

Appendix

Existing Parkland Ownership

Study Area Existing Parkland Ownership⁽¹⁾

Table A-1

Owner	Acres	% of Parkland	% of Study Area
M-NCPPC	3,951	56	10
State of Maryland	2,063	29	5
WSSC	1,055	15	3
Municipalities	18	<1	<1
Total	7,087	100	18

- (1) GIS coverage of existing parkland, M-NCPPC 1997.
 (2) Total parks in planning area is 5,318 acres.

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 12 and reported in Table 9 consist of a combination of several types of areas, many of which overlap. 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, Northwest Branch, Hawulings and Patuxent watersheds. 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 CSPA 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 CSPA 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 CSPS 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 17) was obtained from the County-wide Stream Protection Strategy. The CSPA 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). 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 CSPA 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 the Olney Watersheds

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 CSPA as additional data is collected. Consult the most current copy of the CSPA for updated information.

Fish Species of the Olney Study Area

Table A-2.

Species Name	North Branch of Rock Creek	Hawlings River	Northwest Branch	Patuxent River
American eel			X	
Blacknose dace	X	X	X	X
Bluegill	X	X	X	X
Bluntnose minnow	X	X	X	
Brown bullhead	X		X	X
Brown trout			X	
Central stoneroller		X	X	X
Common shiner	X	X	X	X
Creek chub	X	X	X	X
Cutlips minnow	X	X	X	X
Fallfish	X	X	X	X
Fantail darter			X	
Golden shiner	X		X	
Green sunfish	X	X	X	X
Greenside darter		X		
Largemouth bass	X	X	X	X
Longnose dace	X		X	X
Margined madtom	X	X	X	X
Mottled sculpin	X	X		
Northern hogsucker	X	X	X	X
Potomac sculpin	X			
Pumpkinseed sunfish	X	X	X	X
Rainbow trout (stocked)				X
Redbreast sunfish	X	X	X	X
River chub				X
Rosyside dace	X	X	X	X
Satinfish shiner	X		X	
Shield darter		X		X
Shorthead redhorse		X		
Silverjaw minnow	X			
Smallmouth bass				X
Spotfin shiner	X		X	X
Spottail shiner	X			X
Swallowtail shiner	X	X		
Tessellated darter	X	X	X	X
White sucker	X	X	X	X
Yellow bullhead	X			
Yellow perch		X		

Source: CSPA. February 1998.

PARK WILDLIFE INVENTORY - RACHEL CARSON CONSERVATION PARK

Table A-3

	Common Name	Scientific Name		Common Name	Scientific Name
Butterflies	Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	Reptiles	painted turtle	<i>Chrysemys picta</i>
	Spicebush Swallowtail	<i>Papilio Troilus</i>		eastern box turtle	<i>Terrapene carolina</i>
	Cabbage White	<i>Pieris rapae</i>		northern water snake	<i>Nerodia sipedon</i>
	Clouded Sulphur	<i>Colias philodice</i>		eastern garter snake	<i>Thamnophis sirtalis</i>
	Eastern Tailed Blue	<i>Everes comyntas</i>			
	Great Spangled Fritillary	<i>Speyeria cybele</i>			
	Pearl Crescent	<i>Phyciodes tharos</i>			
	Mourning Cloak	<i>Nymphalis antiopa</i>			
	Silver-spotted Skipper	<i>Epargyreus clarus</i>			
Amphibians	spotted salamander	<i>Ambystoma maculatum</i>	Mammals	opossum	<i>Didelphis virginianus</i>
	northern dusky salamander	<i>Desmognathus fuscus</i>		short-tailed shrew	<i>Blarina brevicauda</i>
	red-backed salamander	<i>Plethodon cinereus</i>		star-nosed mole	<i>Condylura cristata</i>
	American toad	<i>Bufo americanus</i>		eastern cottontail	<i>Sylvilagus floridanus</i>
	spring peeper	<i>Pseudacris crucifer</i>		eastern chipmunk	<i>Tamias striatus</i>
	gray tree frog	<i>Hyla versicolor</i>		groundhog	<i>Marmota monax</i>
	bullfrog	<i>Rana catesbeiana</i>		gray squirrel	<i>Sciurus carolinensis</i>
	green frog	<i>Rana clamitans</i>		southern flying squirrel	<i>Glaucomys volans</i>
	pickerel frog	<i>Rana palustris</i>		beaver	<i>Castor Canadensis</i>
	wood frog	<i>Rana sylvatica</i>		white-footed mouse	<i>Peromyscus leucopus</i>
				meadow vole	<i>Microtus pensylvanicus</i>
				muskrat	<i>Ondatra zibethicus</i>
				meadow jumping mouse	<i>Zapus hudsonius</i>
		red fox	<i>Vulpes vulpes</i>		
		gray fox	<i>Urocyon cinereoagenteus</i>		
		raccoon	<i>Procyon lotor</i>		
		mink	<i>Mustela vison</i>		
		river otter	<i>Lutra canadensis</i>		
		white-tailed deer	<i>Odocoileus virginianus</i>		

Olney and Vicinity Environmental Resources

	Common Name	Scientific Name		Common Name	Scientific Name
Birds (*=breeding; **=breeding forest interior spp)	pied-billed grebe	<i>Podilymbus podiceps</i>	Birds (*=breeding; **=breeding forest interior spp)	European starling*	<i>Sturnus vulgaris</i>
	hooded merganser	<i>Lophodytes cucullatus</i>		Brown-headed cowbird	<i>Molothrus ater</i>
	mallard*	<i>Anas platyrhynchos</i>		red-winged blackbird*	<i>Agelaius phoeniceus</i>
	American black duck	<i>Anas rubripes</i>		Baltimore oriole*	<i>Icterus galbula</i>
	wood duck*	<i>Aix sponsa</i>		common grackle*	<i>Quiscalus quiscula</i>
	ring-necked duck	<i>Aythya collaris</i>		house finch*	<i>Carpodacus mexicanus</i>
	common goldeneye	<i>Bucephala clangula</i>		American goldfinch*	<i>Carduelis tristis</i>
	ruddy duck	<i>Oxyura jamaicensis</i>		grasshopper sparrow*	<i>Ammodramus savannarum</i>
	Canada goose*	<i>Branta canadensis</i>		white-crowned sparrow	<i>Zonotrichia leucophrys</i>
	great blue heron	<i>Ardea herodias</i>		white-throated sparrow	<i>Zonotrichia albicollis</i>
	green heron*	<i>Butorides virescens</i>		chipping sparrow*	<i>Spizella passerina</i>
	American woodcock	<i>Scolopax minor</i>		field sparrow*	<i>Spizella pusilla</i>
	wild turkey	<i>Meleagris gallopavo</i>		dark-eyed junco	<i>Junco hyemalis</i>
	rock dove*	<i>Columba livia</i>		song sparrow*	<i>Melospiza melodia</i>
	mourning dove*	<i>Zenaidra macroura</i>		swamp sparrow	<i>Melospiza Georgiana</i>
	turkey vulture	<i>Cathartes aura</i>		eastern towhee*	<i>Pipilo erythrophthalmus</i>
	black vulture*	<i>Coragyps atratus</i>		northern cardinal*	<i>Cardinalis cardinalis</i>
	red-tailed hawk*	<i>Buteo jamaicensis</i>		indigo bunting*	<i>Passerina cyanea</i>
	red-shouldered hawk**	<i>Buteo lineatus</i>		scarlet tanager**	<i>Piranga olivacea</i>
	American kestrel*	<i>Falco sparverius</i>		tree swallow*	<i>Tachycineta bicolor</i>
	barred owl**	<i>Strix varia</i>		cedar waxwing*	<i>Bombycilla cedrorum</i>
	eastern screech-owl*	<i>Otus asio</i>		red-eyed vireo**	<i>Vireo olivaceus</i>
	great horned owl*	<i>Bubo virginianus</i>		yellow-throated vireo**	<i>Vireo flavifrons</i>
	yellow-billed cuckoo*	<i>Coccyzus americanus</i>		blue-headed vireo	<i>Vireo solitarius</i>
	belted kingfisher*	<i>Ceryle alcyon</i>		white-eyed vireo*	<i>Vireo griseus</i>
	hairy woodpecker**	<i>Picoides villosus</i>		worm-eating warbler**	<i>Helmitheros vermivorus</i>
	downy woodpecker*	<i>Picoides pubescens</i>		northern parula*	<i>Parula Americana</i>
	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>		yellow warbler*	<i>Dendroica petechia</i>
	pileated woodpecker**	<i>Dryocopus pileatus</i>		black-throated blue warbler	<i>Dendroica caerulescens</i>
	red-bellied woodpecker*	<i>Melanerpes carolinus</i>		yellow-rumped warbler	<i>Dendroica coronata</i>
	northern flicker*	<i>Colaptes auratus</i>		palm warbler	<i>Dendroica palmarum</i>
	chimney swift	<i>Chaetura pelagica</i>		prairie warbler*	<i>Dendroica discolor</i>
	ruby-throated hummingbird*	<i>Archilochus colubris</i>		ovenbird**	<i>Seiurus aurocapillus</i>
great crested flycatcher*	<i>Myiarchus crinitus</i>	Louisiana waterthrush**	<i>Seiurus motacilla</i>		
eastern phoebe*	<i>Sayornis phoebe</i>	Kentucky warbler**	<i>Oporornis formosus</i>		
eastern wood-pewee*	<i>Contopus virens</i>	common yellowthroat*	<i>Geothlypis trichas</i>		
Acadian flycatcher**	<i>Empidonax virescens</i>	yellow-breasted chat*	<i>Icteria virens</i>		
willow flycatcher*	<i>Empidonax traillii</i>	house sparrow*	<i>Passer domesticus</i>		
blue jay*	<i>Cyanocitta cristata</i>	northern mockingbird*	<i>Mimus polyglottos</i>		
American crow*	<i>Corvus brachyrhynchos</i>	gray catbird*	<i>Dumetella carolinensis</i>		
fish crow*	<i>Corvus ossifragus</i>	brown thrasher*	<i>Toxostoma rufum</i>		

	Common Name	Scientific Name		Common Name	Scientific Name
Birds (*=breeding; **=breeding forest interior spp)	Carolina wren*	<i>Thryothorus ludovicianus</i>	Birds (*=breeding; **=breeding forest interior spp)	golden-crowned kinglet	<i>Regulus satrapa</i>
	house wren*	<i>Troglodytes aedon</i>		ruby-crowned kinglet	<i>Regulus calendula</i>
	winter wren	<i>Troglodytes troglodytes</i>		blue-gray gnatcatcher*	<i>Poliptela caerulea</i>
	brown creeper	<i>Certhia americana</i>		wood thrush**	<i>Catharus mustelinus</i>
	white-breasted nuthatch*	<i>Sitta carolinensis</i>		veery*	<i>Catharus fuscescens</i>
	tufted titmouse*	<i>Baeolophus bicolor</i>		American robin*	<i>Turdus migratorius</i>
	Carolina chickadee*	<i>Poecile carolinensis</i>		eastern bluebird*	<i>Sialia sialis</i>

Source: Rachel Carson Conservation Park Master Plan, MNCPPC, June 2000.

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 (aerial extent of canopy of individual trees and tree stands less than 10,000 square feet in size, including 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 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 1998 panchromatic digital orthophotos from M-NCPCC GIS coverage, and field verification. The 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 color infrared photos. Field surveys were conducted and the data collected was combined with data contained in Natural Resources Inventory/Forest Stand Delineation (NRI/FSD) reports for a limited number of tracts within the analysis area. This was then used to provide information for the supervised classification of forest types. Forest boundaries were corrected to 2001 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.

The forest boundaries were then 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 Olney and vicinity 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 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-4). Breeding status is determined according to the criteria set forth by the Maryland Ornithological Society.

Wetlands

Functional Assessment of Wetlands in the Olney Policy Area

A more detailed functional assessment was conducted for wetlands found in the Olney policy area. Data used in this functional assessment included existing mapped and documented information (including DOQQ information) and field information collected by staff. Field information was collected for wetlands in those portions of Northwest Branch and Hawlings River within the policy area in 2000–2001. Staff collected field information on wetlands in the upper Rock Creek watershed in 1998–1999 as part of a separate functional assessment (see "Environmental Resources Inventory for the Upper Rock Creek Watershed", January 2000).

The M-NCPPC wetland functional assessment protocol is a tool to measure how well a group of wetlands performs six major functions that are attributed to natural, healthy wetlands in this geographic region: attenuation of flood flows, reductions in sediment and nutrient loads, groundwater discharge, provision of aquatic habitat, provision of terrestrial habitat, and provision of habitat for rare, threatened or endangered plants or animals. Please note that the protocol is designed to provide only estimates of the ability of a wetland group to perform the six wetland functions relative to other wetland groups within the limits of the study. The protocol is not intended to measure how well a wetland group performs a specific function in absolute terms.

The M-NCPPC wetland functional assessment protocol does not evaluate individual wetlands. Rather, the assessment is intended to be a planning level methodology to determine how well various "collections" of wetlands, considered as integral features of stream

Forest Interior Dwelling Bird Species

Table A-4.

Common Name	Scientific Name
Flycatcher, Acadian	<i>Empidonax virescens</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>Limnothlypis swainsonii</i>
*Warbler, worm-eating	<i>Helmitheros vermivorus</i>
*Waterthrush, Louisiana	<i>Seiurus motacilla</i>
Whip-poor-will	<i>Caprimulgus vociferous</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.

systems, fit into the functioning of the specific stream systems within the limits of the study and to provide measures of the relative contributions of these wetland groups to the health of the study area's aquatic and terrestrial environments.

The M-NCPPC protocol was developed by Environmental Planning staff, with input from the Maryland Department of the Environment (MDE), Nontidal Wetlands and Waterways Division. It is a hybrid of the Wetland Evaluation Technique (WET), MDE protocol, and an office-based protocol developed by Biohabitats, Inc. for M-NCPPC as part of the Eastern Montgomery County Wetlands Study. The M-NCPPC wetland functional assessment protocol has been applied in the M-NCPPC environmental inventories conducted for the Potomac Subregion and the Upper Rock Creek watershed.

For this assessment, the wetland resources of the Olney policy area were combined into Wetland Assessment Groups (WAGs). WAGs are groups of wetlands which lie near each other within a subwatershed. Divisions between WAGs occur where the character of the watershed changes, such as places where stream order changes significantly, or at physical separations such as major road crossings. The WAG groupings were determined by staff. Figure 28 shows approximate locations of the WAGs within the Olney policy area.

Field data collected by staff on these WAGs in 2000-2001 were combined with mapped information and data from Montgomery County's Geographic Information System (GIS) database to produce estimates of the six wetland functions for each WAG.

For each of the six wetland functions, there are a set of possible features or characteristics that a wetland may possess. The presence or absence of features or characteristics are determined through GIS or field-collected data. A score is assigned to each feature or characteristic. A wetland characteristic that indicates a healthy, well-functioning, natural, undisturbed wetland is assigned a high score. A characteristic that indicates degraded conditions and/or poor functions is assigned a low score.

For a WAG, the scores for the wetland characteristics under a particular wetland function are averaged. This average (mean) becomes the score for that wetland function. The scores for the six wetland functions are added, with the scores for wildlife habitat and aquatic habitat functions each multiplied by a factor of two. This weighted sum becomes the functional assessment score for the WAG.

The wildlife habitat and aquatic habitat functions are weighted to give them more importance in determining relative rankings of wetlands. This is because these two functions are the most difficult functions to recreate if a wetland is adversely affected and degraded.

Results of the functional assessment are summarized in Tables A-5, A-6, A-7 and Figure 27. The

tables do not show the wetland function of habitat for rare, threatened, and endangered species because there is no documentation or field data to date that indicates the presence of such species in the wetlands within the Olney policy area.

A WAG with a high functional assessment score indicates that the majority of the wetlands in the group have characteristics or features showing they perform most of the six wetland functions relatively well. Generally, a WAG with a high score is of higher quality, provides significant benefits to the stream system and as plant and wildlife habitat, and has been less affected by adverse impacts, compared to a WAG with a low score. For comparison purposes, the highest possible functional assessment score is 23.7 and the lowest possible score is 3.2.

Table A-8 ranks the WAGs according to their weighted composite functional assessment score within the Olney policy area (i.e., regardless of watershed). WAGs are categorized as having high, medium, or low overall functional value based on a qualitative evaluation of the distribution of assessment scores. It should be noted that this ranking is not an absolute ranking. It is intended to show how each WAG compares to other WAGs within the limits of the study only.

Policy Area Wetland Functional Value⁽¹⁾ -- Northwest Branch

Table A-5

Wetland Assessment Group (WAG)	Wetland Function					Weighted Composite ⁽²⁾
	Groundwater Discharge	Floodflow Attenuation	Nutrient Removal/Sediment Retention	Aquatic Habitat	Wildlife Habitat	
BF-2	3.00	2.63	3.10	1.92	1.80	16.16
BF-1	2.33	2.75	3.20	1.75	1.60	14.98
BF-East	2.33	2.75	3.00	1.42	1.10	13.12

⁽¹⁾ Based on field survey and analysis by M-NCPPC staff in 2000-2001.

⁽²⁾ The weighted composite score is the sum of the scores for groundwater discharge, floodflow attenuation, and nutrient removal/sediment retention, plus double the scores for aquatic habitat and wildlife habitat. See explanation of weighting in the text.

Policy Area Wetland Functional Value⁽¹⁾ -- North Branch of Rock Creek

Table A-6

Wetland Assessment Group (WAG)	Wetland Function					Weighted Composite ⁽²⁾	Results from URC Study	
	Groundwater Discharge	Floodflow Attenuation	Nutrient Removal/Sediment Retention	Aquatic Habitat	Wildlife Habitat		URC Rank ⁽³⁾	Priority Wetland
NB-2	3.67	1.75	2.80	3.17	2.42	19.38	2	Yes
NB-1	3.33	1.75	2.40	2.33	2.25	17.65	4	Yes
NB-5	3.33	2.13	2.70	2.33	2.25	17.33	5	Yes
WB-1	3.00	2.00	2.80	2.00	1.67	16.13	11	No
NB-4	3.00	1.75	2.40	2.25	1.92	15.48	12	No
NB-3	3.00	1.88	2.40	2.17	1.75	15.11	13	No
WB-2	2.67	2.00	2.40	1.92	1.67	14.23	15	No
CMT-1	2.67	1.75	2.60	1.83	1.17	13.02	16	No
NB-6	1.33	1.75	2.60	1.67	1.33	12.68	18	No
BMT-1	2.33	1.88	2.50	1.75	1.17	12.54	19	No

⁽¹⁾ Based on field survey and analysis by M-NCPPC staff in 2000-2001.

⁽²⁾ The weighted composite score is the sum of the scores for groundwater discharge, floodflow attenuation, and nutrient removal/sediment retention, plus double the scores for aquatic habitat and wildlife habitat. See explanation of weighting in the text.

⁽³⁾ Total of 21 WAGs were assessed in the Upper Rock Creek inventory.

Policy Area Wetland Functional Value⁽¹⁾ -- Hawlings River

Table A-7.

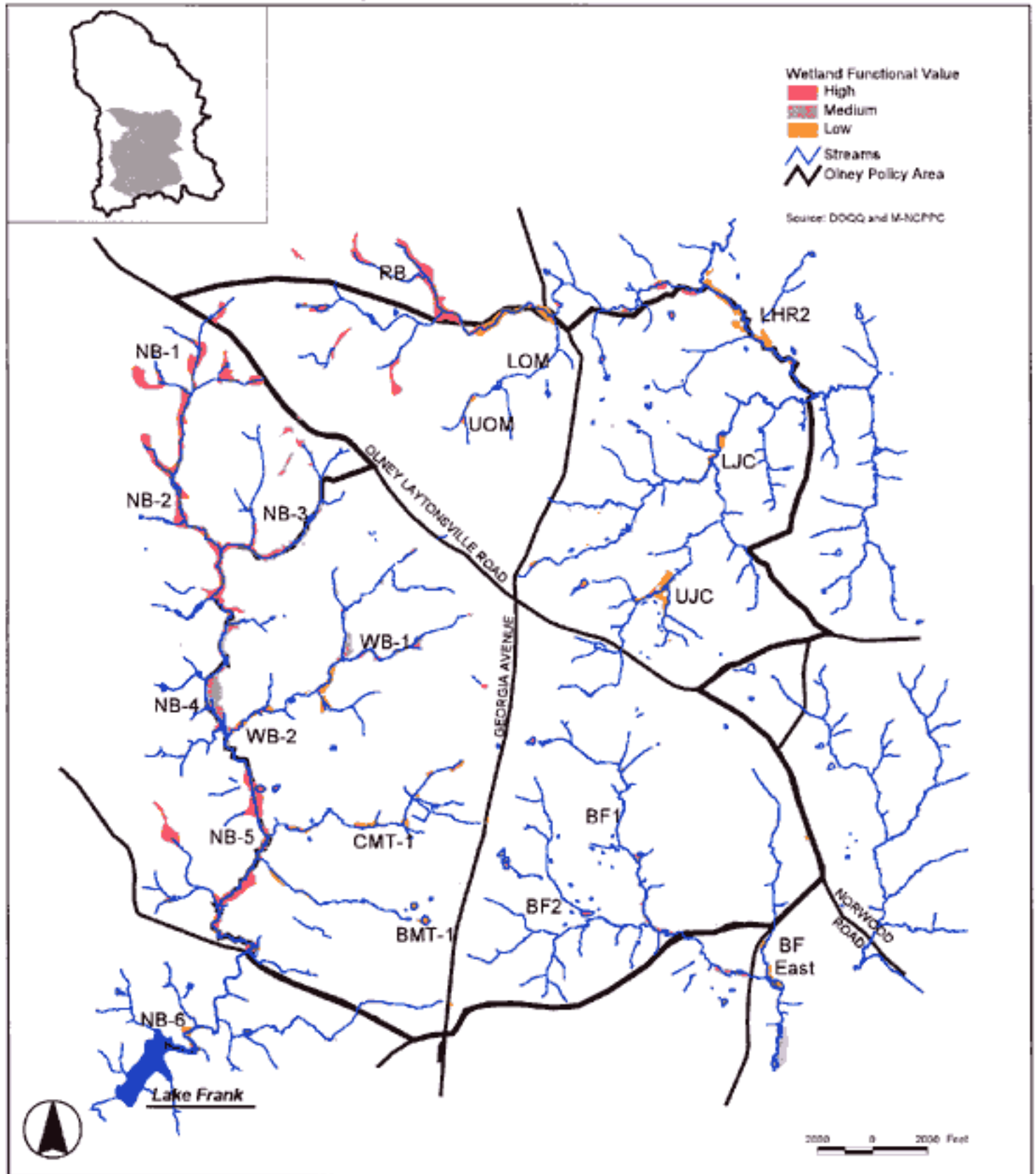
Wetland Assessment Group (WAG)	Wetland Function					Weighted Composite ⁽²⁾
	Groundwater Discharge	Floodflow Attenuation	Nutrient Removal/Sediment Retention	Aquatic Habitat	Wildlife Habitat	
RB (located partly in planning area)	3.67	2.63	3.20	2.50	2.60	19.69
LJC	2.00	2.63	3.00	1.50	1.70	14.03
LOM	1.33	2.50	2.40	1.33	1.60	12.10
UOM	2.33	1.25	2.80	1.33	1.00	11.05
UJC	2.17	1.25	2.60	1.42	1.00	10.85
LHR2 (located partly in planning area)	2.50	2.50	2.40	1.67	1.50	13.74

⁽¹⁾ Based on field survey and analysis by M-NCPPC staff in 2000-2001.

⁽²⁾ The weighted composite score is the sum of the scores for groundwater discharge, floodflow attenuation, and nutrient removal/sediment retention, plus double the scores for aquatic habitat and wildlife habitat. See explanation of weighting in the text

Policy Area Wetland Assessment Groups (WAGs) and Overall Functional Value

Figure 27



Policy Area Wetland Assessment Group (WAGs) Rankings

Table A-8

Watershed	Wetland Assessment Group	Weighted Composite Functional Assessment Score	Relative Overall Functional Value within the Policy Area
Hawlings River	RB	19.69	High Overall Functional Value
Upper Rock Creek	NB-2	19.38	
Upper Rock Creek	NB-1	17.65	
Upper Rock Creek	NB-5	17.33	
Northwest Branch	BF-2 ⁽¹⁾	16.16	Medium Overall Functional Value
Upper Rock Creek	WB-1	16.13	
Upper Rock Creek	NB-4	15.48	
Upper Rock Creek	NB-3	15.11	
Northwest Branch	BF-1 ⁽¹⁾	14.98	
Upper Rock Creek	WB-2	14.23	Low Overall Functional Value
Hawlings River	LJC	14.03	
Hawlings River	LHR-2	13.74	
Northwest Branch	BF-East	13.12	
Upper Rock Creek	CMT	13.02	
Upper Rock Creek	NB-6	12.68	
Upper Rock Creek	BMT-1	12.54	
Hawlings River	LOM	12.10	
Hawlings River	UOM	11.05	
Hawlings River	UJC	10.85	

⁽¹⁾ This WAG has been noted to contain a collection of vernal pools and other wetlands that provide habitat for amphibians. Therefore, a subset of this WAG has a higher functional value than the WAG's overall functional value.

From this wetland assessment, some general observations may be made

1. Northwest Branch
 - a. Each of the three WAGs have some degree of past disturbance (e.g., sewer line construction). Undesirable alien, invasive plant species occur in portions of these WAGs.
 - b. Compared to WAGs in the other two watersheds in the planning area, wetlands in this part of Northwest Branch cover a very small proportion of the watershed.
 - c. Two (BF-1 and BF-2) of the three WAGs have overall medium functional values. But each of these WAGs contain a collection of wetlands, including vernal pools, which provide valuable habitat for

amphibians. The importance of these subsets of the two WAGs are not reflected in the WAGs' overall functional value scores.

2. Rock Creek WAGs
 - a. The North Branch of Rock Creek and many of its tributaries harbor a rich variety of high-quality wetlands. The combination of large forested wetlands, high-quality scrub-shrub and emergent wetlands, and large vernal pool areas make the wetlands of the North Branch especially valuable for the provision of habitat for aquatic, semi-aquatic, and terrestrial life forms. Recent concern within the scientific community about the global decline of amphibian populations increases the value of good amphibian breeding habitats such as these.

- b. The wetland assessment groups associated with the mainstem of North Branch north of Muncaster Mill Road are of particularly high quality. They rank among the highest in overall wetland functions not only within the Rock Creek WAGs of the Olney planning area, but in the entire upper Rock Creek watershed that was evaluated as part of the Upper Rock Creek Environmental Inventory. A large wetland (in M-NCPPC parkland) in this North Branch complex is part of a natural area identified by M-NCPPC as a biodiversity area. Such a designation recognizes the high quality, diverse, and unusual nature of the native plant and animal communities found in the designated area. This wetland is also recognized as important to the county's biological diversity by the Maryland Department of Natural Resources Heritage and Biodiversity Conservation Program.
3. Hawlings River WAGs
- a. Some of the WAGs in the Hawlings River portion of the planning area (UOM, LOM, UJC, and parts of LJC) are located in one of the most highly developed portions of the Olney environmental study area. Wetlands in these highly developed areas show significant impacts of urbanization. These wetlands are generally small and highly fragmented, with substantial degradation caused by hydrology changes and by alien plant invasions which are displacing native species. This means two things about the wetlands: On the one hand, the wetlands in highly developed areas are less valuable than they would be in a less disturbed condition, because their functional capacities have been diminished. On the other hand, while these wetlands have been made less functional, they are more valuable due to their scarcity. These are the only places remaining in the developed areas that can

serve as habitat for plants and animals which are wetland-dependent. Their ability to serve in helping to filter stormwater runoff makes them more valuable for maintaining the water quality of aquatic systems in urbanized areas.

- b. The Reddy Branch WAG (RB) includes a relatively large group of high quality wetlands which supports a variety of plant communities and wildlife habitats. Most of the wetlands lie within parkland, but there is a large forested wetland and wetlands associated with ponds that lie on private property. The land cover is predominantly in field, crops, and forest.

**Description of Individual Wetland
Assessment Groups (WAGs) in the Olney
Policy Area**

NORTHWEST BRANCH

WAGs in Batchellors Forest tributary. Batchellors Forest tributary is one of the major tributaries of Northwest Branch.

BF – 1: One of the headwater streams of Batchellors Forest tributary located east of Georgia Avenue and east of Norbrook Road.

Medium functional value. However, a collection of vernal pools and other wetlands within this WAG have a higher functional value than the overall WAG value because they provide important wildlife habitat.

Site 1 of the WAG is associated with the stream east of Covered Wagon Way. It is a palustrine forested and emergent wetland, with much of the emergent wetland occupying an area cleared for utility line installations. Some of the adjacent property is cleared for farming. In the forested portion, the canopy is dominated by tulip poplars and red maples, with white oaks and American beech in the nearby uplands. Several productive vernal pools occur along the sewer line corridor. Breeding populations of spring peepers and wood frogs were observed using these vernal pools in early March. The dominant vegetation in the emergent wetland area is Vietnamese stiltgrass (*Microstegium vimineum*), which is an invasive non-native grass. Soil samples taken from

this wetland yield a Munsell hue, value, and chroma of 10 Y/R 4/2 with oxidized rhizospheres⁶. The water table is within 10 inches of the soil surface.

Site 3 includes wetlands in and to the east of Trotters Glen Golf Course. Some of the wetlands (PUB) are golf course ponds. Site 2 lies within the BF-2 WAG. The remaining wetlands generally occur as pockets within the wooded floodplain of the stream valley. Wetland pockets include forested wetlands under the tree canopy and shrub wetlands along the edge of the sewer line clearing. Dominant trees include tulip poplars and red maples, with skunk cabbage dominant in the herb layer. Pools of standing water occur in some places. In other areas, bore holes fill with water at a depth of 14 inches. Soil value, hue and chroma were measured as 2.5Y 7/0.

Pools of water occur throughout Site 4, located along the stream just downstream of Batchellors Forest Rd. Soil value, hue, and chroma are 10Y/R 3/1. Standing dead trees (snags) testify to the fact that this emergent wetland was once a wooded site. Unfortunately, the

⁶ Soils found in wetlands exhibit distinguishing features and characteristics that indicate wet conditions. Such features may be characterized through a combination of colors and patterns of colors, textures, and odors of the various components of the soils. Colors and patterns of colors from a soil sample are typically compared to standardized soil color charts known as Munsell soil color charts. These standardized colors are identified by three components: hue, value, and chroma. The hue is related to one of the main spectral colors (red, yellow, green, blue, or purple, or various combinations of these colors). The value measures the degree of lightness (with a range from absolute black to absolute white). The chroma indicates the color strength or purity. In a notation of color for a soil sample, the last number represents the chroma. Generally, chromas of 2 or less are considered low chromas and are often considered to show hydric soils. Low chroma colors include black, various shades of gray, and the darker shades of brown and red.

The presence of spots or blotches of colors (known as mottles) in a soil sample may aid in determining if a soil is subject to prolonged wet conditions. Brightly colored (brown or yellow) mottles in a soil sample that is predominantly gray generally indicates that the soil has some degree of water saturation during the growing season. Another indication of water saturation in soils is a soil sample that is predominantly gray with the presence of brightly colored plant root channels, known as oxidized rhizospheres.

dominant vegetation is the invasive, non-native Vietnamese stiltgrass.

BF – 2: Headwater streams of Batchellors Forest tributary to the east of Georgia Avenue and south of BF-1.

Medium functional value. However, a collection of wetlands within this WAG have a higher functional value than the overall WAG value because they provide important wildlife habitat. This WAG includes man-made ponds, such as those on the Trotter's Glen Golf Course, as well as wetlands within wooded stream valleys. Wetlands within the wooded stream valleys are generally located south of Batchellors Forest Road. They are characterized by large standing pools of water under a mature forest canopy. Trees within and immediately adjacent to the wetland are predominantly red maples. Skunk cabbage (*Symplocarpus foetidus*) is the dominant herbaceous vegetation.

Montgomery County Department of Environmental Protection (DEP) has observed the following species in this WAG: spring peeper, wood frog, spotted salamander, American toad, Fowlers toad, pickerel frog, grey treefrog. DEP has also observed two-lined salamander, northern red salamander, and dusky salamander in adjoining streams. (e-mail comments from DEP dated 1/14/02)

Site 2 includes standing pools of water adjacent to the stream. Vegetation includes skunk cabbage and red maples (*Acer rubrum*).

BF-East: Wetlands in this WAG tend to be clustered just east of Layhill Road and south of Route 28.

Low functional value. These are primarily small palustrine forested wetlands dominated by red maples, with spicebush (*Lindera benzoin*) in evidence in the shrub layer. Invasions of non-native plants, including multiflora rose (*Rosa multiflora*), gill-over-the-ground (*Glechoma hederacea*), and Japanese honeysuckle (*Lonicera japonica*) have degraded the native plant community, especially in the northern portion of the wetland. The Batchellors Forest East tributary runs through open fields north of Route 28. No significant wetlands were detected along this portion of the stream.

HAWLINGS RIVER

WAGs in James Creek

LJC – 1:

Low functional value. This site contains a floodplain forest dominated by green ash (*Fraxinus pennsylvanica*). Spicebush predominates in the shrub layer. There is also a heavy infestation of multiflora rose. The herbaceous layer consists primarily of grasses and gill-over the ground. There is evidence of stream overwash (well-defined channels). The stream itself is somewhat incised, and the streambanks are noticeably eroded.

Site 2 is an emergent floodplain wetland dominated by grasses and rushes. Goldenrods and horse nettle also are present. Boxelder (*Acer negundo*) trees border the wetland. There are areas of standing water, and the soil is saturated to within 10 inches of the soil surface. This wetland has been disturbed by mowing, sewer line construction and a horse trail. There are also tractor tire ruts and extensive beaver activity. Much of this portion of the watershed has been developed relatively recently, with fairly high development densities.

A strip of palustrine, emergent wetlands (PEM1A) not recorded on the wetlands inventory occurs along the northwestern side of the stream between site 1 and site 2.

UJC: The Upper James Creek wetland assessment group contains Lake Hallowell, Brooke Grove Farm and the Brooke Grove Foundation.

Low functional value. Much of the wetland acreage in this WAG is actually the area of Lake Hallowell. Wetlands identified in the western portion of the WAG are seriously degraded by changes in hydrology, non-native plant invasions, and runoff from high density development and commercial areas. The predominant vegetation here is multiflora rose.

WAGs in Olney Mill Tributaries

UOM – 1: This group of wetlands occur along a portion of a tributary of Reddy Branch between Rte. 108 and that part of Olney Mill Rd. near Gold Mine Road.

Low functional value. The Upper Olney Mill tributary contains the created wetlands of the Patuxent

Demonstration Project. Shingle oaks (*Quercus imbricaria*) occur along the south shore of the middle pond. No significant wetlands were found below the Patuxent Demonstration Project in the Upper Olney Mill tributary.

LOM: The Lower Olney Mill tributary wetlands mostly occur along a portion of a tributary of Reddy Branch between Olney Mill Rd. (near Gold Mine Rd.) and Georgia Avenue.

Low functional value. The forested wetland is dominated by red maples over a spicebush shrub layer. Scattered skunk cabbage occurs on the forest floor.

WAG in Reddy Branch

RB: The wetlands in this group are associated with the tributary streams and mainstem Reddy Branch near Brookeville Road. Brighton Dam Road marks the downstream boundary of this WAG.

High functional value. High relative scores in all categories of wetland functions. The WAG has varied and diverse vegetation communities and wildlife habitat. Most of the wetlands lie within parkland. But there is a large forest wetland and wetlands associated with ponds that lie on private property.

Site 1 is a large PEM wetland adjacent to Oakley Cabin. Dominant vegetation includes soft rush (*Juncus effusus*), skunk cabbage, sedges (*Carex specïes*), Vietnamese stiltgrass, and Asiatic tearthumb (*Polygonum perfoliatum*). The last two named are non-native, invasive species. Some scattered black willows (*Salix nigra*) also occur in the wetland. This area previously was flooded by a beaver pond.

Site 2 is a palustrine forested wetland containing vernal pools. The vernal pools serve as a breeding habitat for wood frogs and spring peepers, based on observed vocalizations and the presence of egg masses. The vernal pools also were being used by wood ducks. These pools occur downslope from an old mill race. Soil value, hue and chroma were measured as 10Y/R 4/1 with distinct red-orange mottles. Dominant vegetation includes red maples in the tree layer, with spicebush in the shrub layer and skunk cabbage in the herb layer. Wild grape (*Vitis specïes*) also grows here. A couple of specimens of shingle oak grow near the vernal pools. Vietnamese stiltgrass and Asiatic tearthumb have spread prolifically

along the sewer line. There are active beaver dams in the stream, and considerable evidence of recent beaver activity in the wetland forest.

Site 3 is a large emergent wetland dominated by skunk cabbage, soft rush, and the non-native invasives Vietnamese stiltgrass and Asiatic tearthumb. Red maples and American sycamores (*Platanus occidentalis*) occur around the perimeter. There are large areas of standing water and vernal pools containing wood frog eggs. American toad vocalizations also were heard in this wetland. A pair of red-shouldered hawks appear to be nesting in one of the wetland's snags. This area appears to have once been inundated under a beaver pond.

Site 4 appears to be largely a floodplain forest community. The vegetation features red maples over spicebush, with some scattered skunk cabbage in the herbaceous layer.

Site 5 is a large emergent/forested wetland dominated by soft rush and grasses. This is an obvious groundwater discharge zone, with flowing springs discharging water overland and from the streambanks into Reddy Branch. The forested portion of the wetland is unusual, featuring large populations of several leguminous species, including honey locust (*Gleditsia triacanthos*), black locust (*Robinia pseudoacacia*), and Kentucky coffeetree (*Gymnocladus dioica*). There are also heavy infestations of multiflora rose. Wildlife using this wetland include wood ducks and beavers. A red-tailed hawk was observed overhead.

Site 6 is a palustrine scrub-shrub/forested wetland with large areas of standing water near Brighton Dam Road. The scrub-shrub areas are dominated by soft rush and buttonbush, with heavy infestations of multiflora rose, Vietnamese stiltgrass, Japanese honeysuckle, and Asiatic bittersweet (*Celastrus orbiculatus*). Forested areas have a good canopy of tulip poplars (*Liriodendrum tulipifera*); the quality of the understory has been diminished by invasions of non-native plants such as Gill-over-the-ground, Asiatic tearthumb, Vietnamese stiltgrass, and Japanese barberry (*Berberis thunbergii*). Munsell soil value, hue and chroma were measured as 10 Y/R 4/2 with heavy mottling. American toads (animals and egg masses) were observed in some of the pools.

Site 7 is an emergent wetland featuring soft rush, wild mint (*Metha arvensis*), and black willow (*Salix nigra*).

Soil value, hue and chroma were measured as 10 Y/R 4/2 with mottling. There is some disturbance due to grazing and mowing of this wet meadow.

Site 8 is a small red maple/skunk cabbage swamp under a floodplain forest canopy. The Munsell soil value, hue and chroma measured 10Y/R 3/2 with mottling.

WAG in Lower Hawlings River

LHR-2: This group of wetlands is associated with the portion of Hawlings River and its tributaries (excluding Reddy Branch) between Brighton Dam Rd. at Shipe Rd. and Gold Mine Rd. at Chandlee Mill Rd.

Low functional value. Field evaluation was conducted along the mainstem of Hawlings River. Generally, the wetlands are found as pockets within the floodplain forest. There are gaps in the forest due to past human disturbance. Red maple, sycamore, and pin oak (*Quercus palustris*) are some of the more common trees in this WAG. Invasive plants, such as multiflora rose, Japanese honeysuckle, and Asiatic tearthumb are also fairly common in the stream valley. The PEPCO substation lies within this drainage basin, and the associated transmission lines traverse across some of the small tributaries and wetlands.

UPPER ROCK CREEK

WAGs in 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, as defined in the Upper Rock Creek inventory. 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 to 3 feet of mucky, saturated soils and false nettle (*Boehmeria*

cylindrica), sedges, rushes, arrow-leaved and halberd-leaved tearthumb (*Polygonum sagittatum* and *P. arifolium*, respectively), agrimony (*Agrimonia species*) and deer tongue (*Panicum species*). Near the stream channel is black willow, alder (*Alnus species*), and swamp rose (*Rosa palustris*). 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 (*Asclepias incarnata*), umbrella sedge (*Cyperus species*) 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 (*Sagittaria latifolia*), swamp rose, skunk cabbage, jewelweed (*Impatiens capensis*), 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, ironweed (*Vernonia noveboracensis*), jewelweed, softstem bulrush, sensitive fern (*Onoclea sensibilis*), 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.

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, as defined in the Upper Rock Creek inventory. 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 species*) 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, and 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. Species include smartweed (*Polygonum species*), arrow-leaved tearthumb, sedges, small-headed beak-rush (*Rhynchospora capitellata*), fox sedge (*Carex vulpinoidea*), and 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*), and ironwood (*Carpinus caroliniana*). 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 to 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, and various species of grasses. Unfortunately, the quality of the plant community here appears to be threatened by the proliferation of non-native, invasive plant species, including Vietnamese stiltgrass and Asiatic tearthumb. 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, as defined in the Upper Rock Creek inventory. 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 (*Typha species*) 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 (*Carex stricta*), arrow-leaved tearthumb, and spatterdock (*Nuphar luteum*). Tree species in and adjacent to the wetland include red maple, shingle oak, 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 maples 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.

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.

WAGs in 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. Non-native invasive plant species are a problem for plant biodiversity, with garlic mustard (*Alliaria petiolata*), multiflora rose, Japanese honeysuckle, and Asiatic tearthumb 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 (*Solidago*). 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.

Low 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.

WAG in Cherrywood Manor Tributary

CMT - 1: All of the 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 the stream about 40 feet. 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 to 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.

WAG in 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 to 50 feet. Vegetation includes slippery elm (*Ulmus rubra*), catalpa (*Catalpa species*), 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 to 75 feet.

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 to 150 feet. These areas are not continuous; upland areas occur throughout the north side of this wetland assessment group. Sycamore, hackberry (*Celtis*

Olney and Vicinity Environmental Resources

occidentalis) and stinging nettles (*Urtica dioica*) appear downstream.

Portions of this WAG are on Montgomery County park property.