

Appendix

Existing Parkland Ownership

**Table A-1. Existing Parkland Ownership⁽¹⁾
in Upper Rock Creek Watershed**

| Owner | Acres | % of Parkland | % of Watershed |
|-----------------------|-------|---------------|----------------|
| M-NCPPC | 4,295 | 99.4 | 22.8 |
| Municipalities & HOAs | 25 | 0.6 | 0.2 |
| Total | 4,320 | 100 | 23 |

(1) GIS coverage of existing parkland, M-NCPPC 1997.

Environmentally Sensitive Areas

The sensitive areas mapped for purposes of this report were prepared with some limitations on both the information available and the level of effort associated with preparing the computer Geographic Information System (GIS) coverages. The sensitive areas mapped in Figure 15 and reported in Table 8 consist of a combination of several types of areas, many of which overlap (see Table 8). Sensitive areas are defined by the State Planning Act of 1992, which includes areas considered sensitive by the local government. For purposes of this report, wetlands and wetland buffers are added to the list defined by the legislation of 100-year floodplains, streams and their buffers, steep slopes, and habitats of rare, threatened, or endangered species. Since a comprehensive understanding of the locations of habitats of rare, threatened or endangered species is not mapped, this information was not included in the tables or maps.

The range of acreage and percentages used for stream buffers represent the highs and lows for buffer width applied consistently along the entire stream length. Slopes were not used directly to determine the buffer width as they would be when looking at individual sites. Steep slope acreages and percentages are based on a computerized analysis of the topography to determine areas with slopes greater than 25 percent. The wetlands coverage consists of information from the 1997 DNR wetlands identification project. The 100-year floodplain was mapped using two sources of information: 1) The M-NCPPC 1"=200' ultimate

land use floodplain maps of major tributaries, and 2) the 1995 *Soil Survey of Montgomery County* which contains information on floodplain soils. The M-NCPPC floodplain maps cover the mainstem and major tributaries and lakes in the upper Rock Creek watershed. They provide the best level of detail, and they were designed to account for full buildout based on 1977 zoning of the watershed. The soils maps are less accurate than the M-NCPPC floodplain maps, but they provide floodplain information on smaller tributary streams not covered by the M-NCPPC maps.

All these coverages were combined to obtain a single map of sensitive areas that incorporates stream buffers, steep slopes, the floodplain, wetlands, and wetland buffers as established in the *Environmental Guidelines*. The sensitive area coverage is approximate and only to be used for master planning purposes. Site specific planning and detailed design require more refined mapping and field investigation.

County-wide Stream Protection Strategy

Data Collection

The CSPPS incorporates stream water quality data collected by State and County agencies, as well as volunteers from the Audubon Naturalist Society, and representatives of the development community.

Management Categories

The CSPPS developed five categories that were based first on the existing stream quality and imperviousness combined with predominant land use. The special protection area and regular protection area were included as management approaches (along with a remedial protection approach) under a more general watershed protection category. Two management categories were added to deal with the special conditions in agricultural and urban areas. The categories in the CSPPS include:

Watershed Preservation Areas

- Stream condition is EXCELLENT.
- Projected land use is not expected to put

significant stress on resource and projected imperviousness is generally less than 10 percent of the subwatershed area.

- Areas are generally protected by very low density zoning or parkland.

Watershed Protection Areas

- Stream condition is EXCELLENT or GOOD
- Existing and/or planned land use results in development patterns with imperviousness above 10 percent and protection of the resources from development impacts is necessary.
- Different management levels are applied based on the level and type of protection deemed necessary to protect the resource:

Special level — Due to the sensitivity of the resource and the magnitude of change between existing and planned development, some level of enhanced watershed management is necessary beyond typical environmental guidelines and sediment control and stormwater permitting requirements.

Regular level — Standard existing protection measures are expected to adequately protect the resource from existing and/or projected land use. Development activity is not expected to significantly increase impervious area over what already exists and accompanying development review requirements and stormwater controls would provide adequate mitigation.

Remedial level — Stream condition is good or excellent but problems are observed, usually in the habitat condition, that are attributable to previous land use impacts. Habitat conditions may be on the verge of, or in the process of deteriorating, but stream biological integrity has not yet deteriorated to fair or poor conditions requiring more comprehensive restoration efforts. The remedial level may be used in conjunction with a special level of protection, where existing habitat problems exist and projected land uses are expected to increase imperviousness significantly. In these areas it is particularly important to address existing channel instability so that stream reaches will be able to withstand small incremental impacts associated with change in land use. The remedial level under Watershed Protection Areas differs from Watershed Restoration areas by being applied as limited spot improvements to areas with good or excellent stream condition. Watershed Restoration areas have fair or poor stream condition and require

more comprehensive restoration efforts.

Watershed Restoration Areas

- Stream condition FAIR or POOR.
- Contributing drainage generally has less than 55 percent ultimate impervious area.
- Significant areas of natural stream channel still exist.
- Most land abutting the stream is in conservation easements or public ownership.

Urban Watershed Management Areas

- Designation based on recognition that certain existing and planned land uses have a detrimental and unavoidable effect on subwatershed hydrology, stream habitat, water quality, and aquatic life that limits the potential for restoration.
- Stream condition is POOR.
- Land use generally consists of intense development (e.g. Central Business Districts, major commercial areas).
- Contributing drainage generally has 55 percent or greater ultimate impervious area and system presently does not support viable biological community.
- Significant portion of the drainage area is piped or channelized and habitat restoration is generally infeasible.

Agricultural Watershed Management Areas

- Stream condition is GOOD, FAIR, or POOR.
- Agriculture is the predominant land use.
- Some level of impairment is reflected in the monitoring data, as indicated by a resource condition of good, fair, or poor. (Excellent agricultural subwatersheds would fall into the Watershed Preservation Area management category).
- The Montgomery Soil Conservation District would be the lead agency for developing management approaches and tools for Agricultural Watershed

Management Areas.

Existing Subwatershed Imperviousness

Existing imperviousness (see Figure 16) was obtained from the *County-wide Stream Protection Strategy*. The CSPS used the information from the County's geographic information system (GIS).

The GIS information represents conditions in the period 1993-1994 (different parts of the study area were photographed at different times, see Figure A-1). Land use conditions reflected by the planimetric data were assumed to closely represent present existing conditions. That is, available planimetric data were used to characterize existing conditions with respect to land uses and land cover.

GIS was used to measure all paved surfaces and building rooftops that are shown in the planimetric layers for each subwatershed. These layers include all features that are considered to be impervious surfaces except for sidewalks and driveways for single-family detached houses. (See below for the estimated impervious surface area attributable to sidewalks and residential driveways.)

In order to calculate the area of driveways not already accounted for, the building, road/street, and parking layers were evaluated and an approximate count obtained of the number of buildings (primarily residential single-family detached in subdivisions; rear yard structures assumed to be sheds and the like were not counted) for which a driveway existed but did not appear in the planimetric layer. This number was then multiplied by the average area for a driveway in each subwatershed, which was obtained from the required front-yard setback for the predominant residential zones within the watershed multiplied by an assumed width of 15 feet.

Sidewalks are a feature in the GIS data that are shown as lines and not as polygons. The area of sidewalks was determined by multiplying the length (taken from the planimetric layer) by an assumed width of 4 feet. In addition to the GIS layers for paved features (buildings, driveways, roads, streets and parking, cultural, and sidewalks) the impervious contribution of nonpaved land cover was calculated, based on the assumption that these surfaces also contribute to surface water runoff for some precipitation events. Remaining nonpaved land was categorized as either forested or nonforest-nonpaved. Nonforest-nonpaved land includes lawn, pasture, and crop fields and is referred to as meadow. Forest cover is assigned an imperviousness factor of one percent; nonforest green cover is assigned a factor of three percent. A one percent imperviousness factor for forest cover has been used in other studies that focus on land use imperviousness (Northern Virginia Planning District Commission, 1980;

Galli, 1983; CH2M Hill, 1982). For nonforested green cover, a wider range of imperviousness factors have been used (i.e., 0 to 7 percent). The CSPS uses three percent imperviousness factor for nonforested green cover because it is roughly the middle of the range of values that have been used in other studies and it reflects the greater benefits of forest cover compared to meadow or grass cover on streams.

Fish Species of Upper Rock Creek

The *County-wide Stream Protection Strategy* (MCDEP, 1997) lists fish collected in each watershed in Montgomery County that were identified during the monitoring program (see Table A-2). While this information is based on a limited number of samples, it indicates the diversity of species for each watershed. The information will be updated through the CSPS as additional data is collected. Consult the most current copy of the CSPS for updated information.

Table A-2. Fish Species Collected in the Upper Rock Creek Watershed⁽¹⁾

| Common | Scientific Name |
|---------------------|---------------------------------|
| Blacknose Dace | <i>Rhinichthys atratulus</i> |
| Bluegill Sunfish | <i>Lepomis macrochirus</i> |
| Bluntnose Minnow | <i>Pimephales notatus</i> |
| Brown Bullhead | <i>Ameiurus nebulosus</i> |
| Common Shiner | <i>Luxilus cornutus</i> |
| Creek Chub | <i>Semotilus atromaculatus</i> |
| Cutlips Minnow | <i>Exoglossum maxillingua</i> |
| Fallfish | <i>Semotilus corporalis</i> |
| Golden Shiner | <i>Notemigonus chrysoleucas</i> |
| Green Sunfish | <i>Lepomis cyanellus</i> |
| Largemouth Bass | <i>Micropterus salmoides</i> |
| Longnose Dace | <i>Rhinichthys cataractae</i> |
| Margined Madtom | <i>Noturus insignis</i> |
| Mottled Sculpin | <i>Cottus bairdi</i> |
| Northern Hogsucker | <i>Hypentelium nigricans</i> |
| Potomac Sculpin | <i>Cottus girardi</i> |
| Pumpkinseed Sunfish | <i>Lepomis gibbosus</i> |

| | |
|--------------------|--------------------------------|
| Redbreast Sunfish | <i>Lepomis auritus</i> |
| Rosyside Dace | <i>Clinostomus funduloides</i> |
| Satinfin Shiner | <i>Cyprenella analostanas</i> |
| Silverjaw Minnow | <i>Ericymba buccata</i> |
| Spotfin Shiner | <i>Cyprenella spilopteras</i> |
| Spottail Shiner | <i>Notropis hudsonius</i> |
| Swallowtail Shiner | <i>Notropis procne</i> |
| Tessellated Darter | <i>Etheostoma olmstedii</i> |
| White Sucker | <i>Catostomus commersoni</i> |
| Yellow Bullhead | <i>Ameiurus natalis</i> |

(1) Source: CSPS. February 1998.

Forest Inventory

Criteria for Classification

The forest types that were classified were deciduous forest, coniferous forest, mixed deciduous/coniferous forest, and successional forest. In addition, old field or pre-successional areas were identified.

Staff used the following criteria for development of the thematic layer:

- The minimum forest stand mapping unit will be 10,000 square feet, excluding obvious hedgerows, tree cover and neighborhood tree stands which do not constitute real forest resources.
- The boundaries between forest and non-forest areas should be accurate to within 50 feet at a scale of 1"=200'.
- The boundaries between different forest stands should be accurate to within 100 feet at a scale of 1"=200'.
- The forest resource layer should be 90% accurate, based upon a minimum of 20 ground truth areas. Ground truth areas will not be smaller than 2 acres. Ground truthing of classifications will occur at least 100 feet into the polygon. The 20 ground truth sites will consist of 4 samples within each of the 5 classification categories.
- Polygons shall be classified into five categories: deciduous forest, coniferous forest, mixed deciduous-coniferous forest, successional forest, and old fields.
- Deciduous forest areas will have a closed canopy and contain no more than 40 percent

coniferous trees.

- Coniferous forest areas will have a closed canopy and contain 60 percent or more coniferous trees.
- Mixed forest areas will have a closed canopy and contain from 40-60 percent coniferous trees.
- Successional forest areas will be areas with a minimum of 100 trees per acre with at least 50 percent of those trees having a diameter at breast height (DBH) of 2 inches or greater, but lacking a closed canopy. Areas of mixed old field and successional forest are included in the successional forest category.
- Old field areas will be areas which are succeeding toward forest but which do not meet the definition of forest listed above in the successional category definition.

Methodology

Existing forest resource boundaries were determined using 1992 panchromatic and color infrared digital orthophotos from M-NCPPC GIS coverage, and field verification. In the first step of the analysis, both black and white and color infrared photos covering the entire analysis area were printed. Visual comparison and analysis of the prints were performed to determine where similarities in photo signatures existed between forest stands throughout the study area. Field sampling points were then chosen to cover the various areas (3-5 samples in each area).

M-NCPPC staff went to each of the designated field sampling points and collected data on the forest resources. Site characteristics such as forest type (e.g., deciduous, coniferous, mixed, etc.), species of vegetation (both trees and understory shrubs and herbaceous plants), dominant size class of forest in diameter at breast height (DBH), character of the area (e.g., upland, bottomland, etc.), and overall quality as reflected by vegetation condition and presence of alien/invasive vegetation were recorded on data sheets.

In the next step of the analysis, the black and white aerial photos were overlaid with the tree line layer of the M-NCPPC planimetrics and printed at 1"=200' scale. Forest boundaries were drawn on the prints based upon staff interpretation of these photos with cross checking of the color infrared photos. Data collected during the field survey and contained in Natural Resources Inventory/Forest Stand Delineation (NRI/FSD) reports for a limited number of tracts within the analysis area were used to provide information for the supervised classification of forest types. Forest boundaries were corrected to 1998 conditions using the clearing limits reflected on approved Forest Conservation Plans (FCP) for the area. Finally, additional field checking was conducted to verify the condition of questionable areas.

In the last step of the analysis, the forest boundaries were digitized from the 1"=200' photos to produce a GIS forest resources thematic layer. The digitizing was conducted by Towson State University and checked for accuracy by M-NCPPC staff.

Determination of Significant Forest Blocks

Identification of significant forest blocks in the upper Rock Creek watershed is based on criteria established by the Chesapeake Bay Critical Area Commission (1986). These criteria were developed in response to concerns about the declining populations of many native breeding birds which are associated with large, relatively undisturbed blocks of mature forest. The Chesapeake Bay Critical Area Commission's report suggests that upland forest blocks of 100 acres or more and riparian (streamside) forests which are 300 feet wide or wider may serve as habitat for forest interior dwelling birds. The report goes on to note that these criteria should serve as a general guideline; forest interior birds may be found in some smaller forest areas.

Based on these recommendations, staff measured forest blocks and riparian corridors on the GIS forest layer created for the Upper Rock Creek Environmental Inventory. Upland blocks in excess of 100 acres and riparian corridors 300 feet wide or more were delineated and identified as "significant forest blocks." These areas have the greatest potential to provide habitat for forest interior bird species.

Confirmation that these areas are serving as forest interior areas for birds can only be accomplished by conducting breeding bird surveys. The Chesapeake Bay Critical Area Commission suggests that breeding bird surveys, which identify at least four forest interior bird species or at least one sensitive species as "probable" or "confirmed" breeders in a given forest area, should confirm that area as a forest interior (see Table A-3). Breeding status is determined according to the criteria set forth by the Maryland Ornithological Society.

Forest Interior Dwelling Bird Species Table A-3

| Common Name | Scientific Name |
|--------------------------|--------------------------------|
| Flycatcher, Acadian | <i>Empidonax vireescens</i> |
| *Hawk, red-shouldered | <i>Buteo lineatus</i> |
| Ovenbird | <i>Seiurus aurocapillus</i> |
| *Owl, barred | <i>Strix varia</i> |
| Parula, northern | <i>Parula americana</i> |
| *Redstart, American | <i>Setophaga ruticilla</i> |
| Tanager, scarlet | <i>Piranga olivacea</i> |
| Vireo, red-eyed | <i>Vireo olivacea</i> |
| Vireo, yellow-throated | <i>Vireo flavifrons</i> |
| Warbler, black-and-white | <i>Mniotilta varia</i> |
| *Warbler, hooded | <i>Wilsonia citrina</i> |
| *Warbler, Kentucky | <i>Oporornis formosus</i> |
| Warbler, prothonotary | <i>Prothonotaria citrea</i> |
| *Warbler, Swainson's | <i>Limnithlypis swainsonii</i> |
| *Warbler, worm-eating | <i>Helminthos vermivorus</i> |
| *Waterthrush, Louisiana | <i>Seiurus motacilla</i> |
| Whip-poor-will | <i>Caprimulgus vociferus</i> |
| Woodpecker, hairy | <i>Picoides villosus</i> |
| Woodpecker, pileated | <i>Dryocopus pileatus</i> |

* Denotes species especially sensitive to disturbance

Sources: Chesapeake Bay Critical Area Commission (1986). A Guide to the Conservation of Forest Interior Dwelling Birds in the Critical Area. Guidance Paper No. 1; 15pp. Maryland Ornithological Society. 1982.

Maryland and D.C. Breeding Bird Atlas Project Handbook, 1983-1987. Supplement to Maryland Birdlife, Vol. 38, 1982; 20pp.

Wetland Assessment Groups (WAGs) Upper Rock Creek Mainstem

URC-1: Left fork of the Rock Creek mainstem from east of Cliff Pine Drive north to Dorsey Road.

Medium functional value. **This WAG contains Priority wetlands.** This Wetland Assessment Group incorporates several wetland areas which form the headwaters of the left fork of the Rock Creek mainstem. Wetlands here include old farm ponds, emergent wetlands, and forested wetlands. Some open areas are formerly farmed.

One wetland containing scrub-shrub, emergent and old pond areas occurs north of Fieldcrest Road and east of Belle Chase Drive. This wetland remains very wet, even during drought periods. The vegetative community is somewhat compromised by an abundance of the alien invasive mile-a-minute weed (*Polygonum perfoliatum*).

A large beaver pond exists south of Fieldcrest Road and west of Falling Spring Court. The pond is surrounded by red maples (*Acer rubrum*), black willows (*Salix nigra*),

American sycamores (*Platanus occidentalis*), and ironwood (*Carpinus caroliniana*), with arrowhead (*Sagittaria latifolia*), false nettle (*Boehmeria cylindrica*), skunk cabbage (*Symplocarpus foetidus*), and polygonums growing in the herb layer. This area is designated a **Priority Wetland** by staff based on the large amount of standing water providing outstanding wildlife and aquatic habitat.

Red maple dominated wetlands bracket an old farm pond on a tributary south of Pompano Terrace. Another forested wetland area exists at the confluence of this tributary with the Rock Creek mainstem.

Perhaps the most interesting wetland in this WAG occurs along the right fork of the Rock Creek mainstem south of Fieldcrest Road, east of Falling Spring Court and west of Stream Valley Way: This area contains a large red maple swamp in the headwaters of Rock Creek. There are areas of standing water and extensive skunk cabbage growth. Of special note here: a number of specimens of swamp or sweetbay magnolia (*Magnolia virginiana*). The only other known locations of sweetbay magnolia in Montgomery County occur near the eastern County boundary with Prince George's County, where the transition occurs between the Piedmont and Coastal Plain physiographic provinces. This wetland is designated a **Priority Wetland** by staff based on the presence of the sweetbay magnolia.

Most of this WAG is on Montgomery County park property.

URC - 2: MD 108 southwest to Rock Creek mainstem west of Rolling Road.

Low functional value. This section drains mostly grass and pasture areas associated with some small-scale farming activities, large-lot subdivisions and older parcels with detached homes. Wetlands exist in wet meadows and scrub-shrub areas adjacent to streams. There are also some small stands of forest, mostly associated with the stream valley. Forested wetlands tend to be young red maple woods with understory of honeysuckle (*Lonicera japonica* - an alien invasive plant), spicebush (*Lindera benzoin*), Virginia creeper (*Parthenocissus quinquefolia*), and *Viburnum* species. Some small emergent wetlands, fed by spring seeps, exist adjacent to the stream channel, and contain jewelweed (*Impatiens capensis*), New York ironweed (*Vernonia noveboracensis*), small willows, arrowhead, and arrow-leaved tearthumb (*Polygonum sagittatum*).

Some areas have been disturbed by agricultural activities and dumping of leaves, branches, and lawn clippings, and have been degraded by the introduction of alien invasive plant species including mile-a-minute weed, multiflora rose (*Rosa multiflora*), and Vietnamese stiltgrass (*Microstegium vimineum*). Some significant channel erosion has occurred.

Portions of this WAG are on Montgomery County park property.

URC - 3: Rock Creek mainstem from east of Cliff Pine Drive south to confluence with Airpark Road Branch at Agricultural History Farm Park.

Medium functional value. This Wetland Assessment Group contains patches of wetland embedded in a floodplain community matrix. Wetland areas include seeps and vernal pools.

Wetland types represented within this WAG include red maple swamps, containing red maple, pin oak (*Quercus palustris*) and green ash (*Fraxinus pennsylvanica*) in the canopy layer with skunk cabbage typical in the herb layer. Spicebush and ironwood are frequent components of the understory.

Patches of scrub-shrub and emergent wetlands also occur within the WAG. Scrub-shrub areas may contain black willow, alder (*Alnus serrulata*), and buttonbush (*Cephalanthus occidentalis*). Emergent species include sedges (*Carex spp.*) including tussock sedge (*Carex stricta*) and rushes (*Juncus spp.*).

Wetlands along the upper Rock Creek mainstem are largely within Montgomery County park boundaries; wetlands along tributary streams are largely on private property.

URC - 4: Airpark Road Branch, including tributary streams.

Medium functional value. This WAG includes a young red maple forest with a mix of wetlands and upland areas (pockets of uplands and wetlands). Trees also include black walnut (*Juglans nigra*), tulip poplar (*Liriodendron tulipifera*), and willows. Skunk cabbage, water plantain (*Alisma subcordatum*), monkeyflower (*Mimulus ringens*), Vietnamese stiltgrass (alien invasive plant), Virginia Creeper, spicebush, jewelweed, mile-a-minute weed (alien invasive plant) and occasional cardinal flowers (*Lobelia cardinalis*) occur beneath the red maple canopy.

Most of this WAG is on Montgomery County park property. Exceptions are wetlands in the headwaters and along tributary streams.

URC - 5: Confluence with Airpark Road Branch at Agricultural History Farm south to Muncaster Road, including Pope Farm trib.

Medium functional value. **This WAG contains a Priority Wetland area.** The DOQQ shows a large broad wetland at confluence of two streams, but field work

indicates that wetlands here are patchy. The forest is mostly tulip poplar, red maple, green ash, dogwood (*Cornus spp.*), and black walnut, with an understory of spicebush and multiflora rose and a herb layer containing Vietnamese stiltgrass, mile-a-minute weed, dodder (*Cuscuta gronovii*), and false nettle. There are very small, occasional pockets of skunk cabbage near the stream channel (localized seeps).

At the Pope Farm, southwest of Airpark Road: This emergent wetland is recommended as a biodiversity area by biologists from the Maryland Department of Natural Resources Heritage and Biodiversity Conservation Program. Of special interest here is the presence of a population of small bedstraw (*Gallium trifidum*). This is the only known population of this plant within the State of Maryland; the species was once thought to have been extirpated from the State. For this reason, staff has designated this a **Priority Wetland**.

Other plant species occurring here include various sedges, rushes, cattails, and grasses. A small patch of smooth alder is found along the western edge of the wetland. Species of goldenrod (*Solidago spp.*), asters (*Aster spp.*) and cardinal flower are evident later in the summer. Cinnamon fern (*Osmunda cinnamomea*) and swamp milkweed (*Asclepias incarnata*) occur along the eastern edge. A small red maple swamp occurs just east of the emergent wetland. Skunk cabbage grows within a seep area under the red maples. The remains of an old farm pond help trap some moisture as well.

Portions of this WAG are on Montgomery County park property.

URC - 6 : Muncaster Road south to Muncaster Mill Road.

High functional value. Priority wetland. Wetlands in this Wetland Assessment Group are extensive and many are of fairly high quality. Heading south along the mainstem from Muncaster Road, a large system of forested wetlands occur, dominated by red maple swamps with skunk cabbage covering the forest floor. There are many pockets of standing water in the early spring. The vegetational community is somewhat degraded by the presence of the alien invasive multiflora rose. A large scrub-shrub/emergent wetland occurs on the west side of the stream valley south of Muncaster Road and east of Hollingsworth Drive. Vegetational components of this wetland include cattails (*Typhus spp.*), cinnamon fern, sedges, rushes, swamp rose (*Rosa palustris*), black willow, dogwood, and buttonbush.

Another extensive area of forested wetland occurs in the stream valley just north of Redland Middle School. Red maple, green ash, and pin oak dominate in the canopy layer. This area features many seeps and large areas of skunk

cabbage in a floodplain dissected by small stream channels and swales. A small scrub-shrub wetland occurs in the midst of the forested wetlands. This area was very wet when visited in the early spring.

A third large area of forested wetland occurs in the floodplain just west of the mainstem and north of Muncaster Mill Road. **This WAG is designated a Priority Wetland based on its high functional assessment score.**

Wetlands associated with the mainstem are on Montgomery County park property; wetlands along minor tributaries are largely on private property.

URC - 7 : Muncaster Mill Road south to Lake Needwood.

Medium functional value. This Wetland Assessment Group contains forested wetlands in the floodplain of the Rock Creek mainstem above Lake Needwood. Dominant tree species include red maple and tulip poplar, with ironwood and dogwood in the understory and skunk cabbage on the ground. Vernal pools are present, some contained in old stream oxbows now cut off by stream channelization. A small area of emergent wetland exists around the northern perimeter of the lake. Dominant species here include sedges, rushes, and grasses.

This WAG is on Montgomery County park property.

Mill Creek

MC - 1 : X Ridge Road w/ Oakmont Ave. east to Shady Grove Road.

Low functional value. The forested wetlands in this Wetland Assessment Group are largely confined to the stream channel. Tulip poplar is the dominant canopy tree, with skunk cabbage growing along the stream channel. The wetland is fragmented by a sewer line and by farm roads. One emergent wetland area occurs adjacent to I-370. The emergent area contains species of rushes and sedges, along with sensitive fern (*Onoclea sensibilis*), swamp milkweed, and black willow.

This WAG is on private property.

MC - 2 : MD 124 east to Shady Grove Road, north of MC - 1.

Low functional value. This Wetland Assessment Group contains several disjunct wetland areas of variable size and quality. The large headwater area in the Washington Grove community occupies a forested tract of roughly 50 acres. Within the tract are patches of wetland which tend to follow the drainage channel flowing north and east out of the community. Red maples, pin oaks, and tulip poplars

dominate the canopy in the wetland areas, with spicebush and jewelweed occupying the lower layers. Adjacent uplands are dominated by oak species with spicebush and Virginia creeper common elements of the shrub and herb layers. Farther east, several narrow forested wetland areas occupy the stream channel. Tree species in these wetlands include black willows, American sycamores, red maples, and tulip poplars.

Portions of this WAG occur on Montgomery County park property.

MC - 3 : Shady Grove Road east to Lake Needwood.

Medium functional value. **This WAG contains a Priority Wetland.** Areas near the stream channel between Redland Road and Lake Needwood are dominated by a tulip poplar - hickory - oak forest association with some box elder (*Acer negundo*) and scattered large sycamores along the stream channel. Upland areas adjacent to this WAG have been recommended as a biodiversity area by the Maryland Department of Natural Resources Heritage and Biodiversity Conservation program. Several large vernal pools occur in the floodplain north of the stream. This vernal pool complex is among the most productive observed by staff in Montgomery County, containing numerous egg masses from several amphibian species, including wood frogs, green frogs, and spotted salamanders. Because of the high value of these vernal pools, staff is recommending designation of this portion of the WAG as a **Priority Wetland**.

Upstream from Redland Road are forested wetlands with skunk cabbage, red maple, green ash and tulip poplar. These are located on the northern side of Mill Creek. On the southern side lawns extend almost up to the edge of the stream.

This WAG is largely on Montgomery County park property.

North Branch

NB - 1: Headwaters of North Branch mainstem from the intersection of Brookeville Road w/ Zion Road south to beginning of third-order stream section east of Artesian Drive.

High functional value. Priority Wetland. Not far from Muncaster Road is an area of seeps with a red maple and pin oak dominated canopy. Proceeding east, the wetland becomes larger with vernal pools and seeps and eventually forms a small channel, with water plantain growing in the stream channel. Downstream the stream channel becomes rocky and the forest is more mature. There are a few large seeps along the stream and scattered vernal pools. At the end of this WAG the forest area

narrows and a large wet meadow exists, with 2-3 feet of mucky, saturated soils and false nettle (*Boehmeria cylindrica*), sedges, rushes, arrow-leaved and halberd-leaved tearthumb (*Polygonum arifolium*), agrimony (*Agrimonia spp.*) and deer tongue (*Panicum spp.*). Near the stream channel is black willow, alder, and swamp rose. Flow from the stream appears to spread out through the wet meadow and maintain a seasonally/permanently saturated condition.

Along the eastern fork of the North Branch west of Rt. 108 is an emergent wetland bisected by a small stream. Plants surveyed included rushes, sedges, peppermint (*Mentha piperita*), swamp milkweed, umbrella sedge and softstem bulrush (*Scirpus validus*).

Farther west the wetland narrows and then widens again into a large emergent/scrub-shrub wetland with steeplebush (*Spirea tomentosa*), fern species, rushes, arrowhead, swamp rose, skunk cabbage, jewelweed, and arrowwood (*Viburnum dentatum*). There is standing water in several areas. Adjacent to the meadow/scrub-shrub swamp is a forested wetland dominated by red maple, skunk cabbage and Vietnamese stiltgrass. The forested wetland is drained by a first order stream which originates in a farm pond. The channel of this stream is degraded and there is almost no herbaceous cover in this area because of heavy use by cattle.

At the edge of the forested wetland there is a power line which crosses perpendicular to the mainstem. The area opens up to a meadow and cornfield. There is a narrow tree line along the stream dominated by pin oak, willow and red maple. A wet meadow extends on both sides of the stream with rushes and sedges. This area is contiguous with the wet meadow near the confluence with the mainstem of the North Branch.

The surrounding land use in this section of NB-1 is agricultural with corn fields, cow pasture and meadow. There is no evidence of flooding in this part of the wetland group.

Along the middle tributary of the North Branch mainstem from Mt. Zion Park to the powerline: the headwater channel originates just to the south of the eastern end of the park road (just before the eastern pad of parking spaces). In the electric transmission line right-of-way adjacent to parkland is a wet meadow with some shrubs. Plant species present included umbrella sedge (*Cyperus strigosus*), wool grass (*Scirpus cyperinus*), seedbox (*Ludwigia alternifolia*), blue vervain (*Verbena hastata*), smooth arrowwood (*Viburnum recognitum*), ironweed, jewelweed, softstem bulrush, sensitive fern, and rose species. A portion of this WAG occurs within the boundaries of an area recognized as important to the County's biological diversity by the Maryland Department of Natural Resources Heritage and Biodiversity

Conservation Program.

This WAG is designated a Priority Wetland based on its high functional assessment score.

Portions of this WAG are on Montgomery County park property; large portions, however, are on private property.

NB - 2: North Branch mainstem from beginning of third-order stream section east of Artesian Drive south to Bowie Mill Road.

High functional value. Priority Wetland. Downstream from Rio Vista Drive are forested wetland areas with braided stream channels and abandoned oxbows located parallel to the mainstem. Standing water exists in some areas. In other areas, springs form small first order streams which flow into the mainstem. Vegetation includes arrowwood, northern red oak (*Quercus rubra*), black gum (*Nyssa sylvatica*), spicebush and red maple. The herbaceous layer includes skunk cabbage, wild yam (*Dioscorea villosa*), club mosses (*Lycopodium spp.*) and fern species.

North of Bowie Mill Road a perched water table feeds a forested wetland with several first-order streams flowing into the mainstem. Standing water occurs in several areas. Vegetation includes skunk cabbage, halberd-leaved tearthumb, willow, sycamore, red maple. Further upstream on the east side of the mainstem is a forested wetland with skunk cabbage occupying the herb layer. On the west side of the stream at the toe of the hill slope is another forested wetland with saturated soils and an herb layer dominated by skunk cabbage. Proceeding north along the right side of the channel are scattered areas of bare soil where standing water has been present. At the confluence with the tributary to the east the stream channel has several large meanders. At this point is a very large skunk cabbage dominated wetland with several inches of standing water in places. **This WAG is designated a Priority Wetland based on its high functional assessment score.**

Most of this WAG is on Montgomery County park property, with the exception of wetlands along the upper Granby Woods tributary.

NB - 3: North Branch mainstem from MD 108 west of Luray Court southwest to confluence with North Branch mainstem.

Medium functional value. Upstream from Wickham Road across the power line right-of-way is a scrub-shrub/emergent wetland on both sides of stream. Much of this area is in pasture or meadow - the site was formerly a horse farm. About 1000 feet upstream the area transitions to a forested wetland with a predominance of red maples. Farther upstream are several wet meadows with springs

draining into the creek on both sides of the stream. Species include *Polygonum* sp. (smartweed, arrow-leaved tearthumb), sedges, small-headed beak-rush (*Rhynchospora capitellata*), fox sedge (*Carex vulpinoidea*), ferns. Small intermittent streams flow out of wet meadows on the northern side, near a graded area.

The upper part of this WAG is forested with fairly continuous wetlands on both sides. Red maple dominates with some tulip poplar in drier spots. There are several inches of standing water with Vietnamese stiltgrass, jewelweed, sedges and rushes, New York fern (*Thelypteris noveboracensis*), and swamp rose. Seeps are scattered throughout.

Headwaters of this tributary to the North Branch originate from two depressional areas with springs and seeps. The flow from these two areas eventually forms a small channel.

Downstream (west) of Wickham Road, along a small tributary to the North Branch of Rock Creek, an area several hundred feet wide of forest and meadow has been preserved next to the stream and adjacent wetlands. Except for the first hundred feet, most of the area on the north side of this tributary is forested wetland, dominated by large areas of skunk cabbage, red maple, white oak (*Quercus alba*), ironwood, etc. Springs and seeps occur throughout the central part of this WAG. There is standing water of several inches in some areas. Some areas are saturated, while some just have bare soil or water stained leaves. Width of wetlands range from 25 -150 feet from the edge of the stream.

There are similar wetlands on the south side of the stream, but smaller and not continuous. Rushes and saturated soils were observed in a sewer right-of-way in this area.

Most of this WAG is on Montgomery County park property.

NB - 4: North Branch mainstem from Bowie Mill Road south to confluence w/ Williamsburg Run.

Medium functional value. This wetland assessment group comprises two major wetland areas. An extensive palustrine emergent wetland occupies the stream valley west of Ridge Drive. Dominant vegetation includes skunk cabbage, soft rush (*Juncus effusus*), and various species of grasses. Unfortunately, the quality of the vegetational community here appears to be threatened by the proliferation of alien invasive plant species, including Vietnamese stiltgrass and mile-a-minute weed. The hydrology which created and maintains the wetland appears to result from the existence of beaver dams on the stream's mainstem. This wetland contains numerous snags and appears to provide good habitat for bird and amphibian

species. At the downstream end of this wetland, watercress (*Nasturtium officinale*) grows in the stream channel, indicating good water quality.

The second wetland area in this wetland assessment group is a large palustrine forested wetland which extends from just north of Kirk Drive north to Bowie Mill Road. The canopy layer is dominated by red maple, pin oak, green ash, and tulip poplar with ironwood in the understory and a herb layer dominated by skunk cabbage. The forested wetlands are fed by numerous seeps and springs, and many excellent vernal pools are found here. The calling of frogs is testimony to the productivity of these vernal pools.

NB-4 is fragmented by sewer lines and by two utility pipeline rights-of-way. The wetlands largely occur within the confines of North Branch Stream Valley Park.

NB - 5: North Branch mainstem south of the confluence with Williamsburg Run south to Muncaster Mill Road.

High functional value. Priority Wetland. The wetlands within this wetland assessment group are many, varied, and complex. In the northern portion of the WAG, adjacent to Norbeck Country Club, the wetlands are primarily palustrine forested, with red maple, green ash, boxelder, pin oak, and sycamore abundant in the canopy. Ironwood and spicebush are significant components of the shrub layer, and skunk cabbage dominates the herb layer. Various species of sedges, rushes and cattails appear where openings occur in the canopy.

Large, productive vernal pools occur in the floodplain, especially west of Cherry Valley Drive. Some of these vernal pools may occupy a portion of the millrace and earthworks associated with the former Owens Mill.

West of Minuteman Terrace and adjacent to the North Branch mainstem is an emergent wetland which has been singled out by botanists from the M-NCPPC, the U.S. Army Corps of Engineers, and knowledgeable local citizens for its high quality and unusual flora. Among the plant species present include skunk cabbage, sensitive fern, marsh fern (*Thelypteris thelypteroides*), tussock sedge, arrow-leaved tearthumb, and spatterdock (*Nuphar luteum*). Tree species in and adjacent to the wetland include red maple, shingle oak (*Quercus imbricaria*), and chinquapin (*Castanea pumila*). Areas of standing water supports populations of spotted turtles and marbled salamanders. Many box turtles live in and around the wetland as well.

South of the emergent wetland are pockets of forested wetlands. Canopy-level trees include green ash, sycamore and red maple trees, with spicebush in the shrub layer and skunk cabbage occasionally abundant.

A red maple swamp occurs north of Ellenwood Court. This wetland is characterized by a canopy of red maple trees over skunk cabbage.

A succeeding scrub-shrub/emergent wetland occurs in the headwaters of a tributary to North Branch just northwest of the Muncaster Mill View subdivision. Open areas contain sedges, rushes, cattails, sensitive ferns, and jewelweed, with black willows, sycamores, red maples and silver maples (*Acer saccharinum*) beginning to establish an early-successional tree canopy in some places. A portion of the wetland appears to be an old farm pond and still contains a small area of open water. The area below the pond has more of a wet meadow character.

Wetland Assessment Group NB-5 is fragmented by a sewer line corridor and in the northeast by the golf course at the Norbeck Country Club. Portions of the golf course are built on Montgomery County Park property. One tee area is built on the western side of the stream.

This WAG occurs within the boundaries of an area recognized as important to the County's biological diversity by the Maryland Department of Natural Resources Heritage and Biodiversity Conservation Program. **This WAG is designated a Priority Wetland based on its high functional assessment score and high value for biological diversity.**

The majority of this WAG occurs on Montgomery County park property; notable exceptions are the wetlands along the western tributary north of the Muncaster Mill View subdivision.

NB - 6: North Branch mainstem from Muncaster Mill Road south to Lake Frank.

Low functional value. A succeeding emergent wetland occurs in the backwater area where the North Branch mainstem enters Lake Frank. This wetland contains black willow trees over an herb layer of rushes, sedges, grasses, and sensitive ferns. The wetland occurs within the boundaries of Rock Creek Regional Park.

Williamsburg Run

WB - 1: Headwaters of Williamsburg Run south of Bowie Mill Road, south of MD 108, and west of Georgia Avenue southwest to stream confluence in Cashell Local Park.

Medium functional value. This Wetland Assessment Group consists of several separate wetland areas which lie along the mainstem and tributary streams which form the western portion of the Williamsburg Run stream system. Most of the wetlands are forested, with pin oak, red maple, green ash, and boxelder in the canopy layer and skunk cabbage dominating the herb layer. The wetlands generally

occur as pockets of wetland within a floodplain matrix. Alien invasive plant species are a problem for plant biodiversity, with garlic mustard (*Alliaria petiolata*), multiflora rose, Japanese honeysuckle, and mile-a-minute weed especially prevalent.

A number of shingle oaks occur in the wetland south of Bowie Mill Road and north of Darnell Drive adjacent to the power line. Shingle oak is a Maryland Watchlist species, meaning it is of concern due to restricted or declining populations according to the Maryland Department of Natural Resources Heritage and Biodiversity Program.

One particularly interesting wetland complex occurs along the power line corridor south of Morningwood Drive. A scrub-shrub wetland exists in the power line corridor, with alders and arrowwood growing over various sedges, rushes, jewelweed, and goldenrods. West of the power line is a young forested wetland dominated by red maple in the canopy with skunk cabbage growing underneath. An emergent wetland occurs in the northwest corner of the intersection of the power line corridor with a gas line corridor, with dead pin oaks and live black willows growing amid a large area of sedges, grasses, and rushes, with considerable amounts of standing water. Adjacent to the southeast of the two utility corridors is a mature wooded wetland featuring pin oaks, red maples, sycamores and tulip poplars growing above spicebush, arrowwood, skunk cabbage and jewelweed. (Note: Since this survey was made, PEPCO has cut down all the vegetation in their power line right-of-way, effectively eliminating the scrub-shrub wetland. Some wetland herbs remain, but, due to the drought of 1999, recovery has been slow.)

WB-1 is fragmented by road crossings, subdivisions, and gas, power, and sewer line corridors.

A portion of the wetlands south of Morningwood Drive and east of Cashell Road occur within the boundaries of Cashell Local Park.

WB - 2: Stream confluence in Cashell Local Park west to mainstem of North Branch.

Medium functional value. WB-2 consists of a forested wetland dominated by tulip poplar, red maple and green ash in the canopy layer and ironwood in the understory, with skunk cabbage predominating in the herb layer. A small population of false hellebore (*Veratrum viride*) occurs with the skunk cabbage. The wetland contains vernal pools on the western end and a network of seeps, pools and channels on the east end. It is fragmented by a gas pipeline, and largely occurs within the confines of North Branch Stream Valley Park.

Cherrywood Manor Tributary

CMT - 1: All Cherrywood Manor tributary from just west of Georgia Avenue west to confluence with North Branch mainstem.

Low functional value. This WAG contains a forested wetland with skunk cabbage, sedges, ironwood and tulip poplar. On the north side of the stream is a skunk cabbage seep set back from stream about 40'. This wetland is several hundred feet long and runs parallel to the stream channel. Further downstream is another forested wetland ranging in width from 40-100 feet and adjacent to the stream channel. It features skunk cabbage as the dominant herbaceous plant.

Wetlands along the lower reach of the Cherrywood Manor Tributary are on Montgomery County park property.

Brooke Manor Tributary

BMT - 1: This WAG includes all the Brooke Manor tributary from just west of Georgia Avenue west to the confluence with North Branch mainstem.

Low functional value. Downstream from the Emory Road stream crossing are large forested wetlands with braided channels and springs along the south side of the stream. These wetlands are dominated by skunk cabbage. Most of this area is set back from the stream by 25-50'. Vegetation includes slippery elm (*Ulmus rubra*), catalpa (*Catalpa spp.*), red maple, ironwood, tulip poplar, southern red oak (*Quercus falcata*), and spicebush.

Further downstream on the south side is a large, wide red maple swamp with an open emergent area in the center. Vegetation includes grasses, jewelweed, halberd-leaved tearthumb, northern arrowwood, and fern species. The area is saturated, with some standing water. It is set back from the stream channel by 50-75'.

On north side of stream are forested wetlands dominated by skunk cabbage. Other vegetation includes false hellebore, fern species and agrimony. Wetlands begin at the edge of the stream channel and extend back 100-150'. These areas are not continuous; upland areas occur throughout the north side of this wetland assessment group. Sycamore, hackberry (*Celtis occidentalis*) and stinging nettles (*Urtica dioica*) appear downstream.

Portions of this WAG are on Montgomery County park property.

Crabbs Branch

CB - 1: Crabbs Branch from stormwater pond west of Redland Road east to confluence with Rock Creek mainstem.

High functional value. Priority Wetland. This Wetland Assessment Group consists primarily of a large emergent wetland with considerable amounts of standing and flowing water, even in dry seasons. Plant species include rushes, sedges including tussock sedge, skunk cabbage, cattails, marsh fern, cinnamon fern, sensitive fern, arrowwood, mile-a-minute weed, Vietnamese stiltgrass, and arrow arum (*Peltandra virginica*). Small patches of forested wetland occur in conjunction with the emergent wetland. Considerable beaver activity has contributed to the existence of the wetlands here.

A portion of this WAG occurs within the boundaries of an area recognized as important to the County's biological diversity by the Maryland Department of Natural Resources Heritage and Biodiversity Conservation Program. **This WAG is designated a Priority Wetland based on its high functional assessment score.**

Most of this WAG is within Crabbs Branch Stream Valley Park.