened, endangered, or watch-list species.
3. Exceptional examples of notable plant communities found in Montgomery County (see list for Best Natural Areas).
4. Areas of exceptional scenic beauty.

Additionally, most of these areas were initially identified by staff from the Maryland Department of Natural Resources' Wildlife and Heritage Program.

There are currently 33 BDAs. See **Figure 1** for a map of the BDAs. See **Appendix B** for a table which provides additional information (e.g. size, significant features, and watersheds).

Environmentally Sensitive Areas (ESAs)

Environmentally Sensitive Areas (ESAs) are codified in Article 66B of the Annotated Code of Maryland, and include:

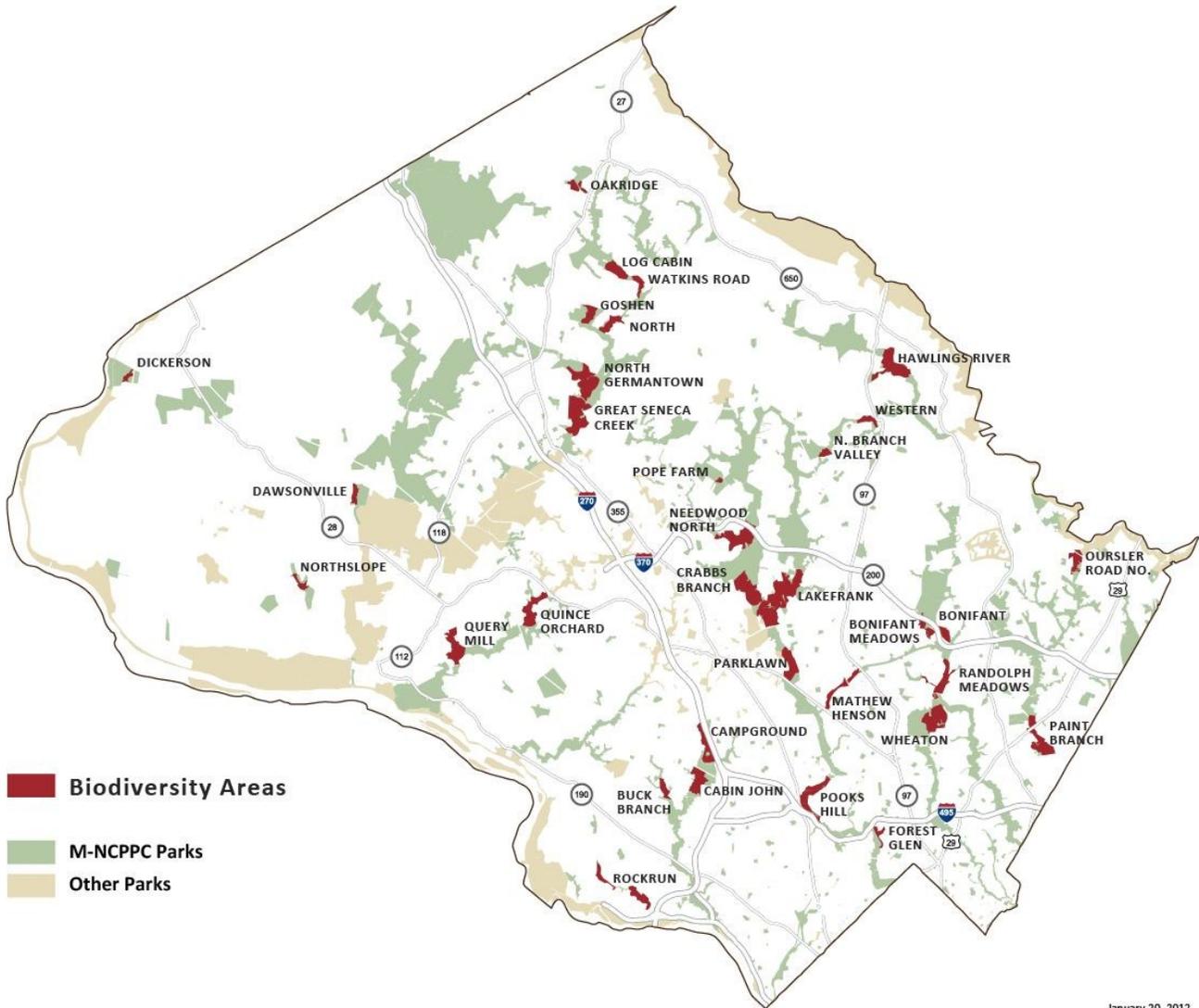
1. Streams, wetlands, and their buffers;
2. 100-year floodplains;
3. Habitats of threatened and endangered species;
4. Steep slopes;
5. Agricultural and forest lands intended for resource protection or conservation; and
6. Other areas in need of special protection, as determined in the plan.

ESAs are recognized in the *Environmental Guidelines (M-NCPPC, 2000)*: "...the Montgomery County General Plan and local area master plans articulate County-wide and planning area-wide goals, objectives, principles, and policies to protect sensitive areas from the adverse effects of development, as required by the Annotated Code of Maryland Article 66B..."

ESAs include both Best Natural Areas and Biodiversity Areas (other areas in need of special protection, as determined in the plan). Other sensitive areas (e.g. streams, steep slopes) can be located in any category of park and are contained in most parks in the system.

Plant communities are generally controlled by physical features of the environment, including bedrock; soil type, moisture, and pH; plus slope, aspect, and elevation. Distribution of animal species is controlled by the vegetation (Hench et al., 1987). The vegetative communities described below are the result of the physical features listed above.

Figure 2- Biodiversity Areas map of Montgomery County, MD

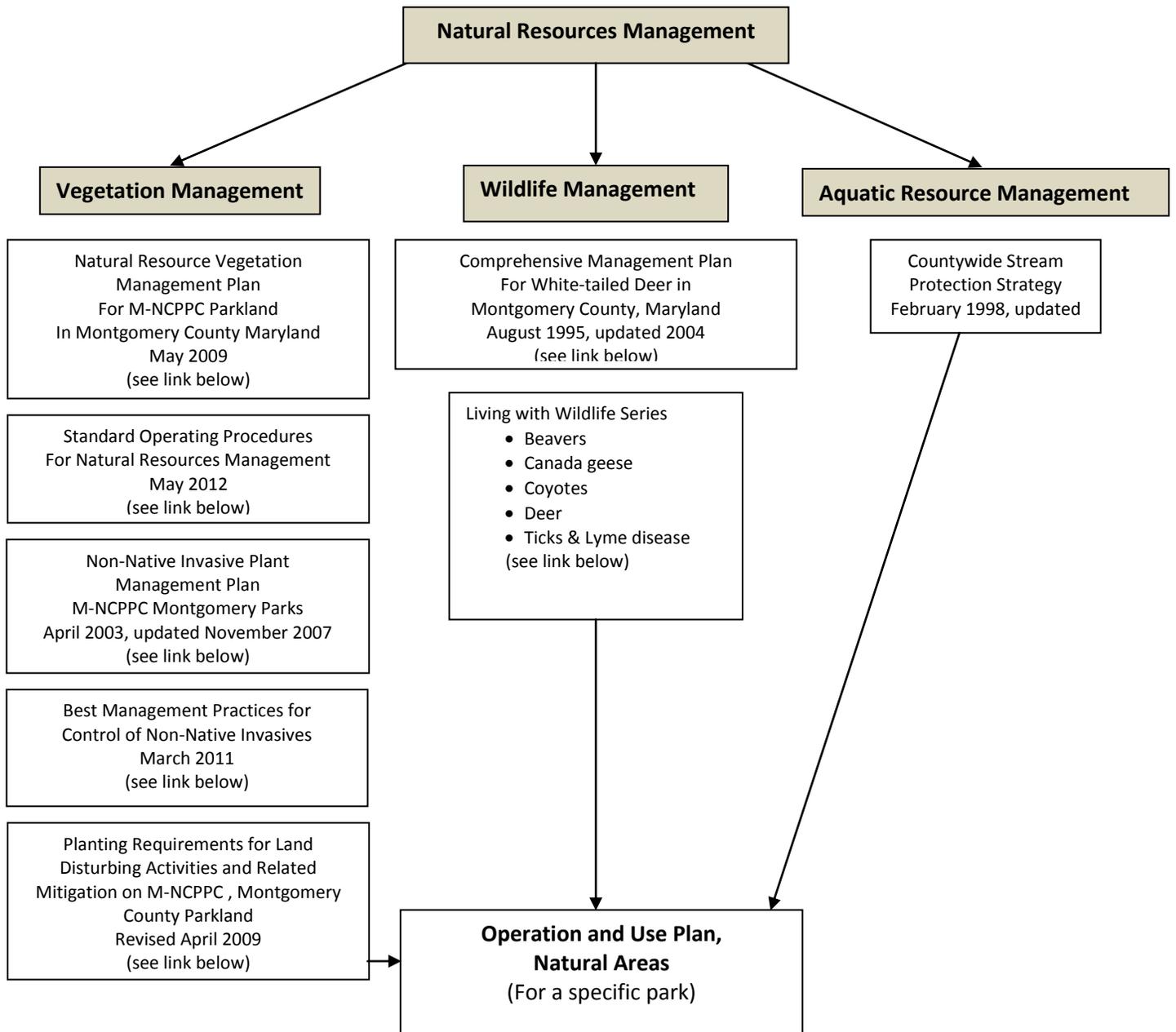


January 20, 2012

Other Natural Areas

Other natural areas covered by this plan include all areas in the Natural Resources Program Element which are not included in the Best Natural Areas, Biodiversity Areas, and other Environmentally Sensitive Areas.

The following chart shows the hierarchy of management documents used by the Department. These documents are described more fully in a later section.



Natural Resource Vegetation Management Plan for M-NCPPC Parkland in Montgomery County, Maryland:

[\[Link not yet available\]](#)

Standard Operating Procedures for Natural Resources Management:

[\[Link not yet available\]](#)

Non-native Invasive Plant Management Plan:

http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/Veg_Management/documents/nni_management_plan2007.pdf

Best Management Practices for Control of Non-Native Invasives:

http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/Veg_Management/documents/nni-bestmanagementpractices-mar2011.pdf

Planting Requirements for Land Disturbing Activities and Related Mitigation on M-NCPPC, Montgomery County Parkland:

http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/Veg_Management/documents/planting_reqs-on-disturbed-land_rev-april09-.pdf

Comprehensive Management Plan for White-tailed Deer in Montgomery County, Maryland (2004 update):

http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/Living_with_wildlife/deer/documents/deerplan_update_aug2004.pdf

Living with Wildlife Series:

http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/LivingWithWildlife.shtm

Countywide Stream Protection Strategy:

[The link below is apparently broken at this time. The link takes you to an outline, but you can't get to the actual sections of the report.]

<http://www.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/csps.asp>

Operation and Use (O&U) Plans

Operation and Use (O&U) Plans, which provide specific guidance to park managers for the management of natural areas (those areas assigned to the Natural Resources Program Element) within their parks, will be produced for each park which contains all or part of a Best Natural Area or Biodiversity Area; plans will also be produced for three down-county stream valleys - Sligo Creek (Stream Valley Units 1 – 5), Rock Creek (Stream Valley Units 1 – 7), and Cabin John Creek (Stream Valley Units 1 – 5). The schedule for the production of the O&U Plans can be found in **Appendix H**

An example of a completed O&U Plan – for Black Hill Regional Park – can be found at the following link (once the plan is available on line): [\[Link to Black Hill O&U Plan\]](#)

Major Terrestrial Natural Communities

BNAs and BDAs represent the best examples of the major terrestrial natural communities found in Montgomery County. The representative terrestrial natural communities of interest are as follows:

- Potomac River Over-wash Savannah
- River-side Outcrops of the Potomac Basin
- Mixed Forest on Serpentine Bedrock
- Mixed Forest on Triassic Shale Bedrock
- Mixed Forest on Diabase Bedrock
- Dry Forest on Acidic Bedrock
- Mesic Forest on Acidic Bedrock
- Central Maryland Floodplain Forest
- Central Maryland Swamp Forest
- Coastal Plain Forest Complex

Each of these natural communities equates to, or is a subset of, the Key Wildlife Habitats found in the Maryland Wildlife Diversity Conservation Plan (MWDCP, Maryland Department of Natural Resources, Wildlife and Heritage Service, 2005). The relationship between the County's terrestrial natural communities and the key wildlife habitats, a general description of each community, and examples within the park system follow. It should be noted that, although each of the listed communities is distinct from the others, several may be intertwined in a relatively small area. For example, in many parks, a central Maryland floodplain forest adjacent to a stream can transition to a mesic forest on the slope above the floodplain, which in turn can transition to a dry forest on the ridge top.

The factors which cause the natural community types to be distinctive from each other include the types of bedrock and soils that underlie them. See **Figures 3 and 4** for maps of the major bedrock types and soil groups that underlie Montgomery County. **Figure 5** is a map of the general locations of the major terrestrial natural communities. This map was developed using bedrock and soils to predict where the natural communities are expected to occur. Many, but not all, of the areas in parkland have been field checked to verify that the existing communities match the predicted communities. Numerous areas outside of parkland have been developed or are being actively farmed, and so will not have the predicted communities. Some areas of parkland are either developed for active recreation, are in successional stages due to past land disturbance, or are being maintained in specific successional stages to provide habitat for plant and wildlife species which prefer successional habitats.

A table of rare, threatened, and endangered plant species found (or expected to be found) in M-NCPPC parks in Montgomery County can be found in **Appendix C**.

Additionally, the MWDCP provides a list of animal species of Greatest Conservation Need (GCN). The list includes rare, threatened, and endangered species, but also includes other species that are declining or otherwise vulnerable. An explanation of how these species were selected is contained in the MWDCP,

Chapter 3. Tables of the GCN mammals, birds, amphibians, reptiles, and fish known or believed to occur in Montgomery County can be found in Appendices D through G. An attempt to provide and protect suitable habitat for all of the GCN species should ensure that the less vulnerable species will have adequate habitat as well.

Figure 3 - Major Bedrock types map of Montgomery County, MD

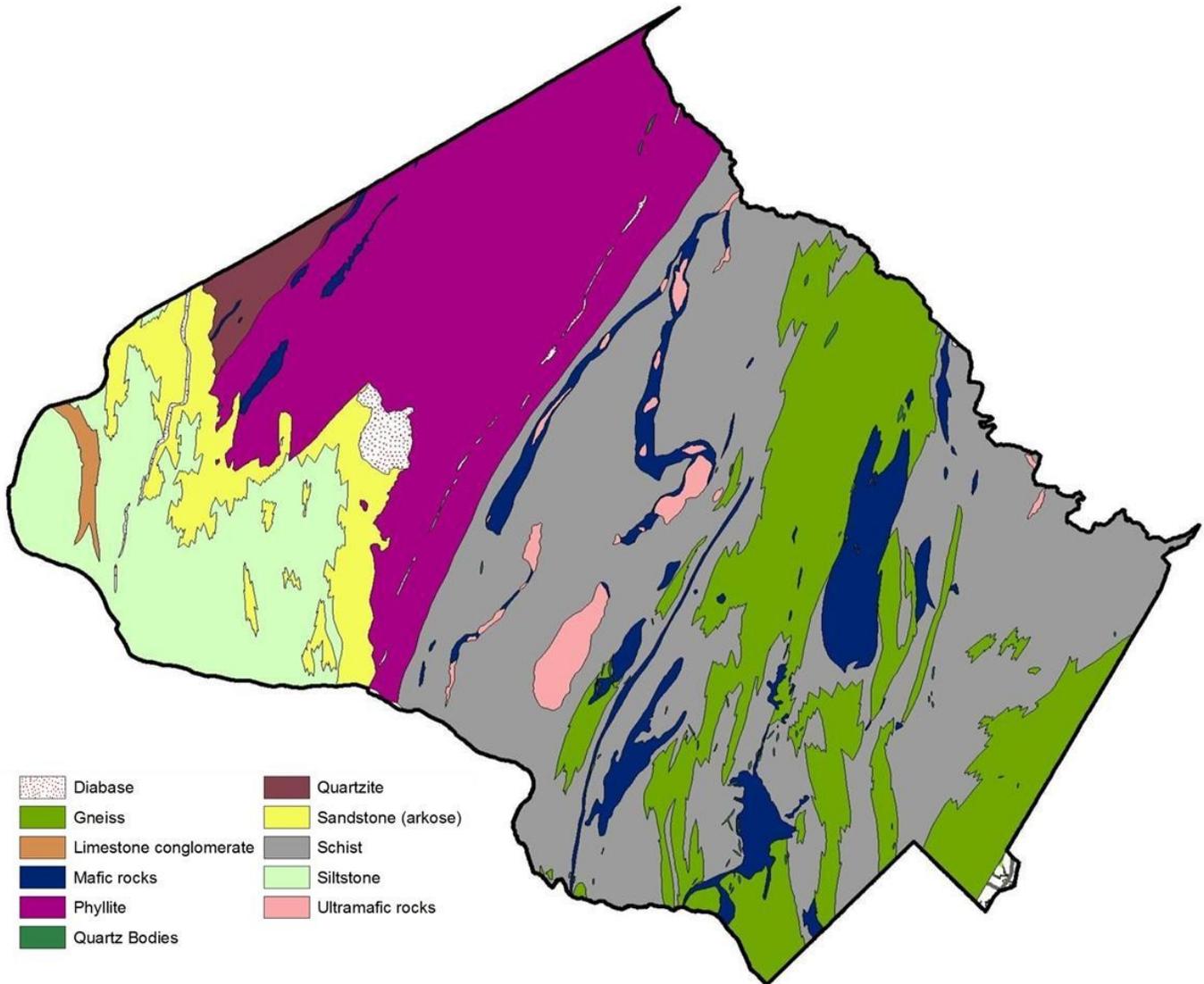


Figure 4 - Soils map of Montgomery County, MD

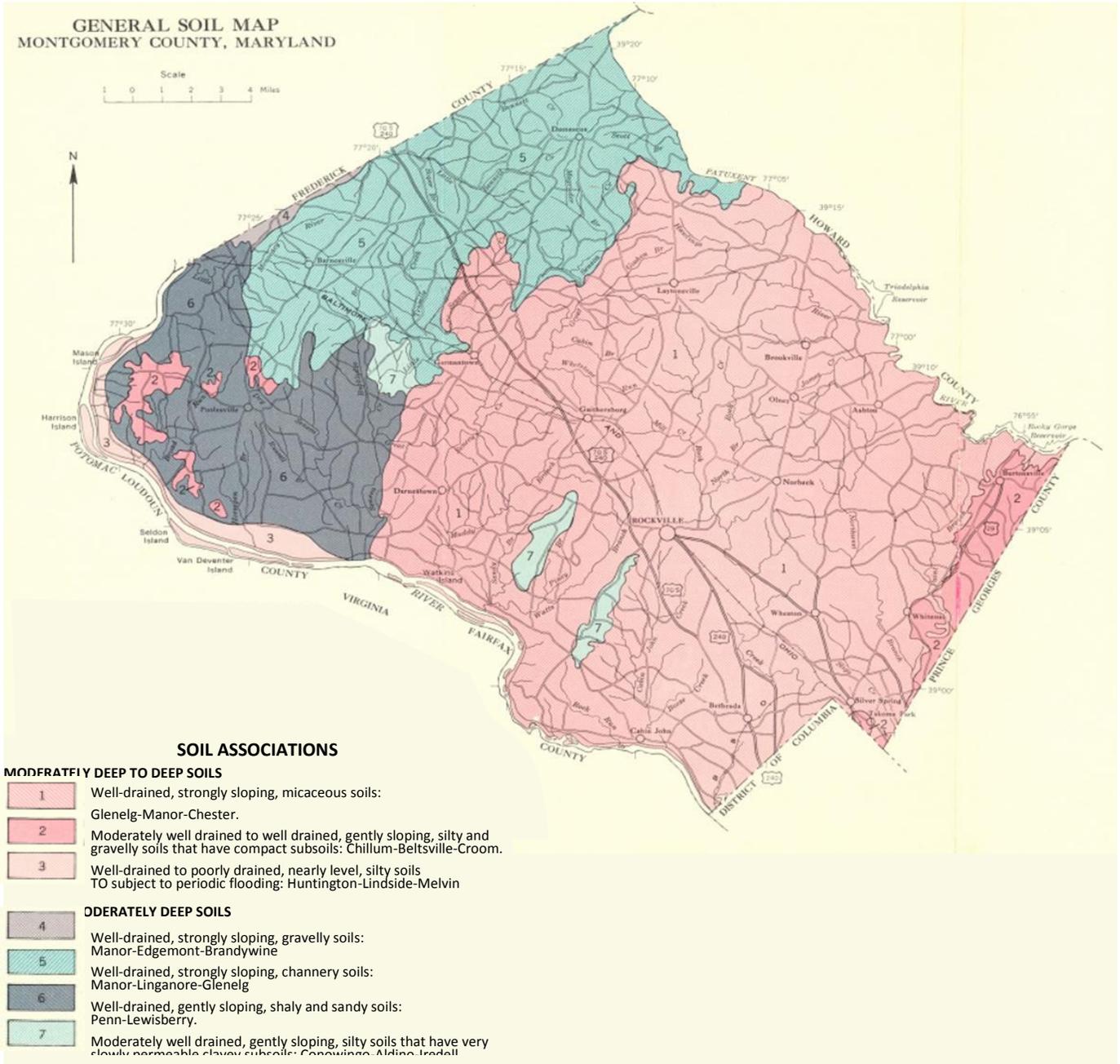
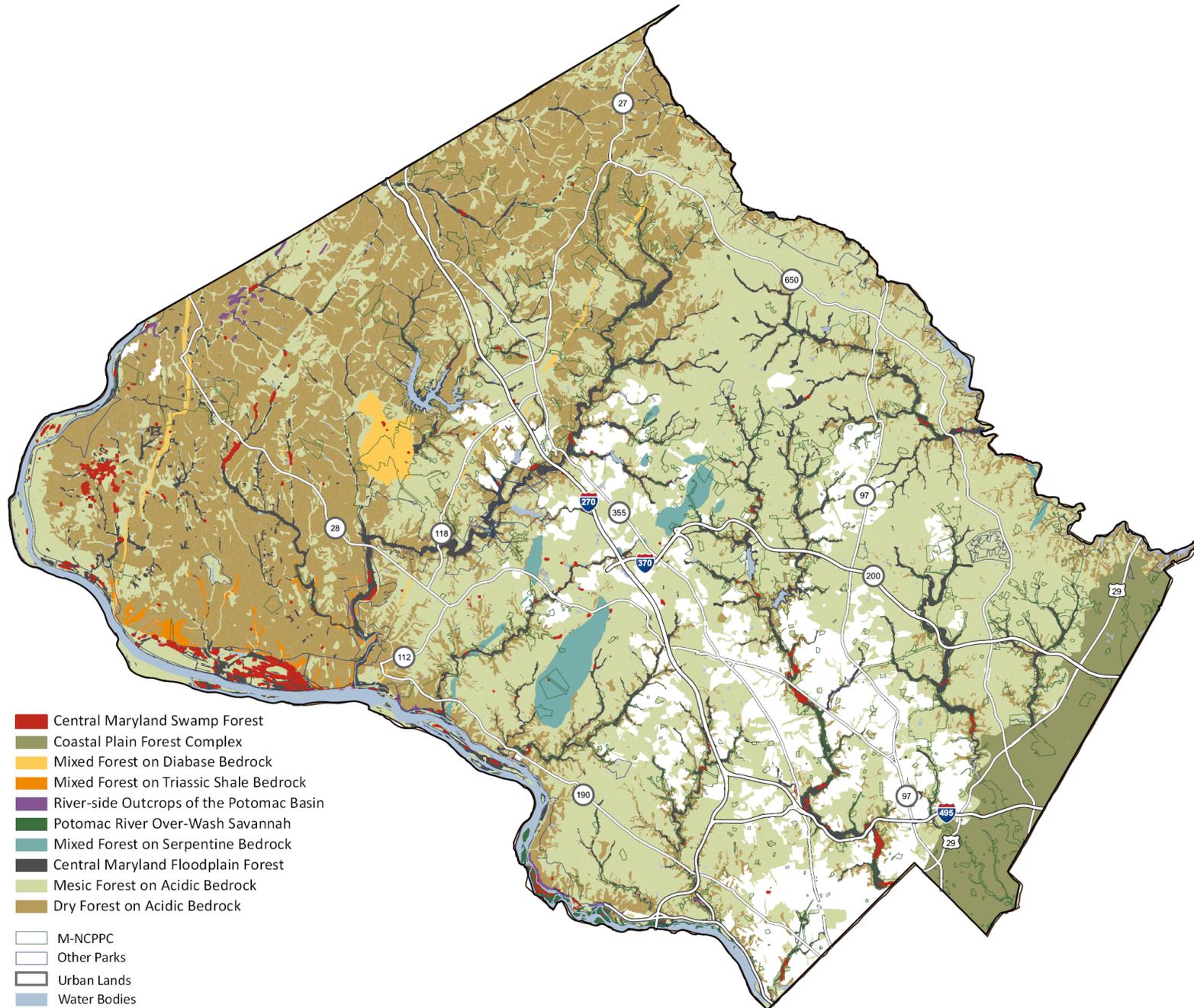


Figure 5- Major Terrestrial Natural Communities map of Montgomery County, MD





Potomac River Over-Wash Savannah.

This type of habitat is included in the MWDCP's "floodplain forests", where "riverside outcrop barrens" are listed as a rare natural community, and described as young, flood-scoured woodlands which occur along shoreline areas and islands, and are frequently dominated by dense stands of small sycamore, box elder, river birch, and green ash. In Montgomery County, these areas are found only along the Potomac River. Most of these are within

non-County parklands (e.g. C&O Canal National Historical Park, Islands of the Potomac Wildlife Management Area), but some small areas may be found on Potomac River islands within the Montgomery County Park system (New Hope Island and Cedar Island Conservation Parks).

River-side Outcrops of the Potomac Basin.

This type of habitat is included in the MWDCP's "cliffs and rock outcrops". While most of these areas occur in the highlands of Maryland, in the piedmont, they do occur in the Great Falls area of the Potomac River. Outcrops are described as steep to vertical, exposed rock formations with well-developed fissures and crevices. They are generally unvegetated or sparsely vegetated, often with early successional communities containing black locust and sassafras. An example of this habitat can be found in Blockhouse Point Conservation Park (Best Natural



Riverside outcrops at Blockhouse Point

Area), where two rare species (state endangered potato dandelion and state threatened narrow melicgrass) were found on south-facing rocky bluffs of schist overlooking the Potomac River.



Serpentine bedrock outcrops

Mixed Forest on Serpentine Bedrock.

This type of habitat is included in the MWDCP's "barrens and dry glades." Areas of serpentine bedrock in Montgomery County are of the forested (rather than grassland) type, which is described as being dominated by Virginia pine, post oak, and blackjack oak. An example of this kind of habitat is the Serpentine Barrens

Conservation Park (Best Natural Area). This area supports post oak and blackjack oak (plus nine other species of oak) and Virginia and shortleaf pine. Twenty-one species of rare, threatened, endangered, and watchlist plants have been found here. This park is located in an area of ultramafic bedrock (serpentinite) where the soils are low in nutrients and high in toxic metals (see **figures 2 and 3**).

Mixed Forest on Triassic Shale Bedrock.

This type of habitat is included in the MWDCP’s “barrens and dry glades”. The one occurrence of shale bedrock in Montgomery County differs somewhat from the general description of shale barrens found within the ridge and valley physiographic province of Maryland in that the shale formation developed during the Triassic rather than Devonian time period. Much of the area is forested, however, the exposed shale outcrops share many of the characteristics of ridge and valley shale barrens including low water holding capacity and a surface layer that becomes very hot on sunny days making for a dry, harsh environment for plants. The River Road Shale Barrens Conservation Park (Best Natural Area) is located on shale bedrock within a larger area of siltstone bedrock, is on a south facing slope and contains many of the characteristic plants of other shale barrens, including chestnut oak, black oak, Virginia pine, eastern red cedar, shagbark hickory, pignut hickory, shadbush, deerberry, fragrant sumac, common dittany and birdfoot violet. While not mentioned in the MWDCP, one of the characteristic plants of the River Road Shale Barrens is prickly pear. The park is in an area of silty and gravelly soils with compact subsoils (see **figures 2 and 3**).



Prickly pear cactus on shale bedrock

Mixed Forest on Diabase Bedrock.

The one diabase area in Montgomery County is shown on the map of MWDCP’s “barrens and dry glades”, although this type of forest is not specifically described. While there may be some small isolated locations within the area that could be characterized as “barrens” or “dry glades”, the vast majority of the property is forested with a canopy that is only slightly stunted by the shallow soils. The large sill of diabase bedrock underlying portions of the park represents the largest such formation in Maryland, and accounts for the area’s exceptional plant diversity. Characteristic species



Northern prickly-ash

include shingle oak, red oak, white oak, post oak, eastern red cedar, Virginia pine, redbud, and white ash. Less common plant species include black ash, Shumard's oak, Canada lily, adder's tongue fern, and three-leaved rosinweed. The Hoyles Mill Conservation Park (Best Natural Area) is second only to the Potomac River gorge as having the highest concentration of rare, threatened, endangered, and watchlist (RTEW) plant species in the county. Over 30 species have been identified in the park, including smooth phlox (once thought extirpated from the state) northern prickly-ash (endangered), striped gentian (endangered), Seneca snakeroot (threatened), heart-leaved skull cap (endangered), and purple sneezeweed. In addition to being located on diabase bedrock, this park is located in an area of moderately well-drained, gently sloping, silty soils that have very slowly permeable clayey subsoils (see **figures 2 and 3**).

Dry Forest on Acidic Bedrock.

This type of habitat is included in the MWDCP's "dry oak-pine forests". These forests are described as being dominated by chestnut oak mixed with other oaks, with an understory of mountain laurel, blueberry, and huckleberry. An example of this kind of forest can be found in Little Bennett Regional Park (Best Natural Area). The canopy contains chestnut, black, northern and southern red, shingle, and white oak, and the understory includes mountain laurel. This park is located in an area of phyllite and schist bedrock, on well-drained, strongly sloping channery soils (see **figures 2 and 3**).



Chestnut oak



Mesic forest in Wheaton Regional Park

Mesic Forest on Acidic Bedrock.

This type of forest is included in the MWDCP's "mesic deciduous forests." Mesic forests on acidic bedrock are described as having canopies of tulip poplar, American beech, oaks, and hickories, with an understory of flowering dogwood, pawpaw, and American hornbeam, and Christmas fern in the herbaceous layer. An example of this type of habitat is found in the eastern part of Wheaton Regional Park (Wheaton Biodiversity Area), with a canopy containing tulip poplar, American beech, hickory, and

ten species of oaks (including two watchlist species – shingle oak and chinquapin oak); flowering dogwood in the understory; and wide diversity of spring ephemeral wildflowers, including seven species of orchid. This park is located in an area of schist bedrock, on well-drained, strongly sloping micaceous soils (see **figures 2 and 3**).

Central Maryland Floodplain Forest

This type of forest is included in the MWDCP’s “floodplain forests.” In the piedmont, these forests are temporarily to intermittently flooded, and are dominated by sycamore, silver maple, box elder, and American elm. Examples of this kind of forest can be found in parks with a variety of bedrock and general soil types (e.g. Watts Branch Stream Valley Park on gneiss/schist bedrock with well-drained micaceous soils, Rock Creek Stream Valley Park with gneiss, schist, and quartz diorite bedrock and micaceous soils, and Great Seneca Stream Valley Park with schist bedrock, and micaceous and channery soils). This type of forest usually occurs in areas of poorly drained hydric soils. See **figures 2 and 3**.



Floodplain forest



Skunk cabbage seep

Central Maryland Swamp Forest

This type of forest is included in the MWDCP’s “forested seepage wetlands”. It can occur where groundwater is forced to the surface along an impermeable clay or rock layer, and the forest will have a mostly closed to semi-open canopy. In the piedmont, the canopy is dominated by red maple, black gum, tulip poplar, and ashes, with spicebush, winterberry, and arrowwood in the understory. An example of this kind of forest can be found in the North Branch Stream Valley (Best Natural Area). This park is located in an area of gneiss bedrock on well-drained, strongly sloping micaceous soils (see **figures 2 and 3**).

Coastal Plain Forest Complex

This type of forested habitat is included in the MWDCP’s “bog and fen wetland complexes” as well as “nontidal shrub wetlands.” It also contains elements of mesic deciduous and dry oak-pine forests. A special feature found in this habitat is the magnolia bog. These wetlands are normally found on the coastal plain in Anne Arundel and Prince Georges Counties; the one that has been found in



Poison sumac

Montgomery County is located very close to the Prince Georges/Montgomery County line in one of the few parts of Montgomery County that can be characterized as coastal plain. Characteristic plants found in a recent addition to McKnew Conservation Park (Best Natural Area) include sweetbay magnolia, black gum, poison sumac, possumhaw viburnum, and cinnamon fern. This park is located in an area of schist bedrock on moderately well-drained to poorly drained, gently sloping, silty and gravelly soils that have compact subsoils (see *figures 2 and 3*).

Other Key Terrestrial Wildlife Habitats

In addition to these major terrestrial natural communities, the MWDCP indicates that a number of other key terrestrial wildlife habitats are found in Montgomery County. These tend to be smaller habitats which are found within the major terrestrial communities, and in many cases, they are ecosystems which, given enough time under relatively stable conditions, will become one of the major communities.

They include early successional forests, northern conifer – hardwood forests, upland depressional swamps, vernal pools, nontidal shrub wetlands, nontidal emergent wetlands, grasslands, and caves/mines/springs. While these are often not the habitats which the Best Natural Areas and Biodiversity Areas were established to protect, they are frequently found within the BNAs and BDAs, and much of the active management of parkland is focused on maintaining these habitats.

Early Successional Forests

Early successional forests are areas dominated by shrubs and small trees (<8 meters tall). The following description of forest succession in the Maryland piedmont is from in Hench (1988):

Succession is a directional, cumulative change in the species which occupy a given area through time (Barbour et al., 1980:202). This phenomenon has been observed in a wide array of vegetation ranging from grasslands to tropical forests (Clements, 1916; Oosting, 1942; Richards, 1952; Daubenmire, 1968). Plants as well as animals are involved, with animals tracking plant species changes as well as changes in the abiotic environment (Spurr and Barnes, 1980:399; MacMahon, 1981). The establishment of plants on a site that was not previously vegetated is termed primary succession (Barbour et al., 1980:204). Primary plant succession beginning with water is referred to as hydrarch succession; that beginning with dry rock material (either as rock or mineral soil) is referred to as xerarch succession; while that beginning with moist, well aeriated soil material is referred to as mesarch succession (Spurr and Barnes, 1980:402). In each case, the succession is generally towards the most mesic site conditions and mesophytic community possible, given soil, topographic, and climactic limitations (Barbour et al., 1980:204). Succession following an event that disrupts (e.g. fire, cultivation, grazing, logging), rather than destroys, an existing community is referred to as secondary succession (Barbour et al., 1980:204). MacMahon (1981) provides this definition: "secondary succession is the change in physiognomy, species composition, or proportion of species on a plot of ground, over a moderate time interval (decades to a few centuries) following a disturbance to that site." Primary succession is the exception rather than the rule in forested regions (Spurr and Barnes, 1980:421).

Secondary succession on croplands or pastures that have been abandoned is referred to as old-field succession (Barbour et al., 1980:204), and has involved extensive areas of the eastern United States (Spurr and Barnes, 1980:444). Old-field succession has been well documented in central New England (Spurr, 1956), New Jersey (Bard, 1952), and on North Carolina's Piedmont (Billings, 1938; Oosting, 1942; Barrett and Downs, 1943; Borman, 1953). Hench et al. (1985) provide a brief, qualitative description of old-field succession in Montgomery County, on Maryland's Piedmont. In most cases fields that are abandoned as grass-bearing hayfields or pastures, are subsequently invaded by conifers. Virginia pine and red cedar are the typical old-field conifers in Montgomery County, Maryland (Hench et al., 1985). Hardwoods predominate in the pioneer stage of old-field succession when fields are abandoned as fallow or cultivated croplands (Spurr and Barnes, 1980:444). In Montgomery County, these pioneer hardwoods include shade intolerant species such as black cherry, black locust, sassafras, and big-toothed aspen (Hench et al., 1985). However, mid-

tolerant species such as red maple and tulip poplar, and more tolerant species such as white oak, pignut hickory, and black gum, may also come in with the first wave of tree invaders.

As conifer stands become established, they are invaded with hardwoods, which form a more ,or less abundant understory by the time the conifer overstory is 20 to 40 years old (Spurr and Barnes, 1980:445). In Montgomery County, black gum and flowering dogwood are two of many hardwood species that often appear in the understory of conifer stands (Hench et al., 1985). Intolerant overstory conifers rarely reproduce themselves under their own canopy, except in the most open stands on the driest sites, and are eventually replaced by more tolerant hardwood species (Spurr and Barnes, 1980:244; Hench et al., 1985). On Maryland's Piedmont, Virginia Pine reaches biological maturity at approximately 45 to 50 years of age. After approximately one century, in the absence of any further site disturbance, the conifer overstory is replaced by an overstory of more tolerant hardwoods, consisting primarily of oaks and hickories (John F. Kundt, pers. commun., 1987).

As noted earlier, the species mix of animals changes over time following the clearing of a plot of ground and its subsequent revegetation (Spurr and Barnes, 1980:399; MacMahon, 1981). The common interpretation for this change parallels the interpretation for plants: as a plant community becomes established and subsequently alters the environment of a disturbed site, the animals track the plant species as well as changes in the physical environment (Shelford and Olson, 1935; MacMahon, 1981).

For animal species that spend most of their lives above ground, vegetational structure is assumed to be predominately responsible for the changing mix of species along a successional gradient (MacMahon, 1981). This appears to be especially true for birds (Karr and Freemark, 1983). MacMahon (1981) notes that the change in mammal species with plant community physiognomic change is less pronounced because mammals (except for arboreal species) respond to the vertical structure of their habitat less than birds. Numerous studies have shown that animals as diverse as insects (Martin, 1966; Murdoch et al., 1972; Futuyma and Gould, 1979; Joern, 1979; Strong, 1979; Strong and Levin, 1979; Boomsma and Van Loon, 1982; Schimpf and MacMahon, 1985), spiders (Duffey, 1978; Stratton et al., 1979; Hatley and MacMahon, 1980), herptiles (Campbell and Christman, 1982; Werschku1, 1982; Reinert, 1985; Weatherhead and Charland, 1985), birds (Johnston and Odum, 1956; Karr, 1968; Kricher, 1973; Wiens, 1974; Smith and MacMahon, 1981; James and Warner, 1982; Peterson, 1982; Karr and Freemark, 1983; Hall, 1984; Rice et al., 1984; Kessler and Kogut, 1985), and mammals (Pearson, 1959; M'Closkey, 1975; Fox, 1978; Anderson et al., 1980; Moulton et al., 1981; Hench et al., 1987) are correlated in their distributions to vegetative structure.

Since succession often involves conspicuous physiognomic change in plant communities, one would expect that there would be a strong association between animal species turnover and physiognomic change along a successional gradient. This is exactly what many of the studies cited above point out. As noted by MacMahon (1981), this emphasis on physiognomy does not deny the fact that the presence of a particular animal species may influence the presence of another species (e.g. the association between primary and secondary cavity nesting species). Nor does it suggest that all animals respond equally to physiognomic changes in their environment. However, the changes in plant physiognomy characteristic of conspicuous succession do appear to be an important factor in determining the mix of animal species along a successional gradient.

Several of the procedures in the *Standard Operating Procedures for Natural Resources Management* (see next section) are intended to maintain these habitats in arrested successional stages in order to provide habitat for specific wildlife species. It should be noted that since 1988, non-native invasive (NNI)

plants have become more prevalent in Montgomery County, and the successional pattern described above is somewhat altered by the presence of NNIs. The MWDCP lists species of greatest conservation need (GCN) which depend on early successional forests, including four species of birds which have been confirmed to nest in BNAs.

Northern Conifer – Hardwood Forests

Northern conifer – hardwood forests are predominately found in the highlands of western Maryland. A few eastern hemlock stands are found in Montgomery County, but according to the mapping in the MWDCP, they are found only along the Patuxent River and the lower portion of the Seneca Creek watershed; they are also known to occur in the Furnace Branch drainage. None are currently known to occur in Montgomery County parks.



Seasonal pool in spring

Vernal Pools

Vernal pools (or seasonal pools), described as small nontidal palustrine wetlands that usually dry completely during the summer, are found in many of our parks. They are usually found within mesic forests or floodplain forests. Significant efforts have been made to protect existing pools, increase their size when feasible, and even to create new pools. These habitats are essential for the survival of several species, including wood frogs, spotted salamanders, and fairy shrimp.

Upland Depressional Swamps

Upland depressional swamps in the piedmont are described as isolated, depressional wetlands characterized by shallow bedrock or clay hardpans that impede soil drainage. These habitats are probably most common in the Great Falls area of the Potomac River, but are also known to occur in the Hoyles Mill Conservation Park.

Nontidal Shrub Wetlands

Nontidal shrub wetlands are described as inland freshwater wetlands dominated by shrubs and small trees. These may be successional areas which are in the process of becoming swamp forests. A large nontidal shrub wetland is located along the North Branch of Rock Creek (North Branch BNA) within a larger mesic forest.

Nontidal Emergent Wetlands

Nontidal emergent wetlands are described as inland freshwater wetlands dominated by herbaceous vegetation. Within the park system, they are often found bordering open water systems, but may include large areas dominated by skunk cabbage.

Grasslands

Grasslands are described as upland areas dominated (>80% cover) by herbaceous vegetation. Numerous grassland areas occur in parks, and several of the maintenance prescriptions are specifically intended to maintain them. Several listed GCN bird species (e.g. American woodcock, eastern meadowlark, field sparrow, grasshopper sparrow) are known to nest in park grasslands.



Meadow in Little Bennett Regional Park

Caves, Mines, and Springs

Caves, mines, and springs are listed together as a key wildlife habitat. Numerous springs are present in the stream valley and conservation parks, and a number of small caves are located along rivers and streams. Several areas of the county have a history of mining (e.g. gold, chromium), and several unidentified shafts have been discovered on parkland (e.g. River Road Shale Barrens).

Microhabitat Features

Additionally, there are other microhabitat features which provide vital habitat for a variety of plants and animals. These include downed trees (logs), standing dead trees (snags), and exposed bedrock (outcrops). Geographic aspect (the horizontal direction to which a hill slope faces) also provides variation in habitat on a small scale, with south-facing slopes being drier and warmer and north-facing slopes being cooler and moister. In Montgomery County, hemlock stands (see “Northern conifer – hardwood forests” above) are usually found on north-facing slopes.



Rotting log

The habitat value of logs has been documented by Pyle and Brown (2002), who demonstrated that logs are used preferentially as perching sites by birds and small mammals, and that several plant species sprout more readily on logs than on the ground. The Maryland Department of Natural Resources (<http://dnr.maryland.gov/wildlife/habitat/wildacres/wasnags.asp>) describes the process by which downed logs create new ecosystems, and provides examples of some of the mammals, birds, reptiles, and amphibians which use logs.

The importance of snags has been studied by Evans and Connors (1979). At least 10 species of birds found in Montgomery County parks are considered dependent on snags for nesting and/or foraging. Minimum size of snags varies among species, with downy woodpeckers using snags as small as 8 inches in diameter and 20 feet tall, while pileated woodpeckers prefer snags that are at least 22 inches in diameter and 60 feet tall. Additionally, 400 snags per 100 acres are needed to maintain the maximum population of



Pileated woodpecker

downy woodpeckers, while only 24 appropriately-sized snags per 100 acres are needed to maintain the maximum population of pileated woodpeckers. In addition to the species which excavate holes in snags, at least two species of GCN birds found in Montgomery County (barred owl and prothonotary warbler) are considered secondary users of cavities in snags – i.e. they use cavities excavated by other species.

Rock outcrops have been shown to support unusual assemblages of plants and wildlife – wildlife in particular seem to react to the dryness and elevation of the outcrops more than to the chemistry of the rocks that make up the outcrops (Swain and Kearsley, 2001). Rock outcrops provide important habitat for a variety of mammals, birds, reptiles, and amphibians (North Carolina Wildlife Resources Commission www.ncwildlife.org).

Management Planning for Natural Resources: Operation and Use Documents

Management of natural areas will be based, at least in part, on the *Standard Operating Procedures for Natural Resources Management* [\[link when available\]](#) developed by the Park Planning and Stewardship Division's Natural Resources Stewardship Section. This document prescribes specific management practices for maintaining particular types of habitat.

An individual Operation and Use Plan will be produced for each park with contains a BNA or BDA (a park may contain a BNA and/or one or more BDAs; some of these areas encompass portions of more than one park).

Operation and Use Plans are intended to provide park operations personnel with specific guidance for the management of BNAs, BDAs, and other ESAs, as defined in the *PROS Plan*.

Each individual Operation and Use Plan will contain information about the location, acquisition date or status, owner, park facility code, park type, acreage, record plat/lot ID, legal description, tax account ID, park region, park manager, planning area, watershed, development potential, policy rationale from master plans, proposed use, site history/cultural significance, and a physical description of the park, to include geology, topography, forest/vegetation, wildlife, land use, structure, existing infrastructure, and access. There is also a description of Biodiversity Areas and/or Best Natural Areas, and specific management information (wildlife management, vegetation management, aquatic resource management, and trail status and management).

Maps included in the document include a park map with locator insert, a Resource Atlas map, a map of the Best Natural Area and/or Biodiversity Areas, a program element map, an aerial photo, a trails map (if applicable), and a management map. Guidance on the key elements of the Operation and Use Plans is included in the sections below.

[\[Link to Black Hill Operation and Use Plan will be included when document is available online\]](#)

Natural Resources Inventories

Natural resources in the parks include the animals and plants, as well as the soils and bedrock that support them. In order to manage the natural resources in our parks, it is necessary to know what is present in the parks. While bedrock and soils have been comprehensively mapped (see **figures 3 and 4**) and change relatively little over time, plants and animals are more subject to change. On a gross scale, forest types have been mapped for Montgomery County, but the floristic composition of the forests, as well as non-forested areas, changes over time as a result of disturbance, secondary succession, and the introduction and spread of non-native invasive plants. The faunal components of all park areas can also change over time in response to changes in habitat and introduction of non-native species. Regular

inventories of the flora and fauna of the parks are required to understand both the composition of the natural resources and the changes that are occurring. Much of this inventory work has been done, but inventories need to continue and to include additional floral, and especially faunal, components.

Freshwater fish and benthic macroinvertebrates are inventoried on a rotating schedule, so that each watershed in the County is inventoried every five years; this work is done in cooperation with the Montgomery County Department of Environmental Protection in support of the Countywide Stream Protection Strategy (MCDEP 1998).



Eastern towhee

Breeding Birds Surveys and Christmas Counts have been conducted for many years. Data from the most recent Maryland Breeding Bird Atlas are available at: www.pwrc.usgs.gov/bba/index.cfm?fa=explore.ProjectHome&BBA_ID=MDDC2002

The following provide additional information on how the data for the Breeding Bird Atlas are collected and processed:

Ellison, Walter G. (Editor), *Second Atlas of the Breeding Birds of Maryland and the District of Columbia*. 2010. The Johns Hopkins University Press, Baltimore, MD. 520 pages.

<http://www.mdbirds.org/atlas/docs/handbook.pdf>

Information on Christmas Bird Counts in Maryland is available at: <http://birds.audubon.org/christmas-bird-count>

The Maryland Amphibian and Reptile Atlas Project is currently underway. Information can be found at http://www.dnr.state.md.us/wildlife/Plants_Wildlife/herps/MD_Herp_Atlas.asp.



Eastern box turtle



Zebra swallowtail

Similar data for butterflies is available at: <http://www.naba.org/counts.html>

Data on dragonflies and damselflies is available at:

<http://southernspreadwing.com/odes/count2010/index.php>

<http://www.marylandinsects.com/MDDCOdonateRecords.html>

Natural Resources Management

Goal 11 of Vision 2030 speaks about management of ecologically healthy and biologically diverse natural areas. The goal of this plan is to protect the best examples of natural communities in various stages of natural succession, and thereby maximize biodiversity. There are two specific objectives related to the goal – to promote maximum biodiversity to the extent feasible and to create and maintain a natural environment conducive to high-quality natural resource-based recreation. It is understood that, in this part of Maryland, forest is the natural mature, or climax, condition, but that, in a natural state, successional habitats would always be present somewhere. It is known that the presence of these successional habitats increases biodiversity, since there are both plant and animal species that depend on them. However, it is also true that many areas may be missing important natural features, and that some of these features can be replaced by artificial structures, such as nesting boxes to replace naturally occurring tree cavities.

By maintaining a variety of habitats, including the best examples of natural community types, and controlling non-native invasives (mainly, but not exclusively, plants), it is expected that the greatest number of species can be accommodated. While maintaining a variety of habitats is important, it is usually not appropriate to try to maintain too many habitat types within a park unit, because the size of the habitat may be important for some of the species of interest. Robbins et al., 1989 established that a number of species of birds require rather large areas of intact forest for breeding, and will breed seldom or never in smaller forest patches. Grassland size is also important, with several species of birds and butterflies occurring most often in grasslands of greater than 50 hectares in size (MD DNR, 2005).

The MWDCP focuses on the specific wildlife species of greatest conservation need which depend on key wildlife habitats. The following section looks at the GCN species which are known or expected to occur in Montgomery County and their specific habitat requirements. This will enable us to ensure that requirements of all the GCN species are considered in the management of our natural areas.

The following table, based on Table 3.1 of the MWDCP, is an indication of the diversity of wildlife found in Montgomery County.

Taxa	Total in MD	State-listed	Federally listed	GCN	Total in MC	GCN in MC
Mammals	97	24	10	34	42	12
Birds	410	33	6	141	242	49
Herptofauna	90	20	6	42	62	16
Fishes	635	26	2	40	54	6
Invertebrates	20,000+	58	5	245	unknown	unknown
Total		161	29	502	400+	83+

Tables which indicate which GCN species of mammals, birds, reptiles, amphibians, and fish are likely to occur in the ten major terrestrial types, as well as a table of rare, threatened, and endangered plants, and which of the terrestrial types they are likely to be found in, can be found in the appendix. Not enough inventory work has been done in M-NCPPC parks to provide an estimate of the GCN species of invertebrates, although some (e.g. Baltimore checkerspot butterfly) are known to exist. In addition, there are GCN species that prefer other key terrestrial wildlife habitats, and many of them use microhabitat features within the habitats. Maintenance of as many examples of each of these habitat types as is feasible provides the greatest likelihood of maintaining viable populations of these species.

In many cases, active habitat management includes actions which are intended to maintain a specific successional stage, rather than allowing secondary succession to proceed toward the expected mature hardwood forest. Specific successional stages often provide ideal habitat for a large number of desirable species.

Hench et al. (1987) describe “natural areas” and “conservation areas” in Montgomery County Parks. In general, natural areas were to be left to mature without interference, with the exception of controlling undesirable non-native species, while conservation areas were to be managed for specific desirable species. Although the only example given of an undesirable species was gypsy moth, since 1987 non-native invasive (NNI) plants have become much more prevalent, so management of natural areas must now include control of NNIs.

Active natural resource management, appropriate in conservation areas, includes habitat management (usually mowing and/or pruning), control of undesirable species (see: http://www.montgomeryparks.org/PPSD/Natural_Resources_Stewardship/LivingWithWildlife.shtm) and the creation of specific habitat structures (e.g. bird nesting boxes, brush piles). The following web sites provide information for creating habitat structures for wildlife:

<http://www.dnr.state.md.us/wildlife/Habitat/WildAcres/index.asp> (general program for Maryland)

<http://www.ces.ncsu.edu/forestry/pdf/www/www17.pdf> (wildlife nest boxes)

http://www.ct.gov/dep/lib/dep/wildlife/pdf_files/outreach/fact_sheets/brshpls.pdf (brush piles)

In areas which represent examples of the 10 terrestrial natural community types, the management focus should be on maintaining the existing habitat. Within these community types, maintenance or creation of minor habitat types can take place – e.g. creation of vernal pools, placement of logs as habitat. Additional guidance for creating and maintaining down logs and snags can be found in Brown 2002.

Management of terrestrial (including wetland) habitats is done in accordance with several documents, including the *Natural Resource Vegetation Management Plan for M-NCPPC Parkland in Montgomery County, Maryland (M-NCPPC, 2009)*, *Standard Operating Procedures for Natural Resources Management (M-NCPPC, 2012)*, and the *Non-Native Invasive Plant Management Plan (M-NCPPC, 2007)*.

Specifications in the Standard Operating Procedures are generally for mowing and pruning, and contain specific prescriptions for maintaining successional habitats, including grass and forb dominated meadows, wet meadows, dry scrub-shrub areas, shrub swamps, savannahs, and ecotones (edges).

Aquatic Habitat Management



Greenside darter

The MWDCP classifies all streams in Montgomery County as either piedmont streams (most streams in the county) or piedmont rivers (mainstem of the Potomac River, Seneca Creek/Great Seneca Creek about as far upstream as Unit 2 of the Great Seneca Creek Stream Valley Park (vicinity of Brink Road), and the Patuxent River between the Triadelphia and T.

Howard Duckett Reservoirs). Six of the GCN fish species listed for these habitats (comely shiner, greenside darter, northern hogsucker, rosytide dace, shield darter, and silverjaw minnow) have been found in park streams.

Although lakes are not listed as key wildlife habitats in the MWDCP (Maryland contains no natural lakes), there are several man-made lakes in the park system, and they do provide habitat for many species, including some GCN species listed for other habitat types (e.g. bald eagle, great blue heron, great egret, red-headed woodpecker, pied-billed grebe, northern red-bellied turtle).



Bald eagle

The quality of aquatic habitat depends on, among other things, complexity, water quality, and food sources. Greater complexity within a section of stream or lake provides habitat for more species and more individuals. Water quality

(including pH, dissolved oxygen, and the presence or absence of pollutants) determines which species are capable of inhabiting an aquatic system. Like the smaller terrestrial habitats features which are embedded within the major terrestrial natural communities, aquatic communities are embedded within the terrestrial communities. The quality and quantity of the runoff and groundwater which feed the aquatic communities depends on the type and quality of the terrestrial communities within the watershed. Additionally, especially in the smaller headwater streams, leaves which fall into the streams form the base of the food chain, and terrestrial invertebrates are an important food source for fish and other aquatic organisms.

General recommendations for the management of County watersheds are found in the Countywide Stream Protection Strategy (MCDEP, 1998), in which each subwatershed is designated as a watershed protection area, watershed restoration area, urban stream management area, or agricultural watershed protection area.

While many aspects of aquatic habitat management (e.g. stream restoration) require detailed planning and permitting, and are therefore normally done as Capital Improvement Program (CIP) projects, one aquatic resource management procedure which is appropriate for park management staff is the maintenance of stream buffers. Recommended stream buffers vary in width from 100 to 150 feet on each side of the stream. These areas should consist of natural vegetation, preferably forest, which is free of NNIs and does not contain, so far as is practicable, recreation-related park improvements. Buffers should not be mowed or cleared (other than for non-native invasive plant control), debris (including grass clippings, leaves, and other organic materials) should not be dumped into buffers or streams, and when areas adjacent to stream buffers are cleared of leaves using blowers, the leaves should not be blown into the streams or their buffers. Additionally, placement of structures in buffers should be avoided when at all feasible. Road and trail crossings may be unavoidable, but facilities such as playgrounds and ballfields should never be constructed in buffers (State regulations may not permit them in some cases) and existing facilities in buffers should be relocated to more suitable locations when possible.

During stream clean-ups, woody debris should not be removed from streams. While it may be unattractive, woody debris is an important element of aquatic habitat. It may be appropriate under some circumstances to remove log jams (e.g. if they are causing excessive erosion), but this should be done only under the supervision of Department of Parks' Park Development Division engineering staff.

Fish and other aquatic organisms should never be moved from one body of water to another without proper coordination. Moving fish can spread disease, parasites, and unwanted aquatic species. Any transfer of fish or other aquatic organisms from one body of water to another requires the permission of the Maryland Department of Natural Resources, and should be coordinated through the Park Planning and Stewardship's Resource Analysis section.

Some aspects of wetland habitat management are included in Standard Operating Procedures. Additional methods of enhancing wetland habitats include blocking outflow channels (with logs, rocks, or sandbags) to keep wetlands wetter, and the installation of cover objects for amphibians. Guidance on

specific wetland enhancement techniques can be found in the Natural Resources Conservation Service's publication Wetland Restoration, Enhancement, and Management (USDA 2003), available at: <ftp://ftp-fc.sc.egov.usda.gov/WLI/wre&m.pdf>.

In general, guidelines for the maintenance of wetland habitats, especially for reptiles and amphibians, include maintaining natural hydrology, natural vegetation, and adequate buffers; providing opportunities for organisms to move from one habitat to another; and avoiding negative impacts such as pollutants and the introduction of non-native species (Mitchell et al. 2006)

Vernal (seasonal) pools can be a particularly productive kind of wetland habitat. Existing pools can be enlarged and new pools can be created, but these activities need to be coordinated with the Park Planning and Stewardship Division. Biebighauser (2002)

[<http://www.fs.fed.us/r8/boone/documents/resources/vernal.pdf>] provides guidance for the creation of seasonal pools; Brown and Jung (2005) provide information on the management of existing pools.

Literature Cited

Anderson, D.C., J.A. MacMahon, and M.L. Wolfe. 1980. Herbivorous mammals along a montane sere: Community structure and energetics. *J. Mammal.* 61:500-519.

Barbour, M.C., J.H. Burk, and W.D. Pitts. 1980. *Terrestrial plant ecology.* Benjamin/Cummings Co., Inc. Menlo Park, Calif. 604 pp.

Bard, G.E. 1952. Secondary succession on the Piedmont of New Jersey. *Ecol. Monogr.* 22:195-215.

Barrett, L.I., and A.A. Downs. 1943. Hardwood invasion in pine forests of the Piedmont Plateau. *J. Agric. Res.* 67:111-128.

Biebighauser, T. R. 2002. *A Guide to Creating Vernal Ponds.* USDA Forest Service.

Billings, W.D. 1938. The structure and development of old-field pine stands and certain associated physical properties of the soil. *Ecol. Monogr.* 8:449-458.

Boomsma, J.J., and A.J. Van Loon. 1982. Structure and diversity of ant communities in successive coastal dune valleys. *S. Anim. Ecol.* 51:957-974.

Bormann, F.H. 1953. Factors determining the role of loblolly pine and sweetgum in early old-field succession in the piedmont of North Carolina. *Ecol. Monogr.* 23: 339-358.

Braun, E.L. 1950. *Deciduous forests of Eastern North America.* The Blakiston Co., Philadelphia. 596 pp.

Brown, L. J. and R. E. Jung. 2005. *An Introduction to Mid-Atlantic Seasonal Pools,* EPA/903/B-05/001. U. S. Environmental Protection Agency, Mid-Atlantic Integrated Assessment, Ft. Meade, Maryland

Brown, T. K. 2002. Creating and maintaining wildlife, insect, and fish habitat structures in dead wood. In: P. J. Shea, W. F. Laudenslayer, Jr, B. Valentine, and C. P. Weatherspoon (Eds.). *Proceedings of the Symposium on The Ecology and Management of Dead Wood in Western Forests,* Reno, Nevada. USDA Forest Service General Technical Report PSW-GTR-181.

Brush, G.S., C. Lenk, and J. Smith. 1980. The natural forests of Maryland: an explanation of the vegetation map of Maryland. *Ecol. Monogr.* 50:77-92.

Campbell, H.W., and S.P. Christman. 1982. The herpetological components of Florida sandhill and sand pine scrub associations. Pages 163—171 in N.J. Scott, Jr. ed. Herpetological communities: a symposium of the Society for the Study of Amphibians and Reptiles and the Herpetologists' League, August 1977. U.S. Dep. Inter. Fish and Wildl. Ser. Wildl. Res. Rep. 13. 239 pp.

Clements, F.E. 1916. Plant succession: an analysis of the development of vegetation. Carnegie Institution of Washington Publ. 242. 512 pp.

Conant, R., and J. T. Collins. 1998. Reptiles and amphibians, eastern and central North America (The Peterson Field Guide Series). Houghton Mifflin Company, Boston and New York

Daubenmire, P. 1968. Plant communities, a textbook of plant synecology. Harper and Row, New York. 300 pp.

Degraaf, R. M., and D. D. Rudis. 1981. Forest habitat for reptiles and amphibians of the Northeast. Northeastern Forest Experiment Station and Eastern Region, Forest Service, U. S. Department of Agriculture.

Degraaf, R. M., G. M. Witman, J. W. Lanier, B. J. Hill, and J. M. Keniston. 1980. Forest habitat for birds of the Northeast. Northeast Forest Experiment Station and Eastern Region, Forest Service, U. S. Department of Agriculture.

Duffey, E. 1978. Ecological strategies in spiders including some characteristics of species in pioneer and mature habitats. Synp. Zool. Soc. London 42:109-123.

Evans, K. E., and R. N. Conner. 1979. Snag management *in* Management of northcentral and northeastern forests for nongame birds (USDA Forest Service General Technical Report NC-51). North Central Forest Experiment Station, St. Paul MN

Fox, J.F. 1978. Forest fires and the snowshoe hare-Canada lynx cycle. *Oecologia* 31:349-374.

Futuyma, D.J., and F. Gould. 1979. Associations of plants and insects in a deciduous forest. *Ecol. Monogr.* 49: 33-50.

Hall, G.A. 1984. A long-term bird population study in an Appalachian spruce forest. *Wilson Bull.* 96:228-240.

Hatley, C.L., and J.A. MacMahon. 1980. Spider community organization: Seasonal variation and the role of vegetation architecture. *Environ. Entomol.* 9:632-639.

- Hench, J.E. 1988. Predicting some effects of land-use changes on wildlife. Ph.D. dissertation. University of Maryland, College Park. 121 pp.
- Hench, J. E., K. Van Ness, and R. Gibbs. 1987. Development of a Natural Resources Planning and Management Process in Integrating Man and Nature in the Metropolitan Environment. Proc. Natl. Symp. on Urban Wildlife. L. W. Adams and D. L. Leedy, eds.
- Hench, J.E., V. Flyger, R. Gibbs, and K. Van Ness. 1985. Predicting the effects of land-use changes on wildlife. Trans. N. Amer. Wildl. Nat. Resour. Conf. 50:345-351.
- James, F.C., and N.O. Warner. 1982. Relationships between temperate forest bird communities and vegetation structure. Ecology 63:159-171.
- Joern, A. 1979. Feeding patterns in grasshoppers (orthoptera: Acrididae): Factors influencing diet specialization. Oecologia 38:325-347.
- Jenkins, R. E., and N. M. Burkhead. 1994. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland
- Johnston, D.W., and E.P. Odum. 1956. Breeding bird population in relation to plant succession on the Piedmont of Georgia. Ecology 37:50-62.
- Karr, J.R. 1968. Habitat and avian diversity on strip-mined land in east central Illinois. Condor 70:348-357.
- Karr, J.R., and K.E. Freemark. 1983. Habitat selection and environmental gradients: dynamics in the “stable” tropics. Ecology 46:1481—1494.
- Kessler, W.B., and T.E. Kogut. 1985. Habitat orientations of forest birds in southeastern Alaska. Northwest Sci. 59:58-65.
- Kricher, J.C. 1973. Summer bird species diversity in relation to secondary succession on the New Jersey Piedmont. Am. Midl. Nat. 89:121-137.
- MacMahon, J.A. 1981. Successional processes: comparisons among biomes with special reference to probable roles of and influences on animals. Pages 277-304 in Shugart, Botkin, and West, eds. Forest Succession: concept and application. Springer-Verlag, New York.
- Martin, J.L. 1966. The insect ecology of red pine plantations in central Ontario. IV. The crown fauna. Can. Entomol. 98:10-27.

Maryland Department of Natural Resources. 2005. Maryland wildlife diversity conservation plan. Maryland Department of Natural Resources, Annapolis, Maryland

Matthews, E.D., E.Z.W. Compy, and J.C. Johnson. 1961. Soil survey of Montgomery County, Maryland. U.S. Dept. Agric. Soil Conserv. Serv. and Md. Agric. Exp. Station. Series 1958, Number 7. 107 pp + 54 plates.

M'Closkey, R.T. 1975. Habitat succession and rodent distribution. *J. Mammal.* 56:950-955.

Mitchell, J. C. 1994. *The Reptiles of Virginia*. Smithsonian Institution Press, Washington and London

Mitchell, J. C., A. R. Breisch, and K. A. Buhlmann. 2006. *Habitat Management Guidelines for Amphibians and Reptiles of the Northeastern United States*. Partners in Amphibian and Reptiles Conservation, Technical Publication HMG-3, Montgomery, Alabama. 108 pp.

M-NCPPC. 2000. *Environmental Guidelines, Guidelines for Environmental Management of Development in Montgomery County*. 75 pp.

M-NCPPC. 2005. *Land Preservation, Parks, and Recreation Plan*.

M-NCPPC. 2009. *Natural Resource Vegetation Management Plan for MNCPPC Parkland in Montgomery County, Maryland*

M-NCPPC and MCDR. 2011 (in draft). *Vision 2030 Strategic Plan for Montgomery County Parks and Recreation*.

Montgomery County Department of Environmental Protection (in cooperation with Maryland- National Capital Park and Planning Commission. 1998. *Montgomery County Countywide Stream Protection Strategy*.

Moulton, M.P., J.R. Choate, and S.J. Bissell. 1981. Small mammals on revegetated agricultural land in eastern Colorado. *Prairie Nat.* 13:99-104.

Murdoch, W.W., F.C. Evens, and C.H. Peterson. 1972. Diversity and pattern in plants and insects. *Ecology.* 53:819—829.

Oosting, H.J. 1942. An ecological analysis of the plant communities of Piedmont, North Carolina. *Amer. Mid. Nat.* 28:1-26.

- Pearson, P.G. 1959. Small mammals and old-field succession on the Piedmont of New Jersey. *Ecology* 40:249-255.
- Peterson, S.F. 1982. A preliminary survey of forest bird communities in northern Idaho. *Northwest Sci.* 56:287-298.
- Powell, D.S., and N.P. Kingsley. 1980. The forest resources of Maryland. U.S. Dep. Agric. For. Serv. Res. Bull. NE-61. 103 pp. Northeast For. Exp. Station, Broomall, Pa.
- Pyle, C. and M.M. Brown. 2002. USDA Forest Service General Technical Report PSW-GTR-181
- Reinhert, H.K. 1984. Habitat variation within sympatric snake populations. *Ecology* 65:1673-1682.
- Rice, J., B.W. Anderson, and R.D. Ohmart. 1984. Comparison of the importance of different habitat attributes to avian community organization. *J. Wildl. Manage.* 48:895-922.
- Richards, P.W. 1952. The tropical rain forest. Cambridge University Press, London. 450 pp.
- Robbins, C. S., D. K. Dawson, and B. A. Dowell. 1989. Habitat area requirements of breeding forest birds of the Middle Atlantic States. *Wildlife Monograph* 103:1-34
USDA. 2003.
- Schimpf, D.J., and J.A. MacMahon. 1985. Insect communities and faunas of a Rocky Mountain subalpine sere. *Great Basin Nat.* 45:37-60.
- Smith, K.G., and J.A. MacMahon. 1981. Bird communities along a montane sere: community structure and energetics. *Auk*. 98:8-28.
- Spurr, S.H. 1956. Forest associations in the Harvard Forest, *Ecol. Monogr.* 26:245-262.
- Spurr, S.H., and B.V. Barnes. 1980. Forest ecology. John Wiley and Sons, New York. 687 pp.
- Stratton, G.E., E.W. Uetz and D.G. Dillery. 1979. A comparison of the spiders of three coniferous tree species. *J. Arachnol.* 6:219-226.
- Strong, D.R., Jr. 1979. Biogeographic dynamics of insect-host plant communities. *Ann. Rev. Entomol.* 24:89-119.

Strong, D.R., Jr., and D.A. Levin. 1979. Species richness of plant parasites and growth form of their hosts. *Am. Nat.* 114:1-22.

Swain, P.C. and J.B. Kearsley. 2001. Classification of the Natural Communities of Massachusetts. Version 1.3 Natural Heritage and Endangered Species Program, Division of Fisheries and Wildlife, Westborough, MA.

Weatherhead, P.J., and M.B. Charland. 1985. Habitat selection in an Ontario population of the snake *Elaphe obsoleta*. *J. Herpetol.* 19:12-19.

Werschkul, D.F. 1982. Species-habitat relationships in an Oregon cold desert lizard community. *Great Basin Nat.* 42:380-384.

Wetland Restoration, Enhancement, and Management. United States Department of Agriculture, Natural Resources Conservation Service, Wetland Science Institute.

Whitcomb, R.F., C.S. Robbins, J.F. Lynch, B.L. Whitcomb, M.K. Klimkiewicz, and D.L.

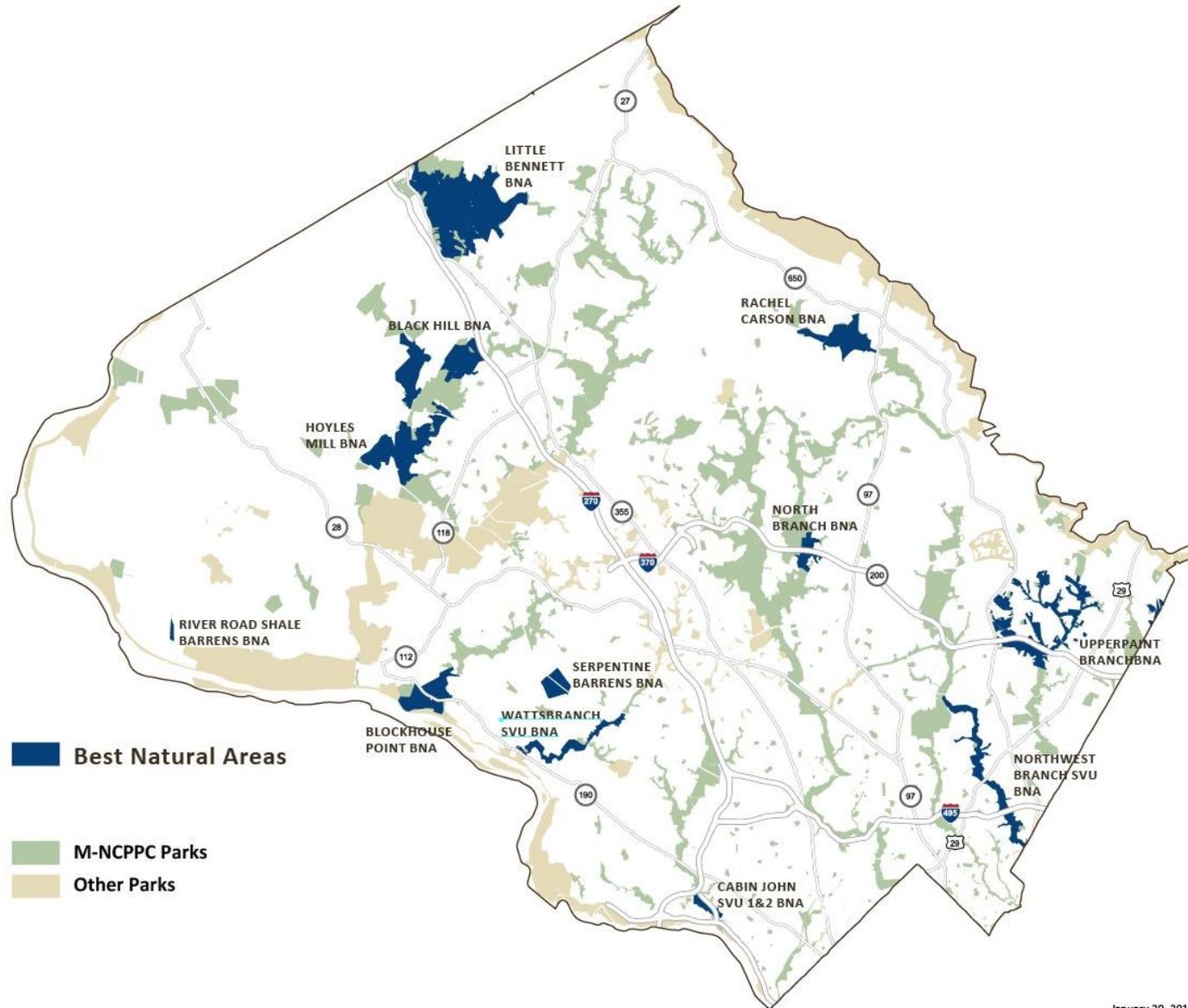
Bystrak. 1981. Effects of forest fragmentation on avifauna of the eastern deciduous forest. Pages 125-205 in R.L. Burgess and D.M. Sharpe, eds. *Forest island dynamics in man dominated landscapes*. Springer-Verlag, New York. 310 pp.

Wiens, J.A. 1974. Habitat heterogeneity and avian community structure in North American grasslands. *Am. Midland Nat.* 91:195-213.

Appendices

- A. Best Natural Areas in M-NCPPC Montgomery Parks
- B. Biodiversity Areas in M-NCPPC Montgomery Parks
- C. Current and Historical Rare, Threatened, and Endangered Plant Species in M-NCPPC Montgomery Parks
- D. Mammal Species of Greatest Conservation Need in M-NCPPC Montgomery Parks
- E. Bird Species of Greatest Conservation Need in M-NCPPC Montgomery Parks
- F. Amphibian and Reptile Species of Greatest Conservation Need in M-NCPPC Montgomery Parks
- G. Fish Species of Greatest Conservation Need in M-NCPPC Montgomery Parks
- H. Schedule for the production of Operation and Use Plans

Appendix A - Best Natural Areas in M-NCPPC Montgomery Parks

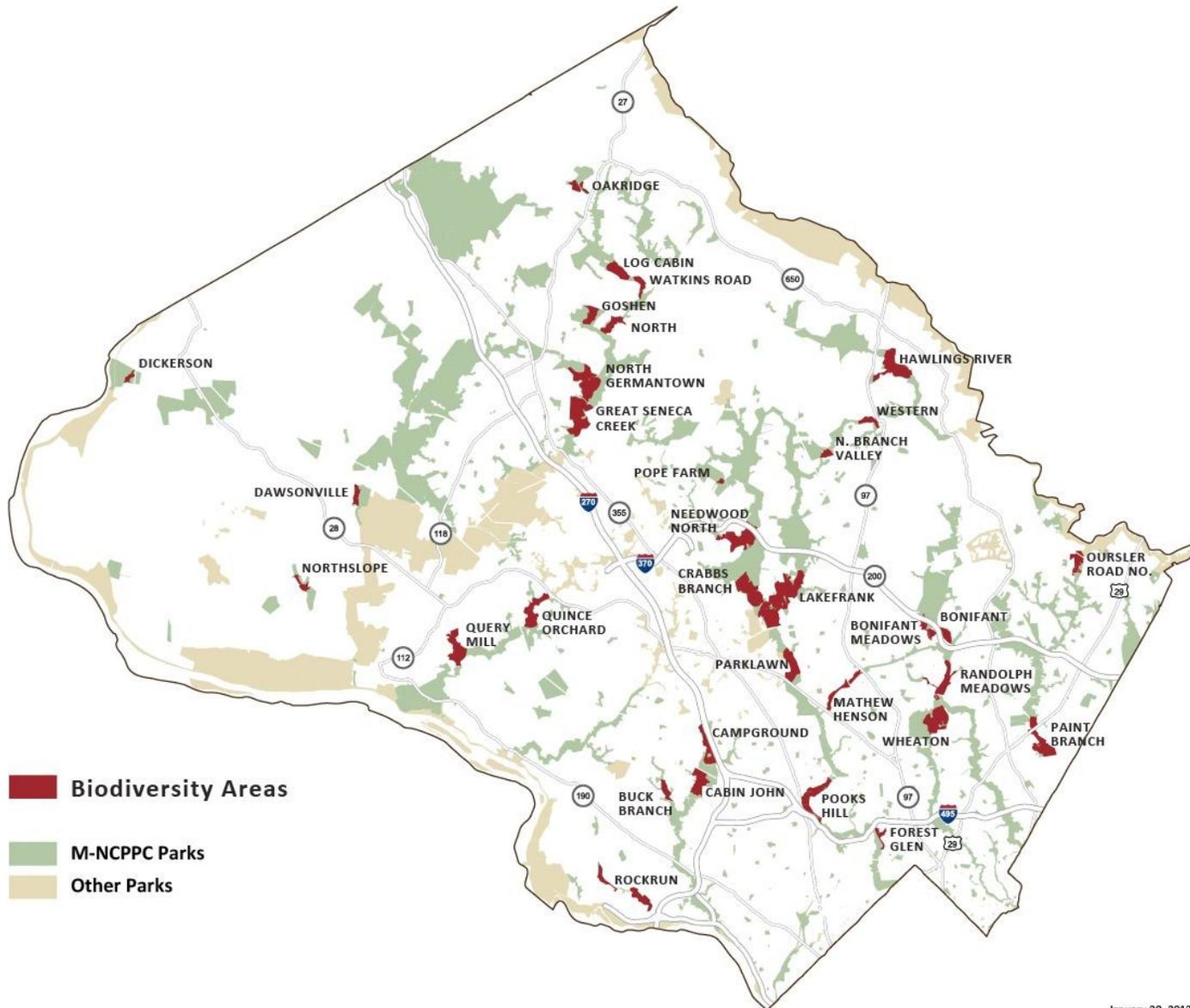


January 20, 2012

Parks Best Natural Areas Chart

BEST NATURAL AREA (BNA) NAME	PARK NAME	ACRES IN BNA	ACRES IN PARK(S)	SIGNIFICANT FEATURES	Major Terrestrial Habitat Types (Note 1)								WATERSHED	WATER QUALITY (NOTE 2)	FOREST INTERIOR ACCESSIBLE VIA SANCTIONED TRAIL				
					MESIC FOREST	FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE				OVER-WASH SAVANNAH	COASTAL PLAIN FOREST		
Black Hill	Black Hill Regional Park	1144	2092	High quality mixed oak and mixed deciduous forests, quality seepage slopes with locally uncommon plant species, and a 505 acre lake with numerous wintering waterfowl.	X	X	X								Little Seneca Cr	G			
Blockhouse Point	Blockhouse Point Conservation Park	629	651	High quality mixed-deciduous forest, river-side rock outcrops, locally uncommon plant species, and extensive wetlands along the C&O Canal.	X	X	X			X					Muddy Branch	G	Y	Y	
Cabin John	Cabin John Stream Valley Unit (SVU) 1&2	127	164	High quality mixed oak and mixed deciduous forest communities, plant diversity with locally uncommon species.	X	X									Cabin John Cr	F	Y	Y	
Hoyles Mill	Hoyles Mill Conservation Park, Camp Seneca Special Park, Little Seneca SVU4, South Germantown Recreational Park, and Boyds Local Park	1141	1882	Large contiguous mixed deciduous forest on diabase bedrock, high quality bottomland swamp, and rare/threatened/endangered plant species.	X	X	X		X						Little Seneca Cr	G	Y	Y	
Little Bennett	Little Bennett Regional Park, including the camping area and the golf course	2947	3707	Good quality oak-dominated forest in uplands, large tracts of good quality successional meadows, high quality skunk cabbage seeps, extensive wet	X	X	X								Little Bennett Cr	E	G	Y	Y

Appendix B- Biodiversity Areas in M-NCPPC Montgomery Parks



January 20, 2012

Biodiversity Areas Chart

BIODIVERSITY AREA NAME	PARK NAME(S)	ACRES IN BDA	ACRES IN PARK(S)	SIGNIFICANT FEATURES	Major Terrestrial Habitat Types (Note 1)										WATERSHED	WATER QUALITY (NOTE 2)	FOREST INTERIOR	ACCESSIBLE VAI SANCTIONED TRAIL	
					MESIC FOREST	FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE	OVER-WASH SAVANNAH	COASTAL PLAIN FOREST COMPLEX					
Bonifant	Northwest Branch SVU 5	162	345	Areas of older forest with excellent habitat and species diversity. One rare and five watchlist plant species have been found here.	X	X										Northwest Br	F	Y	N
Bonifant Meadows	Northwest Branch Recreation Park and Northwest Branch SVU5	36	332	Habitat diversity with several types of wetlands plus rich upland forest. One rare and four watchlist plant species have been found here.												Northwest Br	F	N	N
Buck Branch	Buck Branch Stream Valley Park	55	101	Young to maturing mixed deciduous forest. Two watchlist plant species have been found here.	X	X										Cabin John Cr	F	N	N
Cabin John	Cabin John Regional Park	139	513	Mixed deciduous maturing forest. One watchlist plant species has been found here.	X	X										Cabin John Cr	F	Y	Y
Cabin John Camp Ground	Cabin John Regional Park	148	513	Oak-hickory forest with well-drained south-facing slopes and gently rolling uplands. Four watchlist plant species have been found here.	X		X									Cabin John Cr	F	Y	Y
Crabbs Branch	Rock Creek Regional Park	236	1575	Good quality forested swamp/seep complex. Four watchlist plant species have been found here.		X										Rock Creek	G	Y	Y
Dawsonville	Little Seneca SVU 1	48	190	Good quality forested bottomland swamp. Four		X										Little Seneca Cr	G	Y	N

				been found here.																	
North Germantown	N. Germantown Greenway and Great Seneca SVU2	114	770	Picturesque rock outcrops on slopes and stream banks, high quality seepage swamps, bedrock stream, locally uncommon plant species.	X													Great Seneca Cr	F	Y	N
North Slope	Dry Seneca Creek SVU 2	39	139	Dry oak forest on upper slopes, rich mixed forest with good species diversity on lower slopes. Three watchlist species of plants have been found here.	X		X											Dry Seneca Cr	G	N	N
Oak Ridge	Oak Ridge Conservation Park	54	180	Good quality oak/hickory/pine successional forest. One rare and two watchlist species of plants have been found here.			X											Little Bennett Cr	G	Y	N
Oursler Road	Patuxent River Watershed Conservation Park and Burtonsville Local Park	83	361	Maturing mixed deciduous forest. One watchlist species of plant has been found here.	X													Paint Branch/Patuxent	G	Y	N
Paint Branch	Paint Branch SVU 4&5, and Martin Luther King, Jr. Recreational Park	189	386	Bedrock outcrops, south and west-facing slopes. Five watchlist species of plants have been found here.	X	X												Paint Branch	F	Y	N
Parklawn	Rock Creek SVU 7 and Aspen Hill Local Park	153	301	Extensive, well-developed floodplain with large deposits of rich alluvial sand and gravel. Three watchlist species of plants have been found here.	X	X												Rock Creek	F	Y	Y
Pooks Hill	Rock Creek SVU 3	186	326	Pockets of high-quality forest. Four watchlist species of plants have been found here.	X	X												Rock Creek	F	Y	Y
Pope Farm	Pope Farm Nursery	12	94	Open-canopy wetland of State significance. One rare plant species has been found here.														Rock Creek	E	N	N
Query Mill	Muddy Branch SVU 1	185	338	Moist alluvial deposits along the stream. One watchlist plant species has been found here.'	X	X												Muddy Branch	G	Y	Y
Quince Orchard	Muddy Branch SVU 3	168	308	Areas of good quality maturing forest on the slopes above the creek, with a well-	X													Muddy Branch	F	Y	Y

Appendix C - Current and Historical Rare, Threatened, and Endangered Plant Species of in M-NCPPC Montgomery Parks

Comments

Given the scarcity of these Rare, Threatened and Endangered species statewide, it is not expected that many of them would be found in our County Parks. If a species has been found on M-NCPPC Park property, the location is indicated below.

HMCP=Hoyles Mill Conservation Park; LBRP=Little Bennett Regional Park; SBCEP=Serpentine Barrens Conservation Park; BPCP=Blockhouse Point Conservation Park; PB SVP=Paint Branch Stream Valley Park; RCCP=Rachel Carson Conservation Park; RCRP=Rock Creek Regional Park; NWB SVP=North West Branch Stream Valley Park; NWB RecP=North West Branch Recreational Park; CJ SVP=Cabin John Stream Valley Park; SG RecP=South Germantown Recreational Park; W-B area=Washington -Baltimore area

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)								COMMENTS		
						MESIC FOREST	FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE		OVER-WASH SAVANNAH	COASTAL PLAIN FOREST COMPLEX
Auricled Gerardia	<i>Agalinis auriculata</i>	E	S1		G3	X	X	X		X						Dry to moist fields and open woods; rare statewide; midland; aka: Tomanthera auriculata
Blunt-leaved Gerardia	<i>Agalinis obtusifolia</i>	E	S1		G4G5Q	X	X	X		X						Dry or moist; sandy; coastal; aka: ten-lobed agalinus
Thread-leaved Gerardia	<i>Agalinis setacea</i>	E	S1		G5?			X		X						Dry, sandy woods; coastal
Nantucket Shadbush	<i>Amelanchier nantucketensis</i>	T	S1		G3Q											Found primarily in New England; one disjunct population found along Potomac in C&O Hist. Park
Running Juneberry	<i>Amelanchier stolonifera</i>		S2		G5								X			Dry, acid, unshaded soils
Scarlet Ammannia	<i>Ammannia coccinea</i>		SU		G5											Pond edges, slow stream banks; more a mid-western species
Single-headed Pussytoes	<i>Antennaria solitaria</i>	T	S2		G5	X		X								Rich woods and clearings
Hairy Rockcress	<i>Arabis hirsuta</i>		SU		G5	X		X		X		X				Moist to dry, rocky woods and ledges

Missouri Rockcress	<i>Arabis missouriensis</i>	E	S1		G5?Q	X												Moist rocky woods, rare statewide; HMCP
Woolly Three-awn	<i>Aristida lanosa</i>	E	S1		G5													Dry soils; rare statewide; eastern shore
Lake Cress	<i>Armoracia lacustris</i>	E	S1		G4?													Smooth waters and muddy areas; not common statewide
Leopard's-bane	<i>Arnica acaulis</i>	E	S1		G4													Sandy, open woods; often in damp soils; infrequent statewide
Red Milkweed	<i>Asclepias rubra</i>	E	S1		G4G5													In open wet areas or pine woods; infrequent statewide
Lobed Spleenwort	<i>Asplenium pinnatifidum</i>	E	S1		G4	X												Crevices of non-calcareous rocks; rare statewide; BPCP
Canada Milkvetch	<i>Astragalus canadensis</i>	E	S1		G5						X							Dry midland and mountain forests
Bent Milkvetch	<i>Astragalus distortus</i>	T	S2		G5									X				Shale barrens of Allegheny county; a midwestern species
Wild False Indigo	<i>Baptisia australis</i>	T	S2		G5		X										X	Floodplain of Potomac River; rare statewide
Small Grape-fern	<i>Botrychium simplex</i>	X	SH		G5	X	X											Moist woods
Side-oats Grama	<i>Bouteloua curtipendula</i>		S2		G5													Dry sites and open woods
Broad-glumed Brome	<i>Bromus latiglumis</i>	E	S1		G5	X	X										X	Rich woods and thickets; on Coastal Plain and Potomac River; rare statewide
Nottoway's Brome	<i>Bromus nottowayanus</i>		S1S2		G3G5													Rare perhaps extirpated
Blue-hearts	<i>Buchnera americana</i>	X	SH		G5?													Sandy, poor soils; rare statewide; reported from Harford and Cecil County.
Great Indian-plantain	<i>Cacalia muehlenbergii</i>	X	SH		G4						X							Border of woods or open woods; more common in mountains
Low Bindweed	<i>Calystegia spithamea</i>		S2		G4G5						X						X	Dry, sandy or rocky woods and fields; infrequent in the DC area
Cuckooflower	<i>Cardamine pratensis</i>		S1		G5													Swamp, bogs, and shallow waters; little known in MD
Buxbaum's Sedge	<i>Carex buxbaumii</i>	T	S2		G5													Swamps, bogs, wet meadows; Harford and Cecil County; rare statewide
Carey's Sedge	<i>Carex careyana</i>	E	S1		G4G5													Rich, dry to moist woods; W-B area
Davis' Sedge	<i>Carex davisii</i>	E	S1		G4													Dry to moist woods and fields; W-B area; rare statewide
Cypress-knee Sedge	<i>Carex decomposita</i>	E	S1		G3													Swampy habitats; in W-B area
Hitchcock's Sedge	<i>Carex hitchcockiana</i>	E	S1		G5													Dry to moist woods and thickets; rare statewide
Hop-like Sedge	<i>Carex lupuliformis</i>		S2		G4													Wetland species, full sun to wooded wetlands
Mead's Sedge	<i>Carex meadii</i>	E	S1		G4G5						X							Dry fields; rare statewide; Carroll County; Hoyles Mill Conservation Park

Woolly Sedge	<i>Carex pellita</i>		S2?		G5														Moist to wet meadows and woods: calcareous seeps
A Sedge	<i>Carex planispicata</i>		S1S2		G4Q														Moist to wet meadows
Necklace Sedge	<i>Carex projecta</i>		S2		G5														Damp soils; Garrett County.
Short's Sedge	<i>Carex shortiana</i>	E	S2		G5														Moist woods and fields; W-B and Allegheny
Burr-reed Sedge	<i>Carex sparganioides</i>		S1S2		G5	X	X												Rich woods
Slender Sedge	<i>Carex tenera</i>	X	SH		G5													X	Moist to wet soils of fields and thickets; Great Falls
Rigid Sedge	<i>Carex tetanica</i>	X	SH		G4G5														Fields and wooded areas; Cecil County and Delaware; rare statewide
Big Shellbark Hickory	<i>Carya laciniosa</i>	E	S1		G5	X	X												Rare in MD; usually 7 leaflets and larger nuts than Shagbark; Aka: Kingnut;
American Chestnut	<i>Castanea dentata</i>		S2S3		G4			X										X	Poor, dry, acid soil; LBRP, BHRP, RCCP, SBCP, RCRP
Sugarberry	<i>Celtis laevigata</i>		SU		G5		X												Bottomland; calcareous rock areas; Southern species
Prickly Hornwort	<i>Ceratophyllum echinatum</i>	E	S1		G4?														Submerged herb; in quiet waters; Queen Anne County.
Hairy Spurge	<i>Chamaesyce vermiculata</i>		SH		G5														Disturbed areas, roadsides, fields
Wister's Coralroot	<i>Corallorhiza wisteriana</i>	E	S1		G5	X	X												Deciduous forests; orchid family
Tall Tickseed	<i>Coreopsis tripteris</i>	E	S1		G5		X												Native in Mississippi valley; escaped from cultivation; in the W-B area
Hazel Dodder	<i>Cuscuta coryli</i>	X	SH		G5?														On shrubs or herbs in wet or dry soils; rare statewide
Smartweed Dodder	<i>Cuscuta polygonorum</i>	E	S1		G5														On various plants of moist soils, frequently on species of Polygonum
Reflexed Cyperus	<i>Cyperus refractus</i>		S2?		G5			X											Moist to dry soils of woods and fields; rare statewide; W-B area
Rough Cyperus	<i>Cyperus retrofractus</i>		S2		G5														Dry, sandy soil; coastal; rare statewide
Trailing Tick-trefoil	<i>Desmodium humifusum</i>	X	SH		G1G2Q	X													Dry, sandy soil of wooded areas; coastal; rare statewide
Rigid Tick-trefoil	<i>Desmodium rigidum</i>	E	S1		GNRQ	X	X												Chiefly in sandy woodland; infrequent in Piedmont
Bristling Panicgrass	<i>Dichanthelium aciculare</i>		S2?		G5	X	X												Sandy woods and clearings of Coastal plain, rare statewide
Lax-flowered Witchgrass	<i>Dichanthelium laxiflorum</i>		S1?		G5	X													Moist or dry woods; coastal; a southern species. Rare, little known in MD
Few-flowered Panicgrass	<i>Dichanthelium oligosanthes</i>		S2S3		G5														Dry or moist soils, in open or shade
Tall Swamp	<i>Dichanthelium</i>	E	S1		G4		X		X										Wet soils and woodlands of the Coastal

Panicgrass	<i>scabriusculum</i>																Plain; uncommon statewide
Glade Fern	<i>Diplazium pycnocarpon</i>	T	S2		G5												Mesophytic forests in moist, well drained, neutral to basic soils; aka: <i>Athyrium pycnocarpon</i>
Leatherwood	<i>Dirca palustris</i>	T	S2		G4	X	X									X	Rich woods and stream banks; midland and mountain; SBCP; Potomac River.
Upright Burhead	<i>Echinodorus cordifolius</i>	E	S1		G5												Muddy waters, swamps, and shallow waters; rare statewide; known from Delaware
White Trout Lily	<i>Erythronium albidum</i>	T	S2		G5	X	X										Rich woods; infrequent in Western MD, Rare elsewhere; Found along Potomac
Spotted Joe-pye-weed	<i>Eupatorium maculatum</i>	X	SU		G5												Moist soils of thickets and grasslands
Blunt-leaved Spurge	<i>Euphorbia obtusata</i>	E	S1		G5												Woods, fields, and roadsides; W-B infrequent; aka: Wolf's Milk
Rough-leaved Aster	<i>Eurybia radula</i>	E	S1		G5												Wet woods and swamps as well as dry woodlands
Fringe-tip Closed Gentian	<i>Gentiana andrewsii</i>	T	S2		G5?					X							Wet woods and fields; infrequent in Midland; rare on the Coastal Plain; HMCP
Striped Gentian	<i>Gentiana villosa</i>	E	S1		G4					X						X	Open woods; HMCP, SBCP; aka: Sampson Snakeroot
Yellow Avens	<i>Geum aleppicum</i>	E	S1		G5												Swamps and moist fields at higher elevations; Garrett County.; aka: <i>Geum strictum</i>
Tesselated Rattlesnake-plantain	<i>Goodyera tessellata</i>	X	SH		G5												Dry to moist woods; aka: Loddige's Rattlesnake plantain
Sweet-scented Indian-plantain	<i>Hasteola suaveolens</i>	E	S1		G4											X	Fertile floodplains; Potomac River
Mcdowell's Sunflower	<i>Helianthus occidentalis</i>	T	S1		G5					X							Dry woods; a Southern species; W-B area
Slender-leaved Bluets	<i>Houstonia tenuifolia</i>		S1		G4G5					X							Dry woods; Allegheny County.
Deciduous Holly	<i>Ilex decidua</i>		S2		G5											X	Thickets and bottomlands; collected near Great Falls
Bloodleaf	<i>Iresine rhizomatosa</i>	E	S1		G5	X											Moist woods; in the W-B area; infrequent statewide
Crested Iris	<i>Iris cristata</i>	E	S1		G5												In rich woods; on cliffs; along streams; in W-B area; infrequent statewide; RCRP
Small Whorled Pogonia	<i>Isotria medeoloides</i>	X	SH	LT	G2					X							Dry, acid soil
Butternut	<i>Juglans cinerea</i>		S2S3		G4	X	X			X							Rich soil; in woods/along fence rows; mountains; NWB SVP, NWB Rec P, LBRP, HMCP
Long's Rush	<i>Juncus longii</i>	E	S1		G3Q												Damp clay or peat

Potato Dandelion	<i>Krigia dandelion</i>	E	S1		G5				X			X		X			Fields and edge of wooded areas; SBPCP; HMCP, BPCP, Great Falls NHP
Hairy Lettuce	<i>Lactuca hirsuta</i>	X	SH		G5?				X								Open woods and fields in dry soil
Vetchling	<i>Lathyrus palustris</i>	E	S1		G5												Wet soil of swamps and shores
Florida Yellow Flax	<i>Linum floridanum</i>	X	SH		G5?												Moist to dry soils and pine barrens; Coastal and W-B
Small-flowered Hemicarpha	<i>Lipocarpa micrantha</i>	E	S1		G5												Annual sedge; usually found in wetlands
American Gromwell	<i>Lithospermum latifolium</i>	E	S1		G4	X					X						Rich deciduous woods, wooded slopes, river banks; BPCP; HMCP
Carolina Clubmoss	<i>Lycopodiella caroliniana</i>	E	S1		G5												Wet sands and peaty areas of barrens; Coastal Plain; Prince Georges County.; rare statewide
Climbing Fern	<i>Lygodium palmatum</i>	T	S2		G4												Moist thickets and open woods; rare statewide; W-B area and Anne Arundel County
Lowland Loosestrife	<i>Lysimachia hybrida</i>	T	S2		G5												Wet woods, shores or swamps; rare statewide
Winged Loosestrife	<i>Lythrum alatum</i>	E	S1		G5												Swamps or wet soils; uncommon statewide; reported from Great Falls
Climbing Milkweed	<i>Matelea obliqua</i>	E	S1		G4?	X											Rich woods, often in rocky areas; Allegheny County
Ostrich Fern	<i>Matteuccia struthiopteris</i>		S2		G5												Rich woods; moist bottomlands; rare in Midland; Cabin John SVP
Erect Water-hyssop	<i>Mecardonia acuminata</i>	E	S1		G5												Flatwoods, bogs, swamps, marshes, floodplains, savannahs, alluvial woods, low roadsides
Broad-leaved Bunchflower	<i>Melanthium latifolium</i>	E	S1		G5	X											Eastern deciduous forest biome; rare statewide
Narrow Melicgrass	<i>Melica mutica</i>	T	S1		G5				X		X				X		Dry, open woodland; W-B area; Rock Run Park, NWB SVP, RCRP; HMCP, SBPCP
Long-awned Hairgrass	<i>Muhlenbergia capillaris</i>	E	S1		G5												Woods and clearings, usually where rocky or sandy; rare statewide; HMCP
Thread-like Naiad	<i>Najas gracillima</i>	X	SU		G5?												Submerged aquatic of ponds and muddy shores; infrequent statewide; Eastern shore, W-B area.
American Lotus	<i>Nelumbo lutea</i>		S2		G4												Aquatic herb; ponds and smooth waters; infrequent statewide
Hard-leaved Goldenrod	<i>Oligoneuron rigidum</i>	X	SH		G5												Open, dry, rocky or sandy areas; common in mid-western prairies
Virginia False-gromwell	<i>Onosmodium virginianum</i>	E	S1		G4				X		X						Mostly in dry, sandy pine woods; HMCP, BPCP
One-sided Pyrola	<i>Orthilia secunda</i>	X	SH		G5	X											Woods; northern species
Wiry Witch-grass	<i>Panicum flexile</i>	E	S1		G5												Moist or dry soils; fields or open woods; W-B area

Yellow Nailwort	<i>Paronychia virginica var. virginica</i>	E	S1		G4T1Q				X											Rocky places and forest; western MD
Floating Paspalum	<i>Paspalum fluitans</i>	E	S1		G5															In water or on wet soils in the Coastal Plain; uncommon statewide
Smooth Cliffbrake	<i>Pellaea glabella</i>	E	S1		G5															Limestone outcrops; rare statewide; W-B area
Coville's Phacelia	<i>Phacelia covillei</i>	E	S2		G3															Rich wooded areas; Potomac Rr.
Smooth Phlox	<i>Phlox glaberrima</i>	E	S1		G5					X										Moist woods and Fields; HMCP
Downy Phlox	<i>Phlox pilosa</i>	E	S1		G5															Dry woods and sandy barrens; In DC area; uncommon statewide
Pale Green Orchid	<i>Platanthera flava</i>		S2		G4															Moist soil and swampy woods
Purple Fringeless Orchid	<i>Platanthera peramoena</i>	T	S1		G5				X											Moist fields and moist open woods; LBRP
Small Purple Fringed Orchid	<i>Platanthera psycodes</i>	X	SH		G5															Wet meadows, swamps and woods; Garrett, Baltimore and Cecil Counties; rare statewide
Racemed Milkwort	<i>Polygala polygama</i>	T	S1		G5					X										Dry woods in the W-B area; uncommon statewide
Seneca Snakeroot	<i>Polygala senega</i>	T	S2		G4G5					X										Dry rocky soil, often on calcareous outcrops; rare throughout; HMCP
Leafy Pondweed	<i>Potamogeton foliosus</i>	E	S1		G5															Fresh to brackish streams and ponds; W-B area
Spiral Pondweed	<i>Potamogeton spirillus</i>		S1		G5															Shallow smooth waters; in Delaware; rare statewide
Flatstem Pondweed	<i>Potamogeton zosteriformis</i>	E	S1		G5															Still waters; Harford County., W-B area
Tall Cinquefoil	<i>Potentilla arguta</i>		SU		G5															Dry woods and fields; Baltimore County.
Eastern Dwarf Cherry	<i>Prunus pumila</i>		SU		G5															Sandy shorelines, gravel shorelines.
Basil Mountain-mint	<i>Pycnanthemum clinopodioides</i>		SH		G2															Wooded slopes and shores; rare statewide; in the Piedmont and Coastal Plain
Torrey's Mountain-mint	<i>Pycnanthemum torrei</i>	E	S1		G2															Dry woods and thickets; rare statewide
Whorled Mountain-mint	<i>Pycnanthemum verticillatum</i>	E	S1		G5															Usually in wet soils, open or shaded; Infrequent on the Coastal Plain and in the W-B area.
Virginia Mountain-mint	<i>Pycnanthemum virginianum</i>		S2		G5															Dry or moist meadows or thickets; Cecil, Baltimore County and in the W-B area.
Greenish-flowered Pyrola	<i>Pyrola virens</i>	X	SH		G5															Dry, usually coniferous woods; Rare; Prince Georges County.
Mossy-cup Oak	<i>Quercus macrocarpa</i>		S1		G5															Bottomlands, rich moist woods and floodplains; reported from Queen Anne and Allegheny County.

Shumard's Oak	<i>Quercus shumardii</i>	T	S2		G5		X			X								Rich moist lowland soil; not abundant; South and Central US; HMCP; BPCP
Water-plantain Spearwort	<i>Ranunculus ambigens</i>	X	SH		G4													Swamps and muddy shores; infrequent on the Coastal Plain; mostly on Eastern shore.
Yellow Water-crowfoot	<i>Ranunculus flabellaris</i>	E	S1		G5													Ponds, ditches and wet woods; Rare on the Coastal Plain
Hairy Wild-petunia	<i>Ruellia humilis</i>	E	S1		G5													Dry slopes of open woods and fields; western MD; infrequent statewide
Pursh's Ruellia	<i>Ruellia purshiana</i>	E	S1		G3													Woodlands in mountain areas; aka: R. pedunculata and Appalachian Ruellia
Rustling Wild-petunia	<i>Ruellia strepens</i>	E	S1		G4G5													Rich moist woods and alluvial soil; Coastal Plain and W-B area; aka: Smooth Ruellia
Tall Dock	<i>Rumex altissimus</i>	E	S1		G5													Swamps and floodpains; mostly in the W-B area; aka: Water or Pale Dock
Long-beaked Arrowhead	<i>Sagittaria australis</i>		SU		GNRQ													Swamps, ponds and small streams; mostly in the Lower Midland; infrequent statewide
Engelmann's Arrowhead	<i>Sagittaria engelmanniana</i>	T	S2		G5?													Bogs and acid waters of streams and ponds; Coastal; infrequent statewide
Sessile-fruited Arrowhead	<i>Sagittaria rigida</i>	E	S1		G5													Brackish waters, swamps, and muddy areas; W-B area and Eastern shore; aka: Stiff Arrowhead
Sandbar Willow	<i>Salix exigua</i>	E	S1		G5													Sandy soils along streams, rivers; Northern Plains and New England.
Dwarf Prairie Willow	<i>Salix humilis var. tristis</i>		S1		G4G5													Road banks and dry thickets
Canada Burnet	<i>Sanguisorba canadensis</i>	T	S2		G5													Swamps and wet fields; Garrett County; Rare in the Mid-land and Coastal Plain; Great Seneca SVP
Smith's Clubrush	<i>Schoenoplectus smithii</i>	X	SU		G5?													Wet open sunny spots; aka: blunt-scale clubrush
Reticulated Nutrush	<i>Scleria reticularis</i>		S2S3		G4													Wet sandy shores; Coastal;
Common Skullcap	<i>Scutellaria galericulata</i>		S1		G5													Wet soils; Uncommon statewide; in W-B area; aka: Marsh Skullcap; this species is circumboreal
Leonard's Skullcap	<i>Scutellaria leonardii</i>	T	S2		G4T4													Dry, upland woods; Rare statewide; in the W-B area; Western MD shale barrens; aka: Shale skullcap
Veined Skullcap	<i>Scutellaria nervosa</i>	E	S1		G5													Moist woods; rare statewide; in the W-B area and along the Susquehanna River.
Rock Skullcap	<i>Scutellaria saxatilis</i>	E	S1		G3					X								Rocky woods; rare statewide, in the W-B area; Dickerson CP, HMCP
Virginia Mallow	<i>Sida hermaphrodita</i>	E	S1		G3													Rocky woods

Snowy Campion	<i>Silene nivea</i>	E	S1		G4?														Moist or shaded areas in the W-B areas;
Star-flowered False Solomon's-seal	<i>Smilacina stellata</i>	E	S1		G5														Moist sandy soils of woods and shores; Eastern part of MD;
Halberd-leaved Greenbrier	<i>Smilax pseudochina</i>	T	S2		G4G5														Low woods or damp sandy soil; Coastal Plain and W-B area; aka: False China Root, Bull Briar
Rock Goldenrod	<i>Solidago rupestris</i>	X	SH		G4?														Riverbanks; uncommon statewide; similar in flower head size to <i>S. canadensis</i>
Riverbank Goldenrod	<i>Solidago simplex</i> var. <i>racemosa</i>	T	S1		G5T3?														Dry, rocky river banks; Montgomery County at Great Falls
Showy Goldenrod	<i>Solidago speciosa</i>	T	S2		G5														Dry to moist, open woods and fields; Infrequent statewide
Buttonweed	<i>Spermacoce glabra</i>	E	S1		G4G5														Swamps, wet woods and openings; along muddy shores
Swamp-oats	<i>Sphenopholis pensylvanica</i>	T	S2		G4														Wet places in full sun; swamps, along streams, wet meadows.
Wide-leaved Ladys' Tresses	<i>Spiranthes lucida</i>	E	S1		G5														Damp woods, fields, marshes, and dune hollows; rare statewide
Yellow Nodding Ladys' Tresses	<i>Spiranthes ochroleuca</i>	E	S1		G4														Meadows, open woods, roadsides.
Long-leaved Rushgrass	<i>Sporobolus asper</i>		S1		G5														Dry soils; reported from Queen Anne and Talbot County.
Rough Rushgrass	<i>Sporobolus clandestinus</i>	T	S2		G5														Dry soils; rare statewide
Rough Hedge-nettle	<i>Stachys aspera</i>	E	S1		G4?														Moist soils; reported from Wicomico and Somerset County.
Nuttall's Hedge-nettle	<i>Stachys nuttallii</i>		S1		G5?														Mostly in woods; rare statewide; reported from mountains of MD and the W-B area
Featherbells	<i>Stenanthium gramineum</i>	T	S1		G4G5						X								Moist soils; Eastern MD, W-B area, Garrett County; PB SVP, SBCP
Serpentine Aster	<i>Symphyotrichum depauperatum</i>	E	S1		G2													X	On serpentine barrens; Cecil County.; rare statewide
Drummond Aster	<i>Symphyotrichum drummondii</i>		S1		G5							X							Dry, rocky soils; openings in wooded areas
Fameflower	<i>Talinum teretifolium</i>	T	S1		G4													X	Dry rocky outcrops; sandstone; serpentine; Midland and W-B, infrequent statewide.
Bog Fern	<i>Thelypteris simulata</i>	T	S2		G4G5														Bogs and swamps; eastern shore; rare statewide; reported for W-B area.
Climbing Dogbane	<i>Trachelospermum difforme</i>	E	S1		G4G5														Twisting over shrubs of moist woods; rare statewide; Coastal; Delaware; No record in MD
Bashful Bulrush	<i>Trichophorum planifolium</i>		S2S3		G4G5							X						X	Rocky woodlands; HMCP; SBCP; aka: <i>Scirpus verecundus</i> ;

Narrow-leaved Bluecurls	<i>Trichostema setaceum</i>		S1		G5												Sandy fields and pine woodlands; reported from Midland zone, Delaware, Wicomico County.
Buffalo Clover	<i>Trifolium reflexum</i>	X	SH		G3G4												Fields, roadsides, and margins of wooded areas; infrequent in W-B area.
Narrow-leaved Horse-gentian	<i>Triosteum angustifolium</i>	E	S1		G5												Moist and dry woods; infrequent in the Piedmont and W-B area.
Nodding Pogonia	<i>Triphora trianthophora</i>	E	S1		G3G4												Grows in rich humus of moist woods; rare statewide; Montgomery and Cecil Counties.
Valerian	<i>Valeriana pauciflora</i>	E	S1		G4	X	X										Rich woods; Cecil County and along the Susquehanna River.
Goose-foot Cornsalad	<i>Valerianella chenopodiifolia</i>	E	S1		G5												Moist soils; reported from Montgomery and W-B area.
Tall Cornsalad	<i>Valerianella umbilicata</i>	X	SH		G3G5												Low, moist soils; aka: Wood's Corn Salad
Marsh Speedwell	<i>Veronica scutellata</i>	E	S1		G5												Swamps and bogs; reported from the DC area
Sand Grape	<i>Vitis rupestris</i>		S1		G3												Potomac River Valley and vicinity of DC
Northern Prickly-ash	<i>Zanthoxylum americanum</i>	E	S1		G5					X							Mid-western species; HMCP, SG Rec Park

Note 1: For description of underlying bedrock, soils, and major plant species, see section starting on page 10.

Appendix D - Mammal Species of Greatest Conservation Need Found in M-NCPPC Montgomery Parks

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)										COMMENTS
						POTOMAC RIVER OVER-WASH SAVANNAH	RIVERSIDE OUTCROPS OF THE POTOMAC BASIN	MIXED FOREST ON SERPENTINE BEDROCK	MIXED FOREST ON TRIASSIC SHALE BEDROCK	MIXED FOREST ON DIABASE BEDROCK	DRY FOREST ON ACIDIC BEDROCK	MESIC FOREST ON ACIDIC BEDROCK	CENTRAL MD FLOODPLAIN FOREST	CENTRAL MD SWAMP FOREST	COASTAL PLAIN FOREST COMPLEX	
Southeastern shrew	<i>Sorex longirostris</i>		S3S4		G5					X		X	X	X	X	Fields, thickets, lowland forest
Smoky shrew	<i>Sorex fumeus</i>	I	S2S3		G5		X					X	X		X	Cool, moist forest, bogs
Southern pygmy shrew	<i>Sorex hoyi</i>		S2		G5T4		X				X				X	Forests on ridges and slopes
Least shrew	<i>Cryptotis parva</i>		S3S5		G5			X	X		X				X	Upland fields, meadows
Southeastern star-nosed mole	<i>Condylura cristata</i>		SU		G5T4					X		X	X	X	X	Moist meadows, woods
Eastern red bat	<i>Lasiurus borealis</i>		S5B, S5N		G5	X	X	X	X	X	X	X	X	X	X	Forest and edges
Eastern small-footed myotis*	<i>Myotis leibii</i>	I	S1B, S2N		G3	X	X	X	X	X	X	X	X	X	X	Near caves
Hoary bat	<i>Lasiurus cinereus</i>		SPB, S5N		G5	X	X	X	X	X	X	X	X	X	X	Forest and edges
Silver-haired bat	<i>Lasionycteris noctivagans</i>		SPB, S5N		G5	X	X	X	X	X	X	X	X	X	X	Forest and edges near water
Southern bog lemming*	<i>Synaptomys cooperi</i>		S3		G5								X	X	X	Bogs, moist meadows & forest
Least weasel*	<i>Mustela nirvalis</i>	I	S2S3		G5	X	X	X	X	X	X	X	X	X	X	Open woods, fields, marshes
Bobcat*	<i>Lynx rufus</i>	I	S3		G5	X	X	X	X	X	X	X	X	X	X	Wide variety of habitats

Note 1: For description of underlying bedrock, soils, and major plant species, see section starting on page 10.

* Very uncommon and/or in decline

Appendix E - Bird Species of Greatest Conservation Need Found in M-NCPPC Montgomery Parks

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)										COMMENTS
						POTOMAC RIVER OVER-WASH SAVANNAH	RIVERSIDE OUTCROPS OF THE POTOMAC BASIN	MIXED FOREST ON SERPENTINE BEDROCK	MIXED FOREST ON TRIASSIC SHALE BEDROCK	MIXED FOREST ON DIABASE BEDROCK	DRY FOREST ON ACIDIC BEDROCK	MESIC FOREST ON ACIDIC BEDROCK	CENTRAL MD FLOODPLAIN FOREST	CENTRAL MD SWAMP FOREST	COASTAL PLAIN FOREST COMPLEX	
American black duck	<i>Anas rubripes</i>	I	S4B, S5N		G5							X			tidal marshes, Rivers, lakes	
Northern bobwhite*	<i>Colinus virginianus</i>		S5		G5	X	X	X	X	X	X	X		X	Meadow, old field w/shrubs	
Great blue heron	<i>Ardea herodias</i>		S4B, S3S4N		G5	X				X	X	X	X		Ponds, lakes, rivers, streams	
Black-crowned night-heron*	<i>Nycticorax nycticorax</i>		S3B, S2N		G5						X	X	X	X	Tidewater wetlands, streams	
Yellow-crowned night-heron*	<i>Nyctanassa violacea</i>										X	X	X	X	Tidewater wetlands, streams	
Red-shouldered Hawk	<i>Buteo lineatus</i>		S4S5B, S4N		G5	X		X	X		X	X	X	X	lowland forest, field	
Broad-winged hawk*	<i>Buteo platypterus</i>		S4B		G5			X	X	X	X	X	X	X	Forest interior- and edges	
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	S2S3B, S3N	T	G4					X	X	X	X	X	near large lakes, rivers, bays	
King rail*	<i>Rallus elegans</i>		S3S4B, S2N		G4G5								X	X	Fresh and brackish marshes	
American woodcock	<i>Scolopax minor</i>		S4B, S4N		G5			X		X	X	X	X	X	fields, woods and shrub swamps	
Black-billed cuckoo*	<i>Coccyzus erythrophthalmus</i>		S4B, S4N		G5			X	X	X	X	X	X	X	Large, open, maturing woodlands	
Barn owl	<i>Tyto alba</i>		S3		G5	X		X	X	X	X	X	X	X	Grasslands, forest edge, Marshes	
Barred owl	<i>Strix varia</i>		S5		G5	X		X	X		X	X	X	X	Mature woods, moist habitats	

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)										COMMENTS
						POTOMAC RIVER OVER-WASH SAVANNAH	RIVERSIDE OUTCROPS OF THE POTOMAC BASIN	MIXED FOREST ON SERPENTINE BEDROCK	MIXED FOREST ON TRIASSIC SHALE BEDROCK	MIXED FOREST ON DIABASE BEDROCK	DRY FOREST ON ACIDIC BEDROCK	MESIC FOREST ON ACIDIC BEDROCK	CENTRAL MD FLOODPLAIN FOREST	CENTRAL MD SWAMP FOREST	COASTAL PLAIN FOREST COMPLEX	
Chuck-will's-widow*	<i>Caprimulgus carolinensis</i>		S4B, S4N		G5						X		X	X	X	Woods near open habitat, tidewater
Common Nighthawk*	<i>Chordeiles minor</i>		S3S4B		G5			X	X	X	X	X		X		open habitats, city roofs
Whip-poor-will*	<i>Caprimulgus vociferus</i>		S3S4B		G5			X	X	X	X			X		mature woods near fields, uplands
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>		S4		G5			X	X	X		X	X	X	X	Open woods, edges, w/large dead trees
Hairy woodpecker	<i>Picooides villosus</i>		S5		G5						X	X	X	X	X	FID**, deciduous forest
Pileated woodpecker	<i>Dryocopus pileatus</i>		S5		G5			X	X	X		X	X	X	X	FID**, mature forest
Willow flycatcher	<i>Empidonax traillii</i>		S4B		G5	X							X	X	X	Moist old fields, shrubs, willows
Acadian flycatcher	<i>Empidonax virescens</i>		SB5		G5			X	X	X		X	X	X	X	FID**, forest w/lush understory, near water
Yellow-throated vireo	<i>Vireo flavifrons</i>		S4S5B		G5					X		X	X	X	X	FID**, forest near clearing or water
Red-eyed vireo	<i>Vireo olivaceus</i>		S5B		G5			X	X	X	X	X	X	X	X	FID**, mixed, mature hardwood forest
Common raven	<i>Corvus corax</i>		S2		G5		X	X	X	X	X					Cliffs, forests, mostly high elevations
Brown creeper*	<i>Certhia americana</i>		S4		G5		X	X	X	X	X	X	X	X	X	Forest, nests under loose bark. FID**
Sedge wren*	<i>Cistothorus platensis</i>		S1B		G5							X	X	X	X	Marshes, wet meadow, sedge meadow
Veery	<i>Catharus fuscescens</i>		S4B		G5							X	X	X		FID**, Ravines w/mature forest, dense shrubs
Wood thrush	<i>Catharus mustelinus</i>		S5B		G5			X	X	X		X	X	X	X	FID**, mature deciduous forest, low tree density

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)										COMMENTS
						POTOMAC RIVER OVER-WASH SAVANNAH	RIVERSIDE OUTCROPS OF THE POTOMAC BASIN	MIXED FOREST ON SERPENTINE BEDROCK	MIXED FOREST ON TRIASSIC SHALE BEDROCK	MIXED FOREST ON DIABASE BEDROCK	DRY FOREST ON ACIDIC BEDROCK	MESIC FOREST ON ACIDIC BEDROCK	CENTRAL MD FLOODPLAIN FOREST	CENTRAL MD SWAMP FOREST	COASTAL PLAIN FOREST COMPLEX	
Brown thrasher	<i>Toxostoma rufum</i>		S5B, S2N		G5	X		X	X	X	X	X	X	X	Hedgerows, thickets, forest edge	
Blue-winged warbler	<i>Vermivora pinus</i>		S4B		G5	X			X		X	X	X	X	Moist, shrubby, young forest growth	
Northern parula	<i>Parula americana</i>		S4S5B		G5				X		X	X	X	X	Moist, extensive forests - FID**	
Prairie warbler	<i>Dendroica discolor</i>		S4B		G5	X		X	X	X	X			X	Brushy, regenerating forest, old orchards	
Cerulean warbler*	<i>Dendroica cerulea</i>		S3S4B		G4				X		X	X	X	X	FID**, mature, deciduous forest along streams	
Black-and-white warbler	<i>Mniotilta varia</i>		S4B		G5			X	X	X	X	X	X	X	FID**, young to mature deciduous/mixed forest	
American redstart	<i>Setophaga ruticilla</i>		S4B		G5			X	X	X	X	X	X	X	FID**, prefers dense understory	
Prothonotary Warbler	<i>Protonotaria citrea</i>		S4B		G5							X	X	X	FID**, requires standing water & tree cavities	
Worm-eating warbler	<i>Helmitheros vermivorus</i>		S4B		G5				X		X			X	FID**, prefers steep hillsides & ravines	
Ovenbird	<i>Seiurus aurocapillus</i>		S5B		G5			X	X	X	X	X		X	FID**, tall trees, deciduous understory	
Louisiana waterthrush	<i>Seiurus motacilla</i>		S5B		G5							X	X	X	FID**, along streams	
Kentucky warbler	<i>Oporornis formosus</i>		S4B		G5			X	X	X	X	X	X	X	FID**, prefers dense shrub layer	
Hooded warbler	<i>Wilsonia citrina</i>		S4S5B		G5				X		X	X	X	X	FID**, w/ dense shrub layer, moist	
Summer tanager*	<i>Piranga rubra</i>		S4B		G5			X	X	X	X			X	Dry, open pine/oak forest	
Scarlet tanager	<i>Piranga olivacea</i>		S5B		G5			X	X	X	X	X	X	X	FID**, prefers tall trees, especially oaks	

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FED STATUS	GLOBAL RANK	Major Terrestrial Habitat Types (Note 1)										COMMENTS
						POTOMAC RIVER OVER-WASH SAVANNAH	RIVERSIDE OUTCROPS OF THE POTOMAC BASIN	MIXED FOREST ON SERPENTINE BEDROCK	MIXED FOREST ON TRIASSIC SHALE BEDROCK	MIXED FOREST ON DIABASE BEDROCK	DRY FOREST ON ACIDIC BEDROCK	MESIC FOREST ON ACIDIC BEDROCK	CENTRAL MD FLOODPLAIN FOREST	CENTRAL MD SWAMP FOREST	COASTAL PLAIN FOREST COMPLEX	
Eastern towhee	<i>Pipilo erythrophthalmus</i>		S5B, S4N		G5	X		X	X	X	X	X	X	X	Open woodlands, edges, shrubs	
Field sparrow	<i>Spizella pusilla</i>		S5B, S4N		G5	X		X	X	X	X	X	X	X	Weedy fields w/scattered shrubs/small trees	
Vesper sparrow*	<i>Pooecetes gramineus</i>		S3S4B, S2N		G5	X		X	X	X	X	X	X	X	Large, short-growth, sparsely vegetated fields	
Savannah sparrow*	<i>Passerculus sandwichensis</i>		S3S4B, S4N		G5			X	X	X	X	X	X	X	Grasslands, meadows, marshes, grassy dunes	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>		S4B		G5			X	X	X	X	X	X	X	Grasslands, meadows, w/low, sparse growth	
Dickcissel*	<i>Spiza americana</i>		S2B		G5			X	X	X	X	X	X	X	Grasslands, meadows w/tall dense growth	
Eastern meadowlark	<i>Sturnella magna</i>		S5B, S3N		G5			X	X	X	X	X	X	X	Grasslands, meadows	

Note 1: For description of underlying bedrock, soils, and major plant species, see section starting on page 10.

* Very uncommon (except during migration for some birds), and/or in decline

**FID - Forest interior Dwelling species - requires large tracts of forest (>50 acres)

Appendix F - Amphibian and Reptile Species of Greatest Conservation Need Found in M-NCPPC Montgomery Parks

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FEDERAL STATUS	GLOBAL RANK	MESIC FOREST	Major Terrestrial Habitat Types (Note 1)									COMMENTS	
							FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE	OVER-WASH SAVANNAH	COASTAL PLAIN FOREST		
Jefferson salamander	<i>Ambystoma jeffersonianum</i>		S3		G4	X	X		X	X				X			Damp, shady deciduous or mixed woods, bottomlands, wetlands. Seasonal pool breeder.
Northern red salamander	<i>Pseudotriton r. ruber</i>		S5		G5	X	X		X								Meadow and woodland streams, springs, wetlands. Aquatic breeder.
Eastern mud salamander (+)	<i>Pseudotriton m. montanus</i>		S2?		G5	X	X		X						X		Muddy areas near springs and seeps.
Long-tailed salamander	<i>Eurycea longicauda</i>		S5		G5	X	X	X	X	X					X		Rocky streams and seeps in moist forested areas.
Eastern spadefoot (+)	<i>Scaphiopus holbrooki</i>		S4		G5		X	X									Dry sandy or loose soils, sparse shrubs or open forest. Seasonal pool breeder.
Eastern box turtle	<i>Terrapene c. carolina</i>		S5		G5	X	X	X	X	X				X		X	Woodlands, field edges, thickets, bogs, stream banks. Prefers ecotones with sandy soils.
Spotted turtle	<i>Clemmys guttata</i>		S5		G5	X	X		X							X	Woodland streams, wet meadows and other wetlands. Prefers unpolluted shallow water.
Wood turtle	<i>Glyptemys insculpta</i>		S4		G4	X	X										Slow moving meandering streams with shallow water. Prefers wooded river banks.
Northern red-bellied cooter	<i>Pseudemys rubiventris</i>		S5		G5		X										Ponds, lakes, streams. Prefers larger bodies of water.

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FEDERAL STATUS	GLOBAL RANK	MESIC FOREST	Major Terrestrial Habitat Types (Note 1)								COMMENTS	
							FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE	OVER-WASH SAVANNAH		COASTAL PLAIN FOREST
Broad-headed skink	<i>Plestiodon laticeps</i>		S4		G5	X	X	X		X	X	X	X			Arboreal. Large, open pine and mixed forests.
Queen snake	<i>Regina septemvivatta</i>		S5		G5		X		X					X	X	Edges of small, clear streams and ponds in forested areas.
Common ribbonsnake	<i>Thamnophis s. sauritis</i>		S5		G5	X	X	X	X	X		X		X	X	Semi-aquatic. Prefers brushy vegetation at water's edge
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>		S5		G5			X		X	X		X			Sandy soils in open woodlands.
Rainbow snake(+)	<i>Faranicia e. erythrogramma</i>	E	S1		G5		X	X	X							Highly aquatic, but uses forested flooplains with sandy soils.
Red cornsnake	<i>Pantherophis guttatus</i>		S4		G5	X	X	X		X	X	X	X			Terrestrial and fossorial. Open hardwood forests or grassy areas adjacent to woodlands.
Northern scarletsnake	<i>Cemophora coccinea copei</i>		S3		G5	X	X	X				X	X			Fossorial. Loose, well-drained soils in pine forests.

Note 1: For description of underlying bedrock, soils, and major plant species, see section starting on page 10.

(+) Unconfirmed/uncertain in Montgomery County

**Appendix G - Fish Species of Greatest Conservation Need Found in M-NCPPC
Montgomery Parks**

COMMON NAME	SCIENTIFIC NAME	STATE STATUS	STATE RANK	FEDERAL STATUS	Major Terrestrial Habitat Types (Note 1)										COMMENTS	
					MESIC FOREST	FLOODPLAIN FOREST	DRY FOREST	SWAMP FOREST	FOREST ON DIABASE	RIVERSIDE OUTCROPS	FOREST ON SHALE	FOREST ON SERPENTINE	OVER-WASH SAVANNAH	COASTAL PLAIN FOREST		MESIC FOREST
Comely shiner	<i>Notropis amoenus</i>	T	S2		G5	X	X	X	X	X			X		X	Slower reaches of warm, low-gradient streams and rivers over a variety of substrates.
Greenside darter	<i>Etheostoma blennoides</i>		S5		G5	X	X	X	X	X			X			Riffles and runs of cool to warm streams and rivers (western part of county).
Northern hogsucker	<i>Hypentelium nigricans</i>		S5		G5	X	X	X	X	X			X		X	Clean, cool to warm streams and rivers over hard substrates.
Rosyside dace	<i>Clinostomus funduloides</i>		S5		G5	X	X	X	X	X			X		X	Pools of low and high-gradient streams. Intolerant of siltation.
Shield darter	<i>Percina peltata</i>		S3		G5	X	X	X	X							Low to moderate gradient streams and rivers (Patuxent watershed). Intolerant of siltation.
Silverjaw minnow	<i>Ericymba buccata</i>		S4		G5	X	X	X	X	X			X		X	Shallow runs and pools in warm, low to moderate gradient streams and small rivers.

Note 1: For description of underlying bedrock soils, and major plant species, see section starting on page 10.

The MWDCP classifies all flowing waters in Montgomery County as piedmont streams or piedmont rivers. All six fish species are found in piedmont streams; all but rosyside dace are found in piedmont rivers. Assignment of fish to terrestrial habitats types indicates that they can be expected to be found in streams that flow through those habitat types.

Appendix H- Schedule for the production of Operation and Use Plans

Operation and Use Guidelines/Plans, 6 year work plan FY13 – FY18

FY12: Natural Resources Management Plan

FY13:

Best Natural Areas: Black Hill, Upper Paint Branch, McKnew
Biodiversity Areas: North Germantown, Great Seneca Creek, Oursler Road, Paint Branch,
Pope Farm
Down-county Stream Valleys: Sligo Creek (year 1 of 2)

FY14:

Best Natural Areas: Little Bennett, Hoyles Mill
Biodiversity Areas: Oak Ridge, Log Cabin, Watkins Road, Goshen, Great Seneca Creek
North, Dawsonville
Down-county Stream Valleys: Sligo Creek (year 2 of 2)

FY15:

Best Natural Areas: Rachel Carson, North Branch
Biodiversity Areas: Hawlings River, Western, Needwood North, Crabbs Branch, Lake Frank,
North Branch Valley
Down-county Stream Valleys: Rock Creek (year 1 of 2)

FY16:

Best Natural Areas: Blockhouse Point, Serpentine Barrens
Biodiversity Areas: Parklawn, Matthew Henson, Pooks Hill, Forest Glen, Query Mill, Quince
Orchard
Down-county Stream Valleys: Rock Creek (year 2 of 2)

FY17:

Best Natural Areas: Cabin John, Shale Barrens
Biodiversity Areas: Cabin John Campground, Buck Branch, Cabin John, Rock Run,
Dickerson, North Slope
Down-county Stream Valleys: Cabin John Creek (year 1 of 2)

FY18:

Best Natural Areas: Watts Branch, Northwest Branch
Biodiversity Areas: Bonifant, Bonifant Meadows, Randolph Meadows, Wheaton
Down-county Stream Valleys: Cabin John Creek (year 2 of 2)

