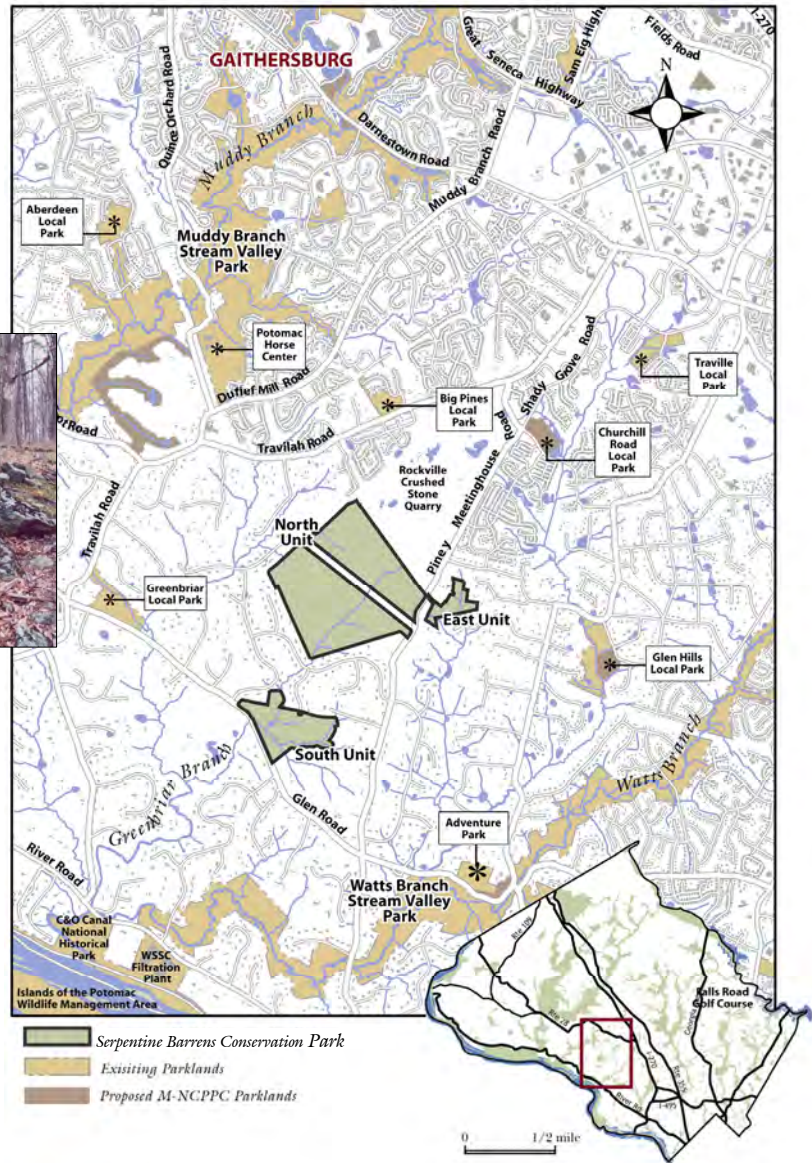


Serpentine Barrens Conservation Park



Operation & Use Plan

Approved July 2007

Department of Parks | Park Planning & Stewardship Division

The Maryland-National Capital Park & Planning Commission | 8787 Georgia Avenue, Silver Spring, MD 20910

Abstract

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Abstract	This Operation & Use Plan provides background materials, describes the planning process and outlines a plan for the development of Serpentine Barrens Conservation Park. It contains materials on natural and cultural resources, needs assessments, implementation strategies and cost estimates.

Serpentine Barrens Conservation Park Operation & Use Plan

Approved July 2007

The Maryland-National Capital Park & Planning Commission
8787 Georgia Avenue, Silver Spring, MD 20910

Department of Parks / Park Planning & Stewardship Division

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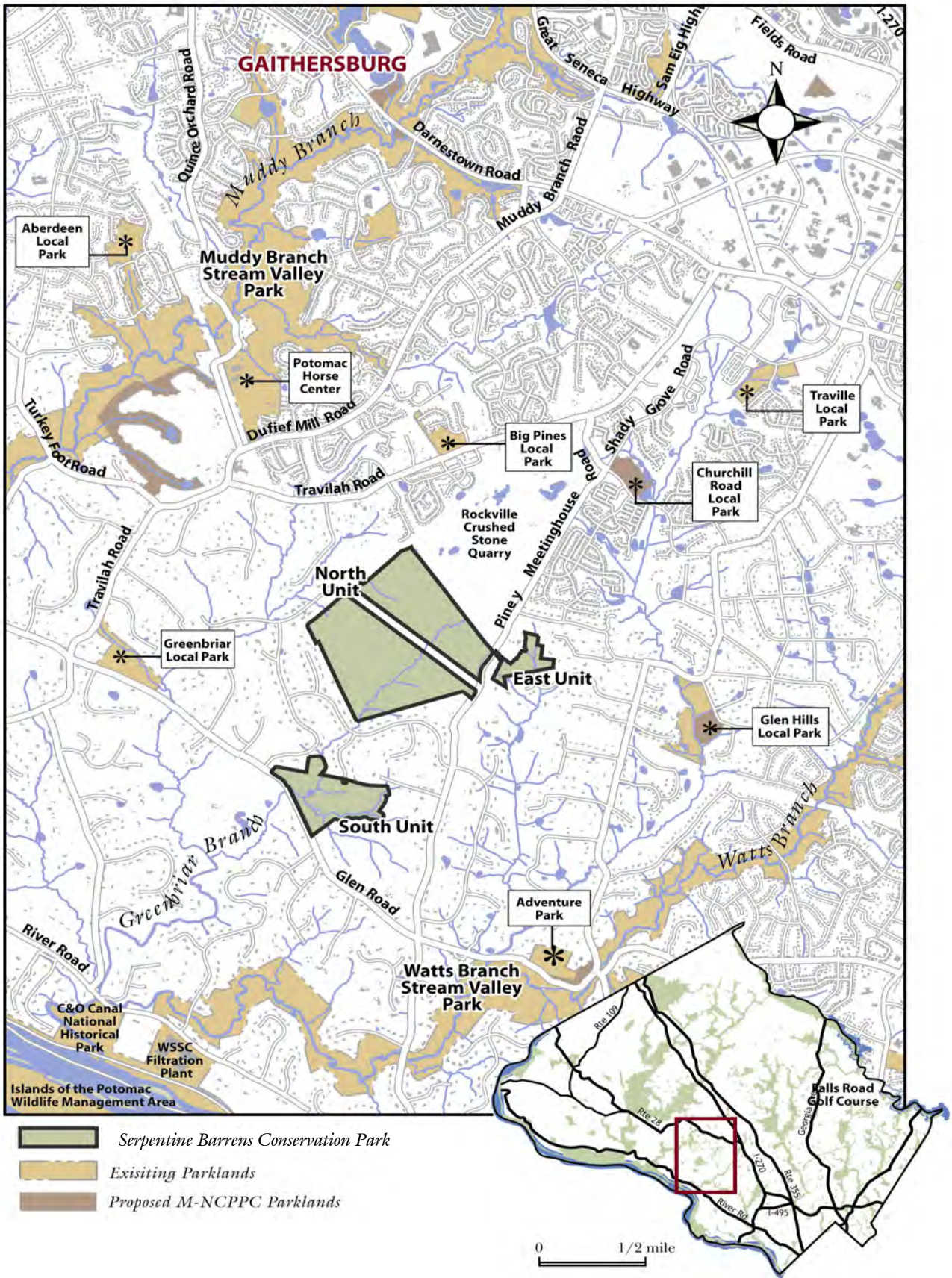
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Serpentine Barrens Conservation Park Vicinity Map

Introduction & Executive Summary

The Serpentine Barrens Conservation Park (SBCP) is one of the County's newest and most unique Conservation Parks. The Maryland National Capital Park and Planning Commission (M-NCPPC) created the Park through a combination of purchase and dedication. Dedicated acreage was part of the site plan approvals for the Estates of Greenbrier and the Greenbrier Preserve developments. Acquisition was accomplished as part of Montgomery County's Legacy Open Space program that was created to protect the County's most significant open space resources. *The Legacy Open Space Functional Master Plan*, approved by the County Planning Board and County Council in 2001, recommended conservation of this property. From the inception of the LOS Program, the Serpentine Barrens has represented the highest priority for acquisition due to the sensitive and rare nature of the resource.

In acquiring Serpentine Barrens Conservation Park, M-NCPPC seeks to achieve the following conservation objectives:

- Maintain the park in its present state as a natural area
- Preserve the park's underlying serpentine geology, which combined with resulting soils supports many unique plant species
- Preserve over 20 identified rare, threatened, endangered, and watchlist plant species within the park, which contains some of the highest biodiversity in Montgomery County outside the Potomac River corridor
- Conserve the large block of high quality contiguous forest that covers most of the site, and is one of the most diverse in the County
- Protect the Greenbrier Branch and its tributaries within the park, including wetlands and sensitive hydrologic features in the park
- Accommodate passive public uses in the park limited to natural surface trails to provide for hiking

The Serpentine Barrens Conservation Park is a 341 acre complex located in southwestern Montgomery County, Maryland, within the Potomac Subregion planning area. The Serpentine Barrens is the only remaining significant undeveloped area of serpentinite-derived soils remaining in the County. The property has been known by numerous names including Travilah Barrens, Piney Barrens, Big Pine and Serpentine Barrens.

The park is located south of Travilah Road and west of Piney Meetinghouse Road, between the communities of Big Pine and Palantine Oaks. The park consists of three units:

- North Unit: 258 acres, fee simple acquisition, west of Piney Meetinghouse Rd

- South Unit: 65 acres, dedication, adjacent to Glen Road
- East Unit: 18 acres, dedication, east side of Piney Meetinghouse Road

All sections contain a variety of exceptional natural resources, though the North Serpentine Barrens unit is most significant due to its size, resource composition and limited encroachments by adjacent residential development. The North Serpentine Barrens borders the Rockville Crushed Stone Quarry; the South Serpentine Area is located on the southern edge of the serpentinite outcrop adjacent to Glen Road; the East Unit is on the east side of Piney Meetinghouse Road.

The Serpentine Barrens area is underlain by serpentinite bedrock. Found only in a few places around the globe, Serpentine communities are exceptionally rare. In North America, serpentinite soils occur in a discontinuous band along the eastern border of the Appalachian Mountains from Newfoundland and Quebec, Canada through New England to Alabama. Nearly 90% of the acreage in eastern North America is within Pennsylvania and Maryland.

Serpentine soils are very low in essential nutrients and high in metals toxic to most plants and animals. These and other factors are responsible for driving “hotspots” of uncommon endemic plant communities, warranting high priority retention for biodiversity conservation. Past development of this natural community has diminished Montgomery County and Maryland’s natural heritage. The Serpentine Barrens Conservation Park is the only remaining undeveloped largely intact area of serpentinite-derived soils remaining in Montgomery County.

There are no existing improved structures or known foundation remains associated with the North unit. Aerial photography dating to and subsequent to 1938 indicates a historically undeveloped site. A large overhead high tension power line owned by PEPCO traverses the North Unit in a SE to NW direction. The South Unit contained one single family home and associated outbuildings, cleared areas, an abandoned farm pond and the remnants of an unimproved road network. The house was razed in 2005 as part of the conditions of approval for the Estates of Greenbrier development.

Three park development alternatives were developed and discussed extensively by the Serpentine Barrens Management Plan staff. The selected alternative focuses on creating an educational experience for visitors, concentrating interpretive efforts in South Unit, while maintaining a conservation emphasis in North Unit. This alternative proposes no development in the North unit save for natural surface trails and one parking area, and an interpretive pavilion with associated infrastructure in the South unit. An interpretive goal is to encourage visitors of South Unit to apply newly acquired knowledge in the more pristine North Unit. No access is currently envisioned for the East Unit.

Visitation to the park is expected to peak during Spring and Fall based on supporting park trends. As this park is generally isolated within a rapidly expanding suburban area, visitation is expected to increase by a margin of 10 percent a year, with initial visitation of 30,000 visits per year. Visitation trends and resulting resource impacts will need to be monitored.

Operation & Use Plan Purpose & Policy Framework

The Serpentine Barrens Conservation Park Operation & Use Plan has been developed to implement the stewardship goals for conserved land that are set forth in both the *Legacy Open Space Functional Master Plan (2001)*, and the *2005 Land Preservation, Park, and Recreation Plan (LPPRP, formerly known as the PROS Master Plan)*. Park Operation & Use Plans, formerly called Management Plans, are internal M-NCPPC staff-level documents that provide guidance to Montgomery Parks' operating divisions on the management and maintenance of natural and cultural resources, trails, public access, and constructed facilities. Goals of the operation & use plan include:

- ❑ Identify and map the park's existing natural, cultural, and recreational resources, as well as operational issues.
- ❑ Provide a plan for how best to manage the park's natural and cultural resources that specifies both initial and on-going management tasks.
- ❑ Facilitate compliance with Montgomery County's Environmental Guidelines during the planning, development and operation of the park.
- ❑ Provide a plan for public access to the park that allows for passive recreational uses in a manner that leaves the park's most significant resources undisturbed.
- ❑ Provide a plan for the park's operation that specifies both start-up improvements as well as on-going maintenance projects.
- ❑ Provide operating budget cost estimates, in 2008 dollars, for implementing the plan's recommendations.
- ❑ Present plan recommendations in a Geographic Information System (GIS) mapped format for field use.

CONSERVATION PARK CLASSIFICATION

The park classification system outlined in the *2005 Land Preservation, Park, and Recreation Plan* establishes the parameters for development and use in conservation parks such as SBCP. The LPPRP defines conservation parks as:

"... generally large areas that preserve specific natural, archaeological, or historical features; are typically located in upland areas; and are acquired specifically for environmental preservation purposes. Conservation area parks may include outstanding examples of natural communities, self-sustaining populations of rare, threatened, or endangered plant and animal species, or unique archaeological and historical resources. Given the sensitive nature of the resources in conservation parks, development is very limited and generally restricted to passive recreation areas and opportunities such as trails, fishing and picnic areas, and nature study."

OPERATION & USE PLANNING PROCESS

The Operation & Use Plan for Serpentine Barrens Conservation Park has been developed following the same process used for previous management plans. A team of staff representing all appropriate Park and Planning Divisions was created to work collaboratively on the Operation & Use Plan. The team conducted significant fieldwork on the site and coordinated with additional staff during the process.

The Parks Director and appropriate Division Chiefs approve Park Operation & Use Plans. In accordance with the trail planning and implementation process set forth in the Countywide Park Trails Plan, the trails and public access component of the Operation & Use Plan is subject to review and approval by the Planning Board. The Trails and Public Access Plan for the Serpentine Barrens Conservation Park was approved unanimously by the Montgomery County Planning Board in November 2005.



***Serpentine Rock
Outcrop, Serpentine
Barrens***

PUBLIC INPUT ON SERPENTINE BARRENS OPERATION & USE PLAN

Over the summer and fall of 2005, staff held a series of meetings with the public to present and gather input on the Park's management plan, including the proposed trail and public access element. Staff presented a concept version of the management plan with proposed trail alignments at a general public meeting held in September 2005 at the Adventure Conservation Park. Workstations were set up at this meeting to gather public input on the plan recommendation. A number of citizens representing the equestrian community expressed considerable opposition to the proposed trail plan excluding horses from the bulk of proposed trails.

Staff met individually with representatives from the citizen groups most concerned about the park's uses to discuss and obtain further input on the management plan proposals including the trail plan.

Potential interest in the adjacent Quarry (Aggregate Industries) providing donations and support also exist. Aggregate Industries stated interest in providing signage/placards linking the Serpentine Barrens Conservation Park with geology and economics associated with their aggregate extraction, in addition to donating gravel materials mined from the quarry for proposed parking areas. Donation of large representative serpentine rocks as an exhibit feature has also been proposed.



FringeTree (Chionanthus virginicus) in flower at Serpentine Barrens Conservation Park

Serpentine Case Study

Soldier's Delight Environmental Area in Baltimore County is the largest remaining serpentine area in the eastern United States and is a very applicable planning case for the Serpentine Barrens in Montgomery County- especially regarding management issues. Soldiers Delight is nearly 2,000 acres, half of which is underlain by serpentine bedrock. Historically, the area was predominantly a grassland and oak savannah community. In the last eighty years, the area has been invaded by Virginia pine along with red cedar and greenbrier. Natural Heritage ecologists theorize that this succession has occurred because of the absence of disturbance from fire and grazing. In the early 1990's the park began a restoration program of mechanically removing pines and burning defined areas to recreate conditions for the growth of grasses. Results of the burns to date have been very promising.

Baltimore Gas and Electric maintains a powerline through Soldier's Delight similar to the PEPCO line through the Serpentine Barrens. BG&E has worked with the park to put up signage and mow the powerline easement to promote the growth of a serpentine grassland community.

Public use of Soldier's Delight is limited to hiking only. Prior to state acquisition of the land, there were equestrian trails, but these were closed in an effort to protect the sensitive ecosystem of the park. Use by equestrians, bicyclist and orienteers has been restricted since 1990 due to concerns over the impacts to the fragile environment. The park receives in excess of 70,000 visitors per year.



Park Resources & Current Conditions

GEOLOGY

The Serpentine Barrens Conservation Park is located within the Piedmont physiographic province of Maryland in an area underlain by metamorphosed ultramafic bedrock (see map attachment). There are two main types of surface bedrock geology in Montgomery County: serpentinite and diabase. The largest of these are the 1700-acre Diabase Sill in Boyds and the 2000-acre Serpentinite outcrop in Potomac. The Serpentine Barrens Conservation Park is located on top of this outcrop. Serpentinite rocks are ferromagnesium silicates high in magnesium and iron and low in aluminum, calcium, and silica.

Land surface over serpentinite is typically stony, unfertile and sparsely vegetated. Soils are often poorly developed and rocky, but highly variable depending upon climate, time of exposure, and slope. Past and recent experience with land disturbance on serpentinite has shown extensive blasting, grading, and filling is needed for, what in other places, would be normal site preparation for development.

The name "serpentine" is attributed to the soil's resemblance to a mottled greenish-brown snake dwelling on similar soils in northern Italy. The greenish soil color comes from fragments of the underlying bedrock containing magnesium silicate. The soil can be very dark in color, depending on its iron, chromite, and magnesium content.

Serpentine is believed to have been thrust up from the earth's core during plate shifting activity some 450 million years ago. Found only in a few places around the globe, serpentinite soils are very low in essential nutrients and high in nickel and chromium metals that are toxic to most plants and animals. In North America, serpentinite soils occur in a discontinuous band along the eastern border of the Appalachian Mountains from Newfoundland and Quebec, Canada through New England to Alabama. Nearly 90% of the acreage in eastern North America is within Pennsylvania and Maryland.

HISTORY OF USE OF SERPENTINE LANDS

Tens of thousands of acres of grassland dotted with Blackjack and Post Oaks once stretched across northern Maryland and nearby Pennsylvania. Prior to European settlement, large areas of Baltimore and Harford Counties and adjacent counties in Pennsylvania were covered by this prairie-like grassland. English settlers seeing this virtually treeless expanse referred to it as "The Barrens" due to the lack of wood. For thousands of years, Native Americans used fire management to keep the grasslands relatively free of woody vegetation for purposes of hunting. European settlement generally eliminated large-scale frequent fires, allowing grassland areas to transition to woodlands. Most barrens in Maryland and SE Pennsylvania have "naturally" afforested in the last 50-75 years. Montgomery County's Serpentine Barrens appears to have remained forested since at least 1920 based on review of aerial photography and dendrology ring counts, indicating a varied ecological condition from the classic "Barrens."

Serpentine communities are considered one of the State's rarest natural resources, and one of the rarest and most unusual sets of natural communities in the eastern North

American temperate forest region. Only about 2500 acres remain in Maryland, or five percent of the pre European settlement amount of 50,000 acres. The most notable Serpentine Barrens areas in Maryland include Pilot, Cherry Hill, and Soldiers Delight. Soldiers Delight is the largest remaining serpentine area in the eastern United States (700-800 ha).

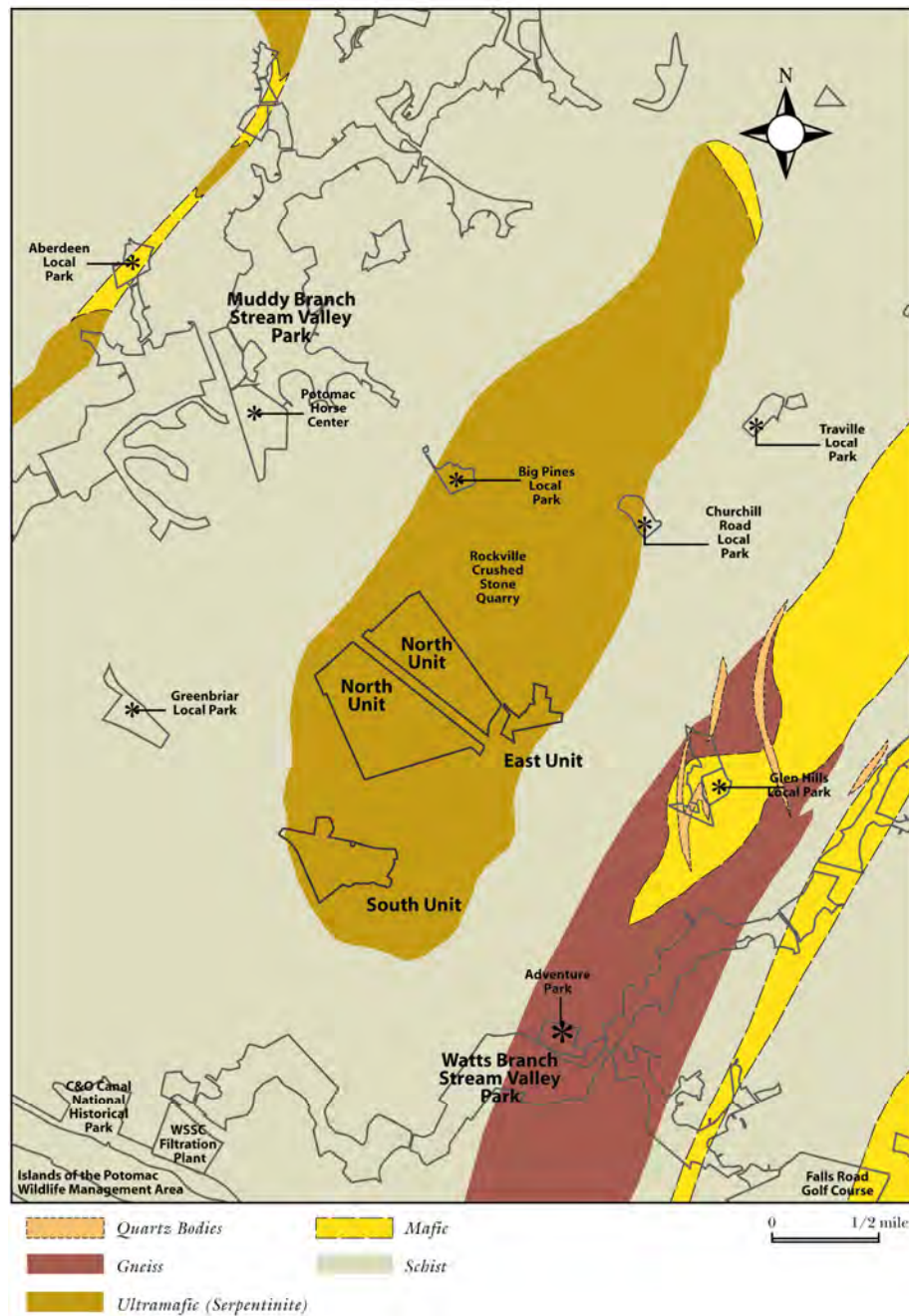
Serpentine rock is valued as a decorative building stone, for road material, and, in two Maryland localities, a historic source of chromium ore. Chromite is a significant accessory mineral in the serpentine. An excerpt from a 1929 Maryland Geological Survey report for Baltimore County discusses the historical chrome deposits:

The commercial source of the element chromium is exclusively in the mineral chromite, which when pure, is an iron chromate of the formula $\text{FeO} \cdot \text{Cr}_2\text{O}_3$. It is a heavy, opaque, iron- to brown-black mineral, with a pitchy luster, uneven fracture and hardness nearly that of steel. Geologically it is almost entirely restricted in occurrence to the dark ultrabasic rocks and their serpentinous derivatives. In Maryland chromite is found only in serpentine – a rock which is readily recognized by the barren country it produces. These “barrens,” as they are locally called, are stretches of uncultivated country which support only a sparse growth of grass, scrub oak, and pine. It is believed that this condition is due to the chemical composition of serpentine (a hydrous magnesium silicate), which prevents a vigorous growth of vegetation, thus allowing the soil to be rapidly eroded, leaving the dull, fractured, greenish-yellow serpentine rock exposed at the surface.

Serpentine outcrops are often associated with mining of chromite, talc, green marble and asbestos. The Serpentine Barrens Conservation Park is located immediately adjacent to the Rockville Crushed Stone Quarry where this bedrock is mined (See aerial image).

A 2004 aerial view of the Serpentine Barrens Conservation Park looking southeast. Note Rockville Crushed Stone Quarry in foreground.





Bedrock Geology Map of the Serpentine Barrens Conservation Park Vicinity

SOILS

The Montgomery County Soil Survey shows that the Serpentine Barrens Conservation Park consist of either Chrome/Conowingo soils, Chrome silt loam or Travilah silt loam. All three of these types are exclusively associated with serpentinite bedrock with all of the unusual characteristics that help to create unique plant associations. The survey describes these soils as having severe restrictions to the placement and use of septic fields and dwellings with basements due to high water table and shallow depth to

bedrock. Many locations on the Serpentine Barrens exhibit exposed bedrock on the surface.

Soils are deeper on the South Serpentine Barrens, especially closer to Glen Road, than in the more northern parts of the serpentinite outcrop. The 1958 Montgomery County Soil Survey indicates an area of Aldino silt loam lay between Greenbrier Branch and Piney Meetinghouse Road. The soils occur on 3 to 8 percent slopes and are moderately well drained. A siltpan or fragipan in the subsoil restricts water infiltration and keeps the soil wet for extended periods following rain events.

The presence of alluvial soils over parts of the South Serpentine Barrens and the neighboring properties indicates that the Potomac River at one time may have flowed over this area (Pleistocene epoch).

TOPOGRAPHY

The terrain of the North Unit of the park generally slopes gently toward the Greenbrier Branch in the middle of the park. North of the PEPCO powerline and west of Greenbrier Branch, the terrain slopes less than 3%. The steepest areas in the North Unit occur on the hillslope between the Greenbrier Branch and Piney Meetinghouse Road, but these slopes are greater than 15% in only a narrow area. The high point on the North Unit occurs near where the PEPCO line intersects Piney Meetinghouse Road with an elevation of 435 feet above sea level. The low elevation occurs where the Greenbrier Branch flows offsite at an elevation of 295 feet above sea level.

The South Unit terrain is generally steeper than the North Unit with slopes greater than 8% throughout much of the area. This topography gives rise to several streams in contrast to the drier conditions in the North Unit. The highest elevation in the South Unit is 325 above sea level; the lowest elevation where the Greenbrier Branch intersects River Road is 245 feet above sea level.

VEGETATION

Because of soil driven stresses, Serpentine Barrens are rare ecosystems that provide habitat for a number of rare, endemic plant species. Toxic to plants, as much as one-third of the bedrock may be made of magnesium. High levels of magnesium in the soil block a plant's ability to take in soil nutrients, especially calcium. Because they are shallow and low in organic material and clay, serpentine soils have limited water holding and nutrient capacity. Serpentine soils often have pockets of additional heavy metals toxic to plants, including chromium, cobalt, and nickel. Also, these soils are normally acidic near the surface, but less so in deeper layers. As wind and water erode the soil, non-acidic layers are exposed, creating varied habitat for plants.

Most serpentine plants have developed special adaptations in form or internal chemistry. Some plants are extra-efficient at absorbing the crucial nutrient calcium, which offsets the negative effects of magnesium. Some herbaceous species on serpentine soils avoid the heat by being very hairy or having specialized leaf types. For example, the

Serpentine Chickweed, which occurs only on serpentine soil, produces a thick covering of hair on its leaves and stems. This dense layer of hair serves to reflect excessive sunlight which could cause leaves to overheat. In addition, it serves as a humidity trap, preventing the leaves and stems from wilting during hot summer droughts. Another example is little bluestem grass that prevents excessive water loss on hot, sunny days by rolling its long, narrow leaves inward. In addition, extensive root systems allow many plants to tap more moisture from the dry, shallow soils.

Plant communities found on this type of formation, including both the north and south serpentine area, have traditionally been called “barrens” due in part to the lack of nutrients in the soil or the presence of minerals at levels toxic to plant growth, and because once cleared, these areas tend not to support agriculture or allow for normal forest regeneration. Serpentinite soils have the effect of stunting growth in plants, creating a somewhat miniaturized condition where forests occur.

Montgomery County’s Serpentine Barrens appears to have remained forested since at least 1920 based on review of aerial photography and study of dendrology ring counts, indicating a varied ecological condition from the classic Barrens. A large majority of the Serpentine Barrens Conservation Park acreage is covered by maturing, second growth forest with good structure, well developed shrub levels, and relatively few non-native invasive species. The oak (*Quercus*) genus is significant on the Serpentine Barrens with abundant representation and dominance in both the overstory and the understory. Common oak species include white, red, black, post, blackjack, chestnut, swamp white, scarlet, southern red, shingle, and willow oak. The total forested acreage is approximately 339 acres. The park’s forested acreage represents one of the largest remaining contiguous forest tracts in the Potomac subregion.

The Serpentine Barrens is unique in the presence of Yellow Pine (*Pinus echinata*), Post Oak (*Quercus stellata*) and Blackjack Oak (*Quercus marilandica*). These three trees are signature species for the SBCP and are very uncommon in the remainder of Montgomery County. The Yellow or Shortleaf Pine is capable of sprouting new growth after fire.

***A 45 year old stunted oak tree stump
(note annual growth rings
and pen for scale)***



The Environmental Resources Inventory for the Potomac Subregion (M-NCPPC, 1999) identified three forest stands on these sites as being significant based on their size and

potential for supporting forest interior wildlife. Further analysis through the Potomac master plan process identified these forests as being among several in Potomac with a high priority for forest preservation. They were “recommended for acquisition because of the following characteristics: the presence of unique vegetation communities or state RTE species or high potential for RTE habitat, the fact that almost the entirety of the applicable properties are covered by the stand, the high potential for forest interior habitat, and the large sizes of the stands.”

Over twenty species of rare, threatened, endangered, and watchlist (RTEW) plants occur in the Serpentine Barrens Conservation Park (vegetation studies conducted by Natural Resources Management staff, Maryland DNR, the Maryland Native Plant Society, and independent consultants). On serpentine outcrops best developed in Maryland are several groups of species which are either endemic or well restricted to these areas. These species include: *Agalinis purpurea*, *Arabis lyrata*, *Arenaria stricta*, *Asclepias verticulata*, *Bouteloua curtipendula*, *Carex bicknellii*, *Carex oblongifolium*, *Cerastium arvense*, *Deschampsia caespitosa*, *Fimbristylis laxa*, *Panicum annulum*, *Phlox subulata*, *Polugala verticillata*, *Quercus marilandica*, *Scutellaria parvula var ambigua*, *Sphenopholis obtusata*, *Sporobolus heterolepis*, and *Talinum teretifolium*. Purple milkweed, found on the South Unit, is reported as either endemic or well restricted to serpentine barrens.

Following the park's acquisition, Park Planning and Natural Resources Management staff completed several “walkthrough” inspections of the park, and species lists for woody and herbaceous plants were compiled. Information on dominant and co-dominant species, size class, uncommon species and special habitats, and general health of the stands was recorded. Individual forest stand descriptions are provided in the plan appendix and include approximate stand acreage, species noted, retention priority, and comments on the stand's overall structure and condition. A complete listing of the park's observed vegetation species is available.

The forest can be described under four broad Forest Stand designations:

Stand 1: Dominated by mixed oaks, but with a high number of other deciduous trees including hickories, white ash, American beech, and elm, as well as scattered conifers such as Virginia pine, and eastern red cedar (200+/- acres).

Stand 2: Heavily influenced by Blackjack and Post oaks, canopy and herbaceous layers more typical of serpentinite influenced soils (50+/- acres).

Stand 3: Dominated by oak and hickory species with a strong Chestnut Oak influence (20+/- acres).

Stand 4: Bottomland, wetland or floodplain forest, typically including swamp white oak, willow oak, greenbriers and hydrophytic vegetation (27+/- acres).

While these broad categories help to give an overall picture of the site in general terms, it should be emphasized that there are a large number of special habitats and species uncommon to Montgomery County scattered throughout the park. These uncommon plants and special communities do not necessarily fit within the forest stand boundaries.

Additionally, even though general forest stand boundaries can be discerned, there is much species overlap within the defined stands. Mixed oak species are common across the entire property.

Commission studies by independent consultants have found seven State of Maryland RTE (rare, threatened or endangered) species and eleven watchlist species on the South Serpentine area. These species are classified based on their locations and abundance in Maryland, NOT in the entire United States (see Appendix B for complete Plant List).

Rare, Threatened, Endangered or Uncommon Plant Species on the Serpentine Barrens

Common Name	Latin Name	State Rank / Status
Running Juneberry	<i>Amelanchier spicata</i>	S-1
Juneberry	<i>Amelanchier stolonifera</i>	S-2
Virginia Snakeroot	<i>Aristolochia serpentaria</i>	S-3
Purple Milkweed	<i>Asclepias purpurascens</i>	SU
Whorled Milkweed	<i>Asclepias verticillata</i>	S-3
Cornel-leaved Aster	<i>Aster infirmus</i>	S-3
Low Bindweed	<i>Calystegia spithamea</i>	S-2
Small-flowered Bittercress	<i>Cardamine parviflora</i>	S-3
Flattened Sedge	<i>Carex complanata</i>	S-3
Pubescent Sedge	<i>Carex hirtifolia</i>	S-3
American Chestnut	<i>Castanea dentata</i>	S-2/3
Whorled Coreopsis	<i>Coreopsis verticillata</i>	S-3
Leatherwood	<i>Dirca palustris</i>	S-2 Threatened
Engelmann's Spikerush	<i>Eleocharis engelmannii</i>	S-3
Tall Boneset	<i>Eupatorium altissimum</i>	S-3
Shining Bedstraw	<i>Galium concinnum</i>	S-3
Striped Gentian	<i>Gentiana villosa</i>	S-1 Endangered
Quillwort	<i>Isoetes engelmannii</i>	S-3
Potato Dandelion	<i>Krigia dandelion</i>	S-1 Endangered
Violet Bushclover	<i>Lespedeza violacea</i>	S-3
Narrow Melic Grass	<i>Melica mutica</i>	S-1 Threatened
Large-seeded forget-me-knot	<i>Myosotis macrosperma</i>	S-2/3
Spring Forget-me-not	<i>Myosotis verna</i>	S-3
Yellow Passionflower	<i>Passiflora lutea</i>	S-3

Common Name	Latin Name	State Rank / Status
Carolina Leaf-flower	<i>Phyllanthus caroliniensis</i>	S-3
Shingle Oak	<i>Quercus imbricaria</i>	S-3
Bashful Bulrush	<i>Scirpus verecundus</i>	S-2/3
Leonard's Skullcap	<i>Scutellaria leonardii</i>	S-2 Threatened
Small Skullcap	<i>Scutellaria parvula</i>	S-H Extirpated
Balsam Ragwort	<i>Senecio pauperculus</i>	S-3
Smalls Ragwort	<i>Senecio smalli</i>	S-3
Featherbells	<i>Stenanthium gramineum</i>	S-1 Threatened

EXPLANATION OF RANK AND STATUS CODES

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

GLOBAL RANK

- G1. Highly globally rare. Critically imperiled globally because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- G2. Globally rare. Imperiled globally because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- G3. Either very rare and local throughout its range or distributed locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; typically with 21 to 100 estimated occurrences.
- G4. Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.
- G5. Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.

STATE RANK

- S1. Highly State rare. Critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation. Species with this rank are actively tracked by the Natural Heritage Program.
- S2. State rare. Imperiled in Maryland because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres in the State) or because of some factor(s) making it vulnerable to becoming extirpated. Species with this rank are actively tracked by the Natural Heritage Program.
- S3. Rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Natural Heritage Program
- S3.1 A species that is actively tracked by the Natural Heritage Program because of the global significance of Maryland occurrences. For instance, a G3 S3 species is globally rare to uncommon, and although it may not be currently threatened with extirpation in Maryland, its occurrences in Maryland may be critical to the long term security of the species. Therefore, its status in the State is being monitored.
- S4. Apparently secure in Maryland with typically more than 100 occurrences in the State or may have fewer occurrences if they contain large numbers of individuals. It is apparently secure under present conditions, although it may be restricted to only a portion of the State.
- S5. Demonstrably secure in Maryland under present conditions.

Habitat Information for Rare, Threatened, Endangered or Uncommon Plant Species on the Serpentine Barrens

Latin Name	Common name	Status	Habitat	Source
<i>Aristolochia serpentaria</i>	Virginia snakewort	Watchlist	Forested areas and clearings, mesic to xeric. Most abundant on limestone substrates in core of range	Natureserve.org, wildflower2.org
<i>Asclepias purpurascens</i>	Purple milkweed	Watchlist	"Apparently not restrictive," prairies, forest openings and edges, thickets, wet or dry areas.	Natureserve.org, Britton and Brown, wildflower2.org
<i>Aster infirmus</i>	Cornel-leaf aster	Watchlist	Dry usually rocky soil	Britton and Brown
<i>Cardamine parviflora</i>	Small-flowered bittercress	Watchlist	Occurs in dry soils. Other Cardamine species adapted to fine to coarse soils	plants.usda.gov, Britton and Brown
<i>Carex hirtifolia</i>	Pubescent sedge	Endangered		
<i>Castanea dentata</i>	American chestnut	Watchlist		
<i>Coreopsis verticillata</i>	Whorled coreopsis	Watchlist	Other Coreopsis sp. adapted to medium, fine grain soils	plants.usda.gov, wildflower2.org
<i>Dirca palustris</i>	Leatherwood	Threatened	Rich or moist woods	Newcomb's wildflower guide wildflower2.org
<i>Eleocharis engelmannii</i>	Engelmann's spikerush	Watchlist	Marshes, ponds, lakes, ditches	
<i>Eupatorium altissimum</i>	Tall thoroughwort	Watchlist	Dry, open places. Open woods and prairies	Britton and Brown, Newcomb's wildflower guide
<i>Gentiana villosa</i>	Striped gentian	Endangered	Found in shady places. Fire tolerance based on other Gentiana species	Britton and Brown, plants.usda.gov
<i>Isoetes engelmannii</i>	Quillwort	Watchlist		
<i>Krigia dandelion</i>	Potato dandelion	Endangered	Moist soil	Britton and Brown
<i>Lespedeza violacea</i>	Violet bushclover	Watchlist	Found on dry hills and banks. Other Lespedeza sp. adapted to coarse to fine grain soils.	plants.usda.gov, wildflower2.org
<i>Melica mutica</i>	Narrow melic grass	Threatened	Other Melica sp. adapted to coarse to fine soils	Britton and Brown, plants.usda.gov
<i>Myosotis verna</i>	Spring forget-me-knot	Watchlist	Dry woods and banks, other Myosotis sp. occur on fine to medium soils	Newcomb's and plants.usda.gov
<i>Quercus imbricaria</i>	Shingle oak	Watchlist	Coarse to medium grain soils	plants.usda.gov
<i>Scirpus verecundus</i>	Bashful bulrush	Watchlist	Primary habitat is dry, rocky hardwood forests. Collected in MD in moist forests, meadows and along streams. May require forest gaps for persistence.	Natureserve.org
<i>Scutellaria parvula</i>	Small skullcap	Endangered	Occurs on sandy soils, usually in limestone areas	Newcomb's wildflower guide Britton and Brown, wildflower2.org
<i>Senecio pauperculus</i>	Balsam ragwort	Watchlist	Occurs on dry, rocky soils. Other Senecio sp. occur on fine to coarse soils	Britton and Brown, plants.usda.gov
<i>Stenanthium gramineum</i>	Featherbells	Threatened	Open woods	Newcomb's wildflower guide
<i>Veronicastrum virginicum</i>	Culver's root	Under review for inclusion	Occurs in a variety of habitats, prairie, meadows, forest edge, stream banks.	Natureserve.org, Britton and Brown

In other parts of the United States, an ecological management program has been initiated to halt the spread of conifers and to restore some of the largest historical serpentine grasslands now occupied by pine woodlands. Pines and cedars are cut and transported off site for disposal. Native oaks are maintained, as they were historically a part of this natural community. When conditions are right, these areas are then burned, using state-of-the-art fire management techniques. A similar program is not appropriate at the Serpentine Barrens Conservation Park as the existing forested mosaic appears to represent a stable community, generally unchanged for at least 100 years.

WILDLIFE

The large contiguous forest that comprises the great majority of the acreage at Serpentine Barrens Conservation Park provides critical habitat for forest interior dwelling species, particularly birds. These species require large unbroken tracts of forest to successfully breed. Large contiguous forest habitat is becoming increasingly scarce in Montgomery County as development continually fragments woodlands into smaller isolated tracts.

Limited wildlife inventories of the Serpentine Barrens have been conducted since the park was acquired. Natural Resources Management staff completed a thorough “walkthrough” inspection of the park, and a species list was compiled. Most of the species have been detected through sightings, tracks, and calls. A complete listing of the park’s observed wildlife is provided in Appendix C. Additional species will likely be recorded for this park as future surveys are conducted.

Birds are an excellent indicator species for evaluating habitat quality and making inferences about habitat suitability for other animal species. Over 60 species of birds were detected in the park. The list includes a significant number of forest interior dwelling species such as Louisiana waterthrush, scarlet tanager, ovenbird, pileated woodpecker, and barred owl, indicating a high quality forest.

In addition to birds, the park is home to a wide diversity of terrestrial wildlife species including at least 14 species of mammals, 6 reptiles, and 11 amphibians. Mammals include common species such as red fox, white-tailed deer and gray squirrel, as well as less common species such as eastern coyote. Many signs of a high deer population were observed in the park including reduced forest understory density and regeneration and negative impacts to the health of several RTEW species. Reptiles include most of the common species of the County as well as the less common eastern hognose snake and five lined skink. Wetlands and vernal pools provide breeding habitat for spotted salamanders, marbled salamanders, wood frogs, spring peepers and other amphibians. The State rare buckmoth also occurs on the property. In addition, the Maryland DNR conducted field surveys of the Eastern sedge barrens planthopper (*Limotettix minuendus*) in September 2006 on the Serpentine Barrens.

HYDROLOGY AND AQUATIC LIFE

Hydrologically, the Serpentine Barrens Conservation Park is located within the Greenbrier Branch watershed. The Greenbrier Branch is a tributary of Watts Branch. The Greenbrier Branch watershed is designated Use I-P by the Maryland Department of the Environment. Use I-P waters are suitable for use as a public water supply. *The Countywide Stream Protection Strategy* (CSPS, Montgomery County Department of Environmental Protection, 1998) identifies the Greenbrier Branch as having good habitat but fair stream conditions overall. The 2003 Update to the CSPS rated the upper portion of the Greenbrier Branch fair and the lower portion good. The North and South Unit comprise approximately one mile of intermittent or perennial stream.

The headwaters of the Greenbrier Branch have been cut off by the excavation of the Rockville Crushed Stone Quarry. Excess water that accumulates in the quarry is pumped through a regulated discharge into Sandy Branch to the northwest of the Park.

Wetlands in the Serpentine Barrens Conservation Park are generally associated with the stream network. A notable exception is a high quality vernal pool/upland depression swamp just south of the PEPCO alignment towards the west end of the North Unit. Trail alignments have been sited so as to avoid this sensitive breeding area for amphibians and a unique resource within the Park. In the North Unit, marbled salamander larvae have been identified in streams in addition to the upland depression swamp. In the South Unit, there are riparian wetlands with large populations of skunk cabbage and an abandoned farm pond with emergent vegetation.

A wetlands functional analysis was conducted for the Potomac subregion by M-NCPPC staff according to a protocol developed collaboratively with the Maryland Department of the Environment in 1997. The study identified the wetlands associated with the Greenbrier Branch as having high functional value. Value was determined using multiple criteria including groundwater discharge, wildlife habitat, sediment retention, nutrient removal, and flood flow attenuation. An Army Corps of Engineers Jurisdiction Wetlands Study delineated many wetlands throughout the stream buffers on the site.

The presence of alluvial soils over parts of the South Serpentine Barrens indicates that possibly the Potomac River at one time may have flowed over this area. Cobbles of an ancestral Potomac River or mainstem tributary are apparent on the property.

CULTURAL RESOURCES

The property has historically remained undeveloped. No cultural or archeological resources are known for the property.

TRAILS AND PUBLIC ACCESS

There are roughly 4 miles of existing unimproved “peoples choice” natural surface trails within SBCP and the PEPCO clearing. The trails and PEPCO clearing have received infrequent use primarily by equestrians from neighboring properties. There are no existing parking areas that provide public access to the trail network. The existing trails have been surveyed by a Global Positioning System (GPS) and are depicted in the attached management plan map.

Resource Management Plan

Primary resource management issues include:

- Control of non-native invasive species: *Microstegium* or Vietnamese stilt grass is abundant in the park and has spread into a number of patches in the forest. Japanese barberry and Japanese honeysuckle also threaten the native plants in the park.
- All-terrain vehicle and equestrian usage: The park has been a site for all-terrain vehicle (ATV) and equestrian activity in the past, and continues to be so even under M-NCPPC ownership. ATVs access the park via the PEPCO lines and gas line easements. ATV usage is not allowed in the Conservation Park. Horses are only permitted on existing equestrian easements and are prohibited in the Park interior.
- Dumping of trash and landscaping debris: Dumping of trash and woody debris has occurred on the property over many years prior to the park's acquisition. Several old minor trash dumps were observed scattered throughout the park particularly in wooded areas near utilities. Overall debris is significantly less common in the North Unit as compared with the South Unit.
- Control of people's choice trails: There are roughly 4 miles of existing people's choice natural surface trails within SBCP. The trails have received infrequent use primarily by previous property owners from neighboring properties. Some of these trails are highly eroded, impact rare plant species, or of concern due to proximity to the adjacent quarry. Problem areas will be rerouted, closed, and re-vegetated as necessary.

The following is a listing of recommended actions to ensure proper stewardship of the natural and cultural resources found in SBCP. Operating budget cost estimates, in 2008 dollars, for implementing recommended actions are included for all affected Montgomery Parks operating divisions.

VEGETATION MANAGEMENT RECOMMENDATIONS

- Ensure there is no further fragmentation of the existing forest within SBCP by restricting all improvements to the edges of the park or within areas previously impacted.
- Conduct further inventories of the park's vegetation. Set up long-term vegetation monitoring plots in the Park to assess population trends in RTEW plants and the composition of the forest. Identify priority RTEW plant habitats and protect them with deer proof fencing. For targeted RTEW species, delineate areas to be managed and develop a species-specific management

protocol. Baseline RTES plot samples were conducted in the Spring and Summer of 2005.

- Monitor forest stands to assess impacts from non-native invasive plants, gypsy moths, white tailed deer, and trail users. At minimum, an annual walk-through assessment should be conducted by PPSD staff. Work with the Maryland Department of Agriculture to monitor local gypsy moth populations and implement management efforts as needed. If spraying is required, utilize Gypchek to protect non-target *Lepidoptera* species. Conduct future surveys for the State Rare Buck Moth, identified on-site circa 1990 by MDDNR staff.
- Identify concentrations of non-native invasive plants and implement management procedure as follows and develop a species-specific management protocol. *Microstegium* occurs along the people's choice trails in the park and has spread into a number of patches in the forest. Japanese barberry and Japanese honeysuckle also threaten the native plants on the site.
- Recruit and train volunteer "weed warrior" groups. Develop work program for "weed warriors" and park staff. Annually monitor and evaluate work program efforts.
- Implement a deer exclusion study by constructing a suitable deer exclusion area, so as to study impacts of deer on forest regeneration. Also, identify priority RTEW plant habitats and protect with deer-proof fencing.
- Inspect proposed trail routes and parking areas prior to construction with Park Planning and Stewardship Division (PPSD) to avoid critical vegetation resources and minimize clearing of trees and understory vegetation.
- Inspect trails twice annually, once in late spring and once in late summer, in coordination with Park Manager, to assess impacts of trail use on vegetation.

WILDLIFE MANAGEMENT RECOMMENDATIONS

- Maintain a closed forest canopy to protect the habitat of forest interior birds by minimizing trail widths and restricting all improvements to the edges of the park.
- Conduct additional wildlife inventories of the park including breeding birds, small mammals, amphibians, and reptiles.
- Install, maintain and monitor a variety of wildlife nest boxes for bluebirds, kestrels, owls, flying squirrels and other cavity nesting species.
- Conduct managed deer hunts or police sharp-shooting as necessary. Evidence of deer overbrowsing on the site has been noted by staff wildlife biologist. A program to manage white-tailed deer populations in the park was initiated in the Fall of 2003 in accordance with the County's deer management plan and will be continued into the foreseeable future. The goal of the program is to maintain

deer numbers at a level compatible with the habitat in order to protect this unique ecosystem. The plan includes the use of hunters to manage deer populations within the park. Managed hunts are held on certain advertised dates and are open only to hunters specially permitted by Montgomery Parks to participate. The park is closed to all other uses on days when the managed hunts occur. Deer populations are monitored, and annual program evaluations and harvest goals are set accordingly.

- Provide adequate signage related to the occurrence of ticks on the property and information related to how to avoid contact and minimize potential for lyme disease exposure. Additional measures for tick management may become necessary, as the SBCP seems to be a “hotbed” for tick activity, based on M-NCPPC field research.

WATER AND FISHERIES MANAGEMENT RECOMMENDATIONS

- Monitor existing vernal pool, wetland seeps and investigate methods to improve this important habitat
- Conduct stream restoration projects, most notably in association with proposed stream crossing projects and area of homestead site and in-line pond on South Unit.
- Inspect proposed trail routes and parking areas prior to construction to avoid critical water resources.
- Inspect trails twice annually, once in late spring and once in late summer, to assess impacts of trail use on water resources. As part of annual trail maintenance re-route any trails outside of wetland buffers unless they are placed on a boardwalk.

OTHER RESOURCE MANAGEMENT RECOMMENDATIONS

- Expand a relationship with PEPCO involving management of PEPCO’s powerline through the Serpentine Barrens. An analogous example: Baltimore Gas and Electric maintains a powerline through Soldier’s Delight similar to the PEPCO line through the Serpentine Barrens. BG&E has worked with the park to put up signage and mow the powerline easement to promote the growth of a ecologically diverse and healthy serpentine grassland community. Also, monitor potential dumping of woody debris and other material along PEPCO property to ensure that a pattern of past dumping/storage of materials does not continue. Bulk debris piles along M-NCPPC Park property in addition to being unsightly and counter to a “park-like experience,” can provide a pathway for invasive species into the Conservation Park.
- Visitation will need to be monitored. If resource impacts are identified, adjustments will be required in numbers of visitors and or trail alignments.

- Implement interpretive opportunities with Montgomery County Board of Education (see Trails and Public Access Plan).
- Develop research programs for students interested in nature or geology study, to be coordinated through Senior Park Naturalist assigned to the Serpentine Barrens.

**RESOURCE MANAGEMENT PLAN IMPLEMENTATION COST ESTIMATES
(IN 2008 DOLLARS)**

Table 1. Operating Budget Impact (OBI) for Park Planning and Stewardship Division, Natural Resources Stewardship and Resource Analysis sections

	Set-up Costs:	Annual Costs:
	1. Vegetation inventory	1. Vegetation inventory
	2. Wildlife inventory	2. Wildlife inventory
	3. Non-native invasive species inventory & control plan	3. Non-native invasive species control
	4. Management of non-native invasive plants	4. Management of non-native invasive plants
	5. Management of RTEW species	5. Management of RTEW species
	6. Deer management	6. Deer management
	7. RTE Enclosures	7. RTE Enclosure monitoring
	8. Inspect proposed trail routes and parking areas for critical resources	8. Annual trail inspections (2X year)
	9. Study interpretive opportunities	9. Study interpretive opportunities
	10. Develop natural resources management plan	10. Develop natural resources management plan
Personnel Services	\$11,000	\$3,233
Supplies and Materials	\$1,300	\$450
Other Services & Charges	\$5,000	\$2,225
Capital Outlay	\$0	\$0
Chargeback	\$0	\$0
Total expenditure	\$17,300	\$5,908
Workyears	0.50	0.19

Table 2. OBI for Northern Region

	Set-up Costs:	Annual Costs:
	1. Coordinate resource management with PPS	1. Coordinate resource management with PPS
	2. Non-Native Invasive control	2. Non-Native Invasive control
Personnel Services	\$3068	\$9204
Supplies and Materials	\$2550	\$500
Other Services & Charges	\$0	\$0
Capital Outlay	\$6500	\$0
Chargeback	\$0	\$0
Total expenditure	\$12,118	\$9704
Workyears	0.06	0.19

Table 3. Capital Budget for Resource Management Plan: Approved FY07-FY12 CIP

Project Description	FY07	FY08	FY09	FY10	FY11	FY12	Unscheduled Expenditures
Stream bank Protection, PDF # 818571							
Stream Restoration in Greenbrier Branch							\$300,000

Trails and Public Access Plan

The trails and public access component of this management plan establishes the location of the park's trails and parking facilities, and determines the types and uses of the trails. The trail system proposed for SBCP consists entirely of natural surface trails that provide access for hikers. The trails and public access plan was developed in accordance with the natural surface trail planning process set forth in the recently amended the *Countywide Park Trails Plan*, and was approved by the Planning Board in November of 2005. The proposed trails, use designations, and associated trailhead parking areas that were approved by the Planning Board are represented in the Natural Surface Trail Map in the attached management plan map.

The Management Plan calls for the construction of natural surface trails open to hikers only. To protect the rare and sensitive ecosystem of the Serpentine Barrens Conservation Park, the Legacy Open Space Advisory Group strongly favored limiting public access into the interior of the park to hiking only. The State of Maryland Department of Natural Resources established this policy for management of Soldiers Delight, Maryland's most expansive remaining natural serpentine area. Prior to State acquisition of the land, there were equestrian trails, but these were closed to equestrians, cyclists, and orienteers in 1990 in an effort to protect the sensitive ecosystem of the park.

Trails at Serpentine Barrens Conservation Park will be field located to avoid sensitive areas including hydrologic features and concentrations of rare, threatened, endangered and uncommon plant species. Trails will allow for interpretation of the unique assemblage of natural resources.

The trails and public access plan meets the following objectives:

- ❑ The plan balances environmental and passive recreational uses, and establishes a network of natural surface trails to provide safe and enjoyable access for a wide variety of trail users while maintaining the significant resources of the park.
- ❑ The plan addresses a County policy to provide passive recreational opportunities in conservation parks for people with disabilities.
- ❑ The proposed trail system leaves undisturbed large areas of the park's interior forest.
- ❑ The plan establishes a shared use natural surface trail connection through SBCP.
- ❑ The plan provides for connectivity to a countywide network of private and public equestrian trails (See Equestrian Trail Corridors map).
- ❑ The plan recommends establishment of an ADA accessible natural surface trail in the South Unit.

- ❑ The plan provides for convenient and safe gravel parking areas for trailhead parking.
- ❑ The plan provides four trail loops within the park.
- ❑ The plan provides educational opportunities to be hosted in a proposed future pavilion in the South Unit.

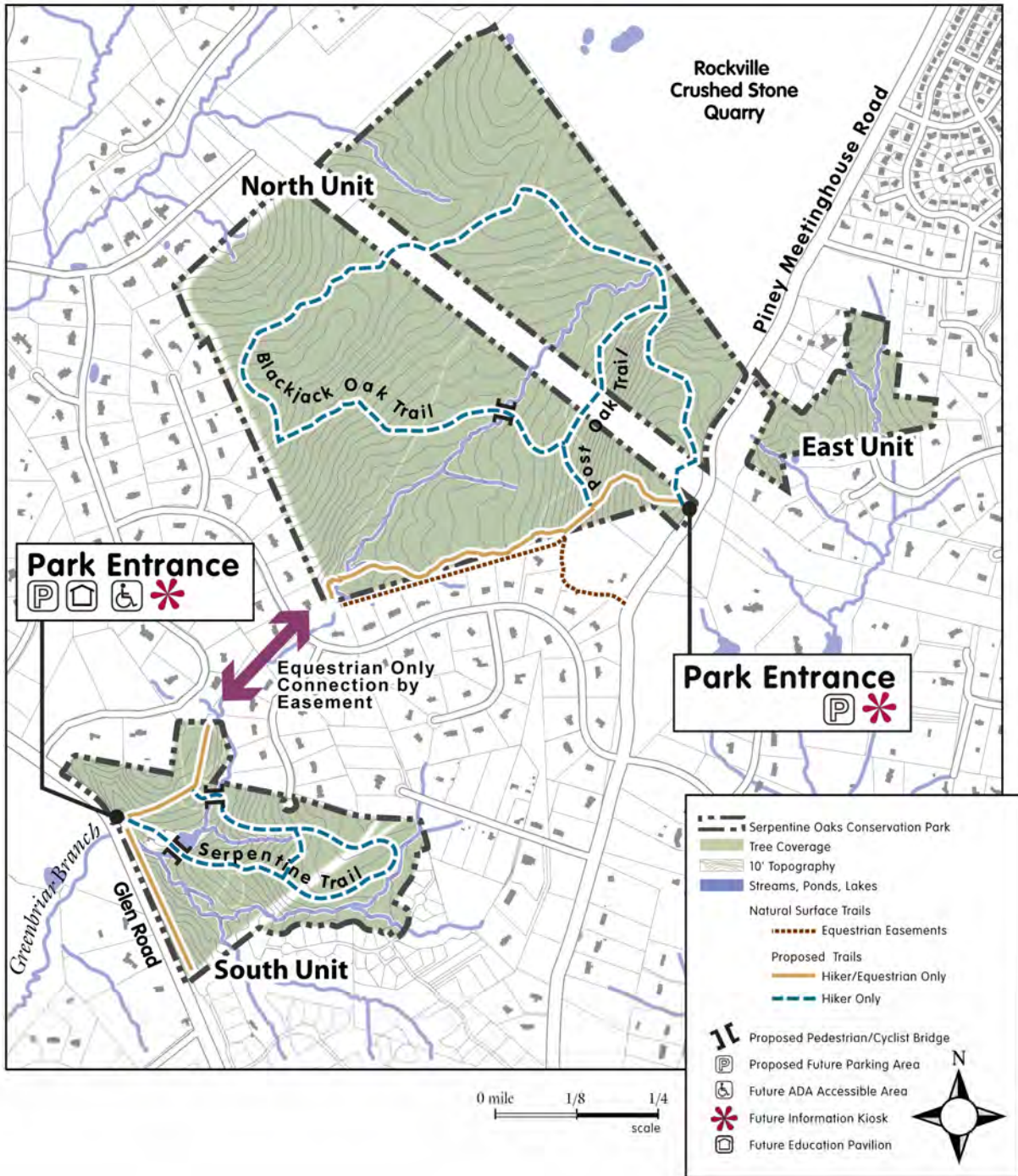
NORTH SERPENTINE UNIT (258 ACRES)

The approved trail concept is to have a 2-3 mile loop interior trail (Blackjack Oak Trail) and a 1-mile self-guided interpretive trail loop (Post Oak Trail). The interior trail will require two crossings of the existing PEPCO lines and the interpretive trail will require one additional crossing. An agreement with PEPCO will need to be negotiated prior to establishing these trails. The short loop goes through the areas of the park near Piney Meetinghouse Road with a small parking area in the southeast corner of the park to facilitate both trails.

The parking lot site was chosen because it provides adequate line of sight on Piney Meetinghouse Road and because that is the most narrow extension of the park and should have the least impact on the forest. A development footprint for this proposed parking area is expected to involve 5000 square feet and accommodate up to 10 automobiles. Clearing of approximately 5000 square feet of forest is expected.

The short or Post Oak Trail traverses hilly terrain providing views of a scenic chestnut oak stand with a predominantly ericaceous (blueberry, huckleberry and other members of the heath family) understory and post oak dominated glades that are representative of prototypical serpentine stunted oak forest. The short trail displays scenic landscapes and unique features of the area while leaving the majority of the forest undisturbed. The most expansive view of the Serpentine Barrens is provided where the Post Oak Trail intersects the PEPCO lines. A forested vista stretches to the west in excess of a mile. This trail also includes the highest elevation of the Serpentine Barrens at approximately 435 feet above mean sea level and involves an approximately 65 foot elevation change over a distance of 1000 feet.

The long or Blackjack Oak Trail crosses approximately $\frac{3}{4}$ the length of the park on the north side, staying a safe distance from the Quarry and avoiding areas of dense RTE plant concentrations. The trail involves two crossings of the Greenbrier Branch. The small drainage area and low flow of Greenbrier branch in the North Unit will necessitate only one minor bridge crossing. One additional power line crossing is involved. The trail is an extension of the Post Oak Trail and has its terminus at the same parking area. The long trail provides access to a large portion of the park while maintaining large, undisturbed areas within the Serpentine Barrens. It is illustrative of the variety of habitats in the park, traversing Chestnut Oak Forest, Greenbrier thickets, Post Oak Glades, and mature Oak/Hickory Forest. The Blackjack Oak Trail avoids the most environmentally sensitive areas including salamander breeding habitat, high quality seeps, a vernal pool, and a State significant concentration of *Dirca palustris* (Leatherwood) and several other State rare listed plant species.



Serpentine Barrens Conservation Park Trail Plan Map

In addition, a 10-foot wide recorded equestrian trail easement along the southeast side of the North Serpentine Unit is platted along the property line, crossing nine recorded and built single-family lots. The existing trail for this easement does not honor the easement area, but in fact encroaches inside park boundaries. The management plan proposes allowing the equestrian trail to be maintained on park property, with minor improvements and rerouting. Maintaining the existing trail as this would be a useful concession for equestrian access/connectivity but would not permit interior encroachment into the forest.

Further, this Operation & Use Plan proposes to extend this horse trail 800 feet to the proposed parking lot along Piney Meetinghouse Road. It is believed this proposal benefits the equestrian community and prevents potential conflicts with adjacent residents without adversely affecting the Serpentine Barrens environment. Locating the horse trail on parkland allows for adequate maintenance by park staff. The trail currently turns off of parkland onto private land before it reaches Piney Meetinghouse Road. Signage indicating equestrian accessible and restricted trail sections will be necessary.

Several areas of existing trail are recommended for closure, including a 3500' stretch of trail that parallels the adjacent quarry at what is considered an unsafe distance. This trail is also in the direct path of a significant population of State listed Skullcap. Other proposed trail closures are for the purpose of expanding interior connectivity and buffering for sensitive resources. Where appropriate, existing trails are being incorporated into the design of the proposed new trail network.

Providing a trail connection between the South Serpentine and North Serpentine units for hikers is not recommended. An existing equestrian trail easement narrowly traverses forested residential backyards and crosses existing Palatine Drive (a tertiary subdivision road) to link the North and South Units. The area is aesthetically inappropriate for purposes of park usership and would be minimally used. It does not appear to be necessary or worthwhile to try to provide a trail connection between the two areas, other than honoring existing equestrian easements.

SOUTH SERPENTINE UNIT (65 ACRES)

The South Serpentine provides a condensed version of the larger serpentine site (i.e. quicker access to riparian habitat, RTEs, representative forest, rock outcrops) and is better suited for a shorter interpretive trail and for elementary-aged school group interpretation. The overall quality of the South Serpentine Barrens is lesser when compared with the North Unit. Areas of clearing and prior usage are common. Invasive and exotic plant species are considerably more entrenched in the South Unit. These factors allows for a greater intensity for proposed usage without concern for significantly degrading a pristine area.

A single trail, the Serpentine Trail, is proposed for the South Unit and involves either a ½- or 1-mile loop. Approximately 50 percent of the proposed trail involves the use of existing unimproved pathway. This trail is intended for interpretation and represents a good example of a serpentinite-influenced forest. Post and blackjack oaks are common as is the pervasive feeling of a generally stunted forest. The trail involves two crossings

of an existing gas line easement. The trail parallels an intermittent stream for approximately 1000 feet and affords good views of exposed bedrock. This trail also incorporates an existing in-line farm pond that has transitioned into a cattail-rich wetland area good for birding and similar nature observation.

Grades associated with the Serpentine Trail are gentle to slightly moderate allowing for Americans with Disabilities (ADA) compliance. The proposed trail will involve two crossings of Greenbrier Branch, necessitating bridge structures. A bridge crossing will be needed downstream of the farm pond or along the existing pond berm. On natural surface trails, six-foot wide fiberglass bridges are usually installed, but hiker-only bridges can be designed smaller with a more rustic appearance. These smaller bridges should be considered in the final planning for this hiking-only trail loop.

Two extensions of an existing equestrian easement are proposed for the South Unit. One traverses an existing impaired area along a roadbed west of the homestead area, extending north through impacted forest and old field to link up with Greenbrier Road. The other proposed extension is along Glen Road, allowing linkage from Greenbrier Road to a recently recorded easement on the Estates of Greenbrier. This connection will involve minor clearing and a ford of the Greenbrier Branch. The trail should be within the Park boundary following the alignment of Glen Road and be buffered by adequate treeline between the road and the trail for the protection and safety of equestrian users and possibly pedestrians using the path. Providing this trail would ensure equestrians access to two existing trail routes: a bridle easement directly across Glen Road from the proposed South Unit park entrance, and the Great Elm bridle easement across Glen Road from the new Greenbrier Subdivision that provides access to Watts Branch Stream Valley Park.

The existing cleared area adjacent to Glen Road on the South Serpentine represents the proposed parking area for the South Unit. The existing house and barn on the site have been removed and remediation of the site is pending.

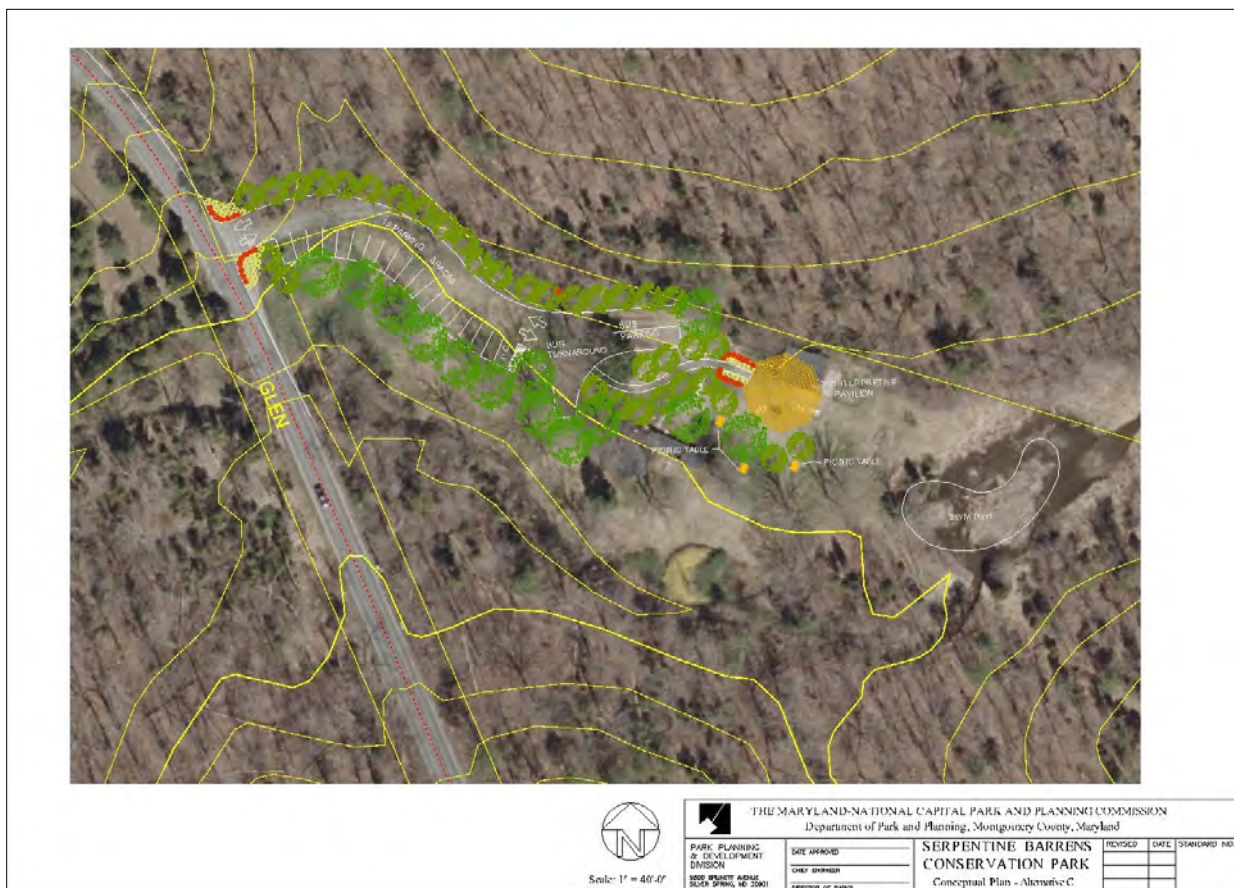
This Operation & Use Plan recommends that an open-air pavilion be established on the South Unit for multiple interpretive uses. The facility is envisioned to provide a staging area for M-NCPPC Park Naturalists as they conduct guided walks of the park and to be sized adequately to host school groups making educational field trips. Significant educational signage will be provided along the one-mile loop trail to build upon the educational information in the pavilion.

The pavilion will need to be secured when not in active use by a park naturalist or approved school group. Toilet facilities also need to be provided to allow school groups to use such a facility. Permanent chemical toilets are recommended for this site as a more attractive and stable alternative to portable toilets. The parking lot will need to be adequately sized to accommodate up to 20 vehicles and at least two buses with turnaround space. The scale of clearing and development required to build such a pavilion and parking lot was considered for the North unit, but deemed inappropriate because it would encroach on a high quality post oak forest community.

Should the pavilion fail to materialize, use of existing M-NCPPC Resources are recommended. Adventure Conservation Park is within a 3-minute drive from the Serpentine Barrens Conservation Park. Adventure has a recently refurbished nature

center that has bathrooms and is ADA accessible and provides a logical base for a naturalist staff. Because the Serpentine Barrens is not within the County's sewer envelope, conventional bathroom facilities at the Serpentine Barrens is not foreseeable. The Adventure facility can accommodate 60 people. An educational / public relations synergy between this facility, Serpentine Barren and the entire Legacy Open Space Program and M-NCPPC protection of sensitive resources is possible. In addition to the Serpentine Barrens, the adjacent Watts Branch Stream Valley Park, and LOS-acquired Cahoon Property allow for actual examples of M-NCPPC work in environmental protection and Park acquisition.

Cost estimates for constructing and maintaining such a pavilion, parking lot, toilet facility and interpretive signage along the trail are not included in this Plan. Detailed plans and costs will be developed as negotiations proceed with a potential donor interested in funding this exciting educational resource.



Conceptual Layout for South Serpentine Unit

EAST SERPENTINE UNIT (18 ACRES)

The east unit is entirely on the east side of Piney Meetinghouse Road. This acreage was dedicated to M-NCPPC as part of the approval of Site Plan 8-04020 (Potomac

Preserve). The majority of this section is within environmental buffer, including 100-year floodplain. Entirely forested, no formal development is proposed. Access from Piney Meetinghouse Road to Tanager Lane via an existing natural surface trail provides access for surrounding developments to the east to reach the North Unit. Bollards at the end of Tanager Lane are recommended to help limit the potential for dumping or illegal access. This area is not recommended for formalized use but strictly as a Conservation area. The East Unit will require monitoring for potential encroachments and future use.

INTERPRETIVE PROGRAMS

The Montgomery County Parks Interpretive Programming unit proposes a use plan that will combine formal public programs, special school programs, community programs, and self-guided programs in a multi-pronged approach to interpretation of this unique resource.

M-NCPPC anticipates that programming at the site will build over time. Because this is a new resource and still relatively unknown to the public, it will take time for interest to build and interpretive programming to realize maximum potential on the site.

M-NCPPC Interpretive Programming Unit proposes planning for about 24 public-organized and school group programs annually in the beginning. This will include a variety of hikes and special interpretive programs advertised to the public, plus anticipated school group programs. The bulk of the programming will take place in the spring, less in the fall and summer, and very few programs in the winter. This is based on historical patterns of attendance at interpretive programs.

The SBCP Interpretive Program proposes contacting local community groups and organizations to offer programs targeted at the communities surrounding the Serpentine Barrens. These programs will be designed to convey the uniqueness and value of the Barrens, as well as special stewardship concerns. The proposed educational pavilion on the South Unit is envisioned to be the cornerstone of coordinating educational efforts with the public schools for school-aged groups.

The Serpentine Barrens Conservation Park will also be part of a larger interpretive initiative that will involve a self-guided tour of high-value natural areas in the Montgomery County Park system. This tour will require program participants to visit several special natural areas and find answers to specific questions. The answers can only be obtained by going to each park. Once all the questions have been answered, completed brochures can be returned to one of our nature facilities to be checked by a naturalist. Successful completion of the tour will earn the program participant a patch or badge. In this way, we hope to encourage additional use of the park in a way that also achieves the objectives of the No Child Left Inside Initiative.

Formal programming of the Serpentine Barrens site cannot begin in earnest until the trail system is in place, for several reasons: A trail system minimizes trampling damage to sensitive resources by confining visitors to the established trails. Furthermore, the designated trail alignment will avoid the most valuable or sensitive areas of the Serpentine Barrens. Another consideration is safety, especially given the large numbers

of ticks that inhabit this area. A developed trail system is necessary to allow hikers to traverse the site while minimizing contact with shrubs and brush that could expose hikers to ticks.

TRAILS INFRASTRUCTURE IMPLEMENTATION RECOMMENDATIONS

Trails

Note: Trail use designations are subject to change due to seasonal conditions or future consideration according to the judgment of the park manager in consultation with other M-NCPPC staff.

- Construct shared use natural surface trails, open to hiking use only, in the North and South units in the general locations shown on the Natural Surface Trail Map.
- Construct and maintain an ADA accessible trail in the South Serpentine Unit.
- Inspect proposed trail routes prior to construction with Park Planning and Stewardship staff to avoid critical resources.
- Install 5-inch concrete filled steel bollards at the following 3 trail entrances to prevent motorized vehicles from entering trails:
 - Parking Area at Piney Meetinghouse Road just south of PEPCO lines
 - Glen Road Entrance to South Unit Parking Area
 - Terminus of Piney Glen Court
- Close any observed trails created by ATV's and unapproved equestrian uses and other undesirable trails that are not part of this plan.
- Construct and maintain all trails in a manner consistent with M-NCPPC trail construction guidelines.
- Pursue construction of a permanent Pavilion for Educational Interpretation to be located in the South Unit within proximity of the farm pond and parking area.
- Provide toilet facilities in the South Unit for accommodation of school groups and general visitors. Permanent chemical vault toilets are recommended.
- Identify potential future trail connections and assess needs based on future patterns of circulation and user-ship of the Serpentine Barrens

Parking

- ❑ Construct two gravel parking areas. North Unit parking will accommodate 10 to 12 vehicles and allow room to park and turn around. South Unit Parking will accommodate 20 spaces and allow for bus turnaround, in addition to supporting toilet and pavillion facilities. A sediment and erosion control permit will be required if construction disturbance is greater than 5,000 square feet. Gravel for parking areas may potentially be donated by Rockville Crushed Stone as an education “tie-in” to the Quarry’s operations.
- ❑ Install standard metal gates (sizes to be determined) for closing the entrances to both proposed gravel parking areas.
- ❑ Inspect proposed parking areas prior to construction with Park Planning and Stewardship staff to avoid critical resources.

Signage

- ❑ Install standard wood M-NCPPC “brown and white” park entrance signs at the proposed two new gravel parking areas to identify public access to SBCP. The signs should acknowledge the County’s Legacy Open Space Program for its role in acquiring the park.
- ❑ Construct wood information kiosks at the trailhead parking areas for North and South Units. The kiosks will provide space to post the park’s rules and regulations, and other metal regulatory signs best suited for this type of park.
- ❑ Develop a comprehensive trail signage plan for SBCP. The plan will identify the type and location of all directional, mile marker, and user designation signs, as well as trail blazes.
- ❑ Develop Interpretive Signage specific to the Serpentine Barrens.

TRAIL & PUBLIC ACCESS PLAN IMPLEMENTATION COST ESTIMATES (IN 2008 DOLLARS)

Table 4. Operating Budget Impact (OBI) for Park Planning and Stewardship Division, Natural Surface Trails Implementation section

	Start-up Costs:	Annual Costs:
	<ol style="list-style-type: none"> 1. Construct new Trails 2. Close and/or re-route sections of Trail 3. Install 3 hiker trail stream crossings 4. Install wood kiosks 5. Install trail signage 6. Install fence along trails across PepCo Property 	None
Personnel Services	\$27,000	\$0
Supplies and Materials	\$0	\$0
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Chargeback	\$0	\$0
Total expenditure	\$27,000	\$0
Workyears	0.52	0.00

Table 5. OBI for Northern Region

	Start-up Costs:	Annual Costs:
	<ol style="list-style-type: none"> 1. Close undesirable trails 	<ol style="list-style-type: none"> 1. Trail maintenance 2. Spray weeds in parking areas 3. Repair and re-paint park signage
Personnel Services	\$384	\$3,355
Supplies and Materials	\$0	\$100
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Chargeback	\$0	\$0
Total expenditure	\$384	\$3,455
Workyears	0.01	0.07

Table 6. OBI for Central Maintenance Division

	Start-up Costs:	Annual Costs:
	1. Install bollards at trail entrances 2. Construct and Install park entrance signs	Maintenance of gravel parking lots
Personnel Services	\$588	\$980
Supplies and Materials	\$900	\$300
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Chargeback	\$0	\$0
Total expenditure	\$1,488	\$1,280
Workyears	0.01	0.02

Table 7. Capital Budget for Trails and Public Access Plan: Approved FY07-FY12 CIP

Project Description	FY07	FY08	FY09	FY10	FY11	FY12	Unscheduled Expenditures
Trails – Natural Surface, PDF #858710							
<i>North Unit Improvements</i>							
Construct one trail stream crossing							\$20,000
Construct one gravel parking area							\$20,000
Construct wood kiosk and trail signage (supplies and materials only)							\$5,000
<i>South Unit Improvements</i>							
Construct two trail stream crossings							\$40,000
Construct one gravel parking area							\$50,000
Construct wood kiosk and trail signage (supplies and materials only)							\$5,000



Park Operations Plan

The following is a list of recommended actions to address operational issues identified following the purchase of SBCP for securing the property as part of the M-NCPPC park system. These include both initial or “start-up” projects and annual maintenance tasks. Project implementation will be handled by Northern Region Shady Grove staff in coordination with staff from Central Maintenance Division, surveyors from the Park Development Division, and the Park Police Division’s Patrol Section.

Tables 8 - 12 summarize capital and operating budget estimates for the Park Operations Plan. In addition, Table 13 summarizes management tasks and frequencies for the Northern Region.

Northern Region

- Install “No Hunting” and property border signs.
- Locate and remove deer hunting tree stands scattered throughout the property.
- Remove trash and debris. Dumping of trash and woody debris has occurred on the property over many years prior to the park’s acquisition. Several old minor trash dumps were observed scattered throughout the park particularly in wooded areas near utility easements. Overall debris is significantly less common in the North Unit as compared with the South Unit. Home construction and other types of debris have been noted on the edges of the park, especially along the gas line easement. A periodic effort will be made to remove debris.
- Mow grass homestead area at the South Unit entry.

Central Maintenance

- Construct and install gate at entrance to parking area on South Unit.

Park Development

- Install park green and white posts. Park green and white posts have been set up on the parts of the boundary for the North Unit, but remain to be installed on the rest of the North Unit and the South and East Units.

Park Police

- Increase Park Police presence in SBCP. Patrol access points and trails to prevent illegal uses, with particular emphasis on ending ATV use and dumping in the park. The Park Police Division’s Patrol Section has been responsible for patrolling SBCP since its purchase. Public use of the Serpentine Barrens is expected to increase significantly once proposed trail alignments are constructed. The park has been a site for all-terrain vehicle (ATV) activity in the past, and continues to be so even under M-NCPPC ownership. ATVs access the park primarily via the PEPCO Utility easements.
- Conduct “special” checks of the park during hunting seasons to prevent illegal hunting.

ACQUISITION OF FUTURE PARKLAND

Several sites adjacent to the Park should be evaluated for potential future acquisitions to bolster the Serpentine Barrens Conservation Park, including potential long-term incorporation of the +/- 300 acre Rockville Quarry into public ownership. Upon completion of operation, the Rockville Quarry represents a unique opportunity for a water supply reservoir and water-based or other form(s) of recreation. The quarry shares a 3300-foot boundary with the Serpentine Barrens. Four other properties along Piney Meetinghouse road near the PEPCO power line may provide expanded use/protection for the SPCP, including two properties owned by Dumont Oaks Corp. Aggregate Industries, Inc., the parent company of the Rockville Quarry, also owns 24.4 acres of forested land on the northwest corner of the Serpentine Barrens that could make a logical extension to the existing park. A property adjacent to that one is used for a nursery operation (owned by Milton Johnson) and has access to Travilah Road. Acquisition of those two parcels could improve access to the park in the long term.

PARK OPERATIONS PLAN IMPLEMENTATION COST ESTIMATES

Table 8. Operating Budget Impact (OBI) for Northern Region (In 2008 Dollars)

	Start-up Costs: 1. Install "No Hunting" signs 2. Remove and dispose deer hunting tree stands 3. Remove existing dump sites	Annual Costs: 1. Trash Pickup 2. Mow South Unit entry area
Personnel Services	\$5,347	\$4602
Supplies and Materials	\$0	\$0
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$5,347	\$4602
Work years	0.11	0.09

Table 9. OBI For Central Maintenance Division

	Start-Up Costs: Construct & install gate at South Unit	Annual Costs:
Personnel Services	\$2,352	\$0
Supplies and Materials	\$0	\$0
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$2,352	\$0
Work years	0.04	0.00

Table 10. OBI for Park Development Division, Engineering Section Surveyors

	Start-up Costs: Survey park boundary and install "green-and-whites" (Partially complete)	Annual Costs: None
Personnel Services	\$20,000	\$0
Supplies and Materials	\$0	\$0
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$20,000	\$0
Work years	0.69	0

Table 11. OBI for Park Police Division, Patrol Section

	Start-up Costs: Park patrols	Annual Costs: Park patrols
Personnel Services	\$960	\$960
Supplies and Materials	\$290	\$290
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$1,250	\$1,250
Work years	0.02	0.02

Table 12. Capital Budget for Park Operations Plan: Approved FY07-FY12 CIP

Project Description	Previous Expenditures (FY03-04)	FY07	FY08	FY09	FY10	FY11	FY12
Legacy Open Space, PDF# 018710*							
Install “No Hunting” and other signs (supplies and materials only)			\$1000				
Initial Park Cleanup (Tipping Fees Only)			\$5040				
Construct metal gate at South Unit entrance (supplies and materials only)			\$800				
Survey park boundary and install “green-and-whites” (supplies and materials only)			\$2000				

* The Legacy Open Space PDF has up to \$50,000 per year available for park operations start-up costs at parks purchased through the Legacy Open Space program.

Table 13. Annual Management and Maintenance Task Summary for Northern Region

Maintenance Task To Be Completed	FREQUENCY OF TASK	Materials Needed	# of People To Do Task	# Hours Per Person To Do Task	Total # of Man Hours	Notes
Park Management & Coordination with other Park Divisions	8 X year	None	2	4	32	
Non-Native Invasive Control	10 x year	Herbicide	4	8	320	Region staff working under supervision of PPSD, Natural Resources Stewardship, NNI manager.
Trail maintenance	12 X year	None	2	4	96	1) Trail surfaces and adjacent areas will be visually inspected for hazards, excessive wear and tear, vandalism, washouts, etc., and be repaired as appropriate. 2) Trails that are not part of approved trail plan will be closed as will ATV created trails. 3) Trees adjacent to trails will be inspected for dead trees and hazardous limbs, and tree crew will be contacted for removal of dead trees or hazardous limbs. Where appropriate dead trees will be pruned in a manner that allows one-third of the trunk to remain standing to create bird habitat.
Spray for weeds in parking areas	2 X year- Summer only	Herbicide	1	2	4	A pre/post emergent herbicide will be used to treat weeds within the gravel parking area as well as around entrance gates. This is a preventative measure to keep vegetation from taking over.
Repair and repaint wooden park signs	1 X year - Winter only	Paint	2	20	40	1) All signs will be legible, secure and maintained as originally designed. 2) Damaged or missing signs will be repaired or replaced. 3) Wood signs will be repainted. 4) Vegetation will be removed from signs or posts. 5) Sign posts will be secured and straightened. 6) Dirt will be removed from signs.
Trash pickup and mowing	32 X year	None	2	3	192	1) Minor trash pickup at both North & South Units 2) Weed-eat parking lot edges at both North & South Units 3) Mow open area at South Unit.

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Serpentine Barrens Conservation Park Operation & Use Plan

Summary of Operating and Capital Budget Estimates

Tables 14-18 summarize operating budget estimates across all three plans (Resource Management, Trails & Public Access and Park Operations) for each affected Park Division.

Table 14. Summary of Operating Budget Impacts (OBI) for Park Planning and Stewardship Division (in 2008 Dollars) (tables 1 & 4)		
	Start-up Costs:	Annual Costs:
Personnel Services	\$38,000	\$3,233
Supplies and Materials	\$1,300	\$450
Other Services & Charges	\$5,000	\$2,225
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$44,300	\$5,908
Work years	1.02	0.19

Table 15. Summary of OBI for Northern Region Division (in 2008 Dollars) (tables 2,5, & 8)		
	Start-up Costs:	Annual Costs:
Personnel Services	\$8,799	\$17,161
Supplies and Materials	\$2,550	\$600
Other Services & Charges	\$0	\$0
Capital Outlay	\$6,500	\$0
Charge back	\$0	\$0
Total expenditure	\$17,849	\$17,761
Work years	0.18	0.35

Table 16. Summary of OBI for Central Maintenance Division (in 2008 Dollars) (tables 6 & 9)		
	Start-up Costs:	Annual Costs:
Personnel Services	\$2,940	\$980
Supplies and Materials	\$900	\$300
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$3,840	\$1,280
Work years	0.05	0.02

Table 17. Summary of OBI for Park Development Division (in 2008 Dollars) (table 10)

	Start-up Costs:	Annual Costs:
Personnel Services	\$20,000	\$0
Supplies and Materials	\$0	\$0
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$20,000	\$0
Work years	0.69	0

Table 18. Summary of OBI for Park Police Division (in 2008 Dollars) (table 11)

	Start-up Costs:	Annual Costs:
Personnel Services	\$960	\$960
Supplies and Materials	\$290	\$290
Other Services & Charges	\$0	\$0
Capital Outlay	\$0	\$0
Charge back	\$0	\$0
Total expenditure	\$1,250	\$1,250
Work years	0.02	0.02

The following tables (#19 and #20) total all estimate Operating Budget Impacts (OBI) and Capital Budgets estimates for this Operation & Use Plan.

Table 19. Summary of Operating Budget Impacts (OBI) Across Montgomery Parks Operating Divisions (in 2008 Dollars) (tables 14 - 18)

	Start-up Costs:	Annual Costs:
Personnel Services	\$70,699	\$22,334
Supplies and Materials	\$5,040	\$1,640
Other Services & Charges	\$5,000	\$2,225
Capital Outlay	\$6,500	\$0
Charge back	\$0	\$0
Total expenditure	\$87,239	\$26,199
Work years	1.96	0.58

Table 20. Summary of Capital Budget: Approved FY05-FY10 CIP (tables 3, 7 & 12)

Project Description	Previous expenditures (FY03-04)	FY07	FY08	FY09	FY10	FY11	FY12	Unscheduled Expenditures	Totals
Stream Protection, PDF # 818571								\$300,000	\$300,000
Trails – Natural Surface, PDF # 858710								\$140,000	\$140,000
Legacy Open Space, PDF# 018710			\$8,840						\$8,840
Totals			\$8,840					\$440,000	\$448,840



Appendices

Appendix A: List of Maps

Appendix B: Plant Species List

Appendix C: Fauna List



Appendix A: List of Maps

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Serpentine Barrens Conservation Park Vicinity Map	2
Bedrock Geology Map of the Serpentine Barrens Conservation Park Vicinity	11
Serpentine Barrens Conservation Park Trail Plan Map	30
Conceptual Layout for South Serpentine Unit	33

Appendix B: Plant Species List

Woody		Moonseed Family	
Pine Family		<i>Menispermum canadense</i>	Moonseed
<i>Pinus rigida</i>	Pitch Pine	Magnolia Family	
<i>Pinus echinata</i>	Yellow Pine	<i>Liriodendron tulipifera</i>	Tulip Poplar
<i>Pinus virginiana</i>	Virginia Pine	Custard-apple Family	
Cypress family		<i>Asimina triloba</i>	Pawpaw
<i>Juniperus virginiana</i>	Eastern Red Cedar	Laurel Family	
Lily Family		<i>Lindera benzoin</i>	Spicebush
<i>Smilax glauca</i>	Glaucous Greenbrier	<i>Sassafras albidum</i>	Sassafras
<i>Smilax rotundifolia</i>	Round-leaf Greenbrier	Witch-hazel Family	
Willow Family		<i>Hamamelis virginiana</i>	Witch - hazel
<i>Salix nigra</i>	Black Willow	Plane-tree Family	
<i>Salix humilis</i>	Prairie Willow	<i>Platanus occidentalis</i>	Sycamore
<i>Populus grandidentata</i>	Large-toothed Aspen	Rose Family	
<i>Populus deltoides</i>	Eastern cottonwood	<i>Amelanchier arborea</i>	Downy Juneberry
Walnut Family		<i>Amelanchier laevis</i>	Smooth Juneberry
<i>Juglans nigra</i>	Black Walnut	<i>Aronia arbutifolia</i>	Red Chokeberry
<i>Carya glabra</i>	Pignut Hickory	<i>Crataegus straminea</i>	Alleghany Thorn
<i>Carya tomentosa</i>	Mockernut Hickory	<i>Malus coronaria</i>	Wild Crabapple
Birch Family		<i>Physocarpus opulifolius</i>	Ninebark
<i>Corylus americana</i>	American Hazelnut	<i>Crataegus crus-galli</i>	Cockspur Thorn
<i>Carpinus caroliniana</i>	American Hornbeam	<i>Crataegus macrosperma</i>	Large-seeded Thorn
<i>Alnus serrulata</i>	Smooth Alder	<i>Rubus occidentalis</i>	Black Raspberry
Beech Family		<i>Rubus species</i>	Blackberry
<i>Fagus grandifolia</i>	American Beech	<i>Rosa carolina</i>	Pasture Rose
<i>Castanea dentata</i>	American Chestnut	<i>Prunus americana</i>	Wild Plum
<i>Quercus alba</i>	White Oak	<i>Prunus serotina</i>	Black Cherry
<i>Quercus bicolor</i>	Swamp White Oak	Legume Family	
<i>Quercus coccinea</i>	Scarlet Oak	<i>Cercis canadensis</i>	Redbud
<i>Quercus falcata</i>	Spanish Oak	Cashew Family	
<i>Quercus imbricaria</i>	Shingle Oak	<i>Rhus copallinum</i>	Shining Sumac
<i>Quercus marilandica</i>	Blackjack Oak	<i>Rhus glabra</i>	Smooth Sumac
<i>Quercus palustris</i>	Pin Oak	<i>Rhus hirta</i>	Staghorn Sumac
<i>Quercus prinus</i>	Chestnut Oak	<i>Toxicodendron radicans</i>	Poison Ivy
<i>Quercus rubra</i>	Red Oak	Holly Family	
<i>Quercus stellata</i>	Post Oak	<i>Ilex verticillata</i>	Winterberry
<i>Quercus velutina</i>	Black Oak	<i>Ilex opaca</i>	America Holly
<i>Ulmus americana</i>	American Elm	Staff-tree Family	
<i>Ulmus rubra</i>	Slippery Elm	<i>Euonymus americanus</i>	Strawberry Bush
Mulberry Family		Bladdernut Family	
<i>Morus alba</i>	Red Mulberry	<i>Staphylea trifoliata</i>	Bladdernut
Crowfoot Family			
<i>Clematis virginiana</i>	Virgin's Bower		

Maple Family	
<i>Acer rubrum</i>	Red Maple
Buckthorn Family	
<i>Ceanothus americanus</i>	New Jersey Tea
Vine Family	
<i>Parthenocissus quinquefolius</i>	Virginia Creeper
<i>Vitis aestivalis</i>	Wild Grape
<i>Vitis labrusca</i>	Fox Grape
<i>Vitis vulpina</i>	Winter Grape
St. John's-wort Family	
<i>Ascyrum hypericoides</i>	St. Andrew's Cross
<i>Hypericum spathulatum</i>	Shrubby St. John's-wort
Metzereum Family	
<i>Dirca palustris</i>	Leatherwood
Sour Gum Family	
<i>Nyssa sylvatica</i>	Black Gum
Ginseng Family	
<i>Aralia spinosa</i>	Angelica Tree
Dogwood Family	
<i>Cornus amomum</i>	Silky Dogwood
<i>Cornus florida</i>	Flowering Dogwood
<i>Cornus racemosa</i>	Gray-stemmed Dogwood
Heath Family	
<i>Rhododendron nudiflorum</i>	Pinxter Azalea
<i>Lyonia ligustrina</i>	Maleberry
<i>Leucothoe racemosa</i>	Fetterbush
<i>Gaylussacia baccata</i>	Black Huckleberry
<i>Vaccinium angustifolium</i>	Blueberry
<i>Vaccinium atrococcum</i>	Black Highbush Blueberry
<i>Vaccinium stamineum</i>	Deerberry
<i>Vaccinium vacillans</i>	Blueberry
Ebony Family	
<i>Diospyros virginiana</i>	Persimmon
Olive Family	
<i>Fraxinus americana</i>	White Ash
<i>Chionanthus virginicus</i>	Fringe-tree
Madder Family	
<i>Mitchella repens</i>	Partridgeberry

Honeysuckle Family	
<i>Sambucus canadensis</i>	Elderberry
<i>Viburnum prunifolium</i>	Black Haw
<i>Viburnum recognitum</i>	Arrow-wood
Ferns and Fern Allies	
Quillwort Family	
<i>Isoetes species</i>	Quillwort
Clubmoss Family	
<i>Lycopodium digitatum</i>	Fan Clubmoss
Adder's-tongue Family	
<i>Botrychium dissectum</i>	Cutleaf Grape Fern
<i>Botrychium virginianum</i>	Rattlesnake Fern
Royal Fern Family	
<i>Osmunda claytonia</i>	Interrupted Fern
Cliff Fern Family	
<i>Onoclea sensibilis</i>	Sensitive Fern
<i>Athyrium filix-femina</i>	Southern Lady Fern
Marsh Fern Family	
<i>Thelypteris hexagonoptera</i>	Broad Beech Fern
<i>Thelypteris palustris</i>	Marsh Fern
<i>Thelypteris noveboracensis</i>	New York Fern
Wood Fern Family	
<i>Dryopteris marginalis</i>	Marginal Wood Fern
<i>Polystichum acrostichoides</i>	Christmas Fern
Bracken Family	
<i>Dennstaedtia punctilobula</i>	Hay-scented Fern
<i>Pteridium aquilinum</i>	Bracken Fern
Spleenwort Family	
<i>Asplenium platyneuron</i>	Ebony Spleenwort
Maiden-hair Family	
<i>Adiantum pedatum</i>	Maiden hair Fern
Polypody Family	
<i>Polypodium virginianum</i>	Rock Polypody
Herbaceous Plants - Monocots	

<i>Cattail Family</i>		<i>Eleocharis tenuis</i>	Slender Spikerush
<i>Typba latifolia</i>	Broadleaf cattail	<i>Scirpus atrovirens</i>	Dark Green Bulrush
<i>Water-plantain Family</i>		<i>Scirpus cyperinus</i>	Woolgrass
<i>Alisma subcordatum</i>	Water plantain	<i>Scirpus verecundus</i>	Bashful Bulrush
<i>Sagittaria latifolia</i>	Broad leaved Arrowhead	<i>Arum Family</i>	
<i>Grass Family</i>		<i>Arisaema triphyllum</i>	Jack in the Pulpit
<i>Andropogon gerardii</i>	Big Bluestem	<i>Symplocarpus foetidus</i>	Skunk Cabbage
<i>Andropogon scoparius</i>	Little Bluestem	<i>Sedge Family</i>	
<i>Andropogon virginicus</i>	Broom-sedge	<i>Juncus effusus</i>	Soft Rush
<i>Aristida oligantha</i>	Prairie Three-awn	<i>Juncus marginatus</i>	Grass-leaved Rush
<i>Brachyelytrum erectum</i>	Bearded Short-husk	<i>Juncus secundus</i>	One-sided Rush
<i>Cinna arundinacea</i>	Wood-reed	<i>Juncus tenuis</i>	Path Rush
<i>Danthonia spicata</i>	Poverty Grass	<i>Luzula bulbosa</i>	Bulbous Woodrush
<i>Eragrostis spectabilis</i>	Purple Lovegrass	<i>Lily Family</i>	
<i>Elymus villosus</i>	Wild Rye	<i>Allium canadense</i>	Wild Onion
<i>Festuca octoflora</i>	Six-weeks Fescue	<i>Erythronium americanum</i>	Trout Lily
<i>Festuca rubra</i>	Red Fescue	<i>Lilium species</i>	Wild Lily
<i>Glyceria striata</i>	Fowl Meadow Grass	<i>Polygonatum biflorum</i>	Solomon's Seal
<i>Melica mutica</i>	Narrow Melic Grass	<i>Smilacina racemosa</i>	Solomon's Plume
<i>Panicum acuminatum</i>	Hairy Panic Grass	<i>Smilax herbacea</i>	Carrion Flower
<i>Panicum boscii</i>	Bosc's Panic Grass	<i>Stenanthium gramineum</i>	Featherbells
<i>Panicum dichotomum</i>	Bushy Panic Grass	<i>Uvularia perfoliata</i>	Perfoliate Bellwort
<i>Panicum depauperatum</i>	Starved Panic Grass	<i>Uvularia sessilifolia</i>	Sessile Bellwort
<i>Panicum sphaerocarpon</i>	Round-fruited Panic Grass	<i>Yam Family</i>	
<i>Phragmites australis</i>	Common Reed	<i>Dioscorea quaternata</i>	Wild Yam
<i>Sphenopholis nitida</i>	Shining Wedgegrass	<i>Dioscorea villosa</i>	Wild Yam
<i>Sorghastrum nutans</i>	Indian Grass	<i>Amaryllis Family</i>	
<i>Triodia flava</i>	Purple-top	<i>Hypoxis hirsuta</i>	Yellow Stargrass
<i>Sedge Family</i>		<i>Iris Family</i>	
<i>Carex abscondita</i>	Thicket Sedge	<i>Sisyrinchium angustifolium</i>	Blue eyed Grass
<i>Carex amphibola</i>	Narrow-leaf Sedge	<i>Orchid Family</i>	
<i>Carex cephalophora</i>	Oval-headed Sedge	<i>Goodyera pubescens</i>	Downy Rattlesnake Plantain
<i>Carex crinita</i>	Fringed Sedge	<i>Liparis lilifolia</i>	Large Twayblade
<i>Carex festucacea</i>	Fescue Sedge	<i>Platanthera lacera</i>	Ragged-fringed Orchid
<i>Carex frankii</i>	Frank's Sedge	<i>Spiranthes gracilis</i>	Slender Ladies' Tresses
<i>Carex glaucoidea</i>	Gray-green Sedge	<i>Spiranthes cernua</i>	Nodding Ladies' Tresses
<i>Carex hirsutella</i>	Hirsute Sedge	<i>Tipularia discolor</i>	Crane-fly Orchid
<i>Carex hirtifolia</i>	Pubescent Sedge	<i>Herbaceous Plants - Dicots</i>	
<i>Carex intumescens</i>	Bladder Sedge	<i>Lizard's-tail Family</i>	
<i>Carex lupulina</i>	Hop Sedge	<i>Saururus cernuus</i>	Lizard's tail
<i>Carex lurida</i>	Yellow-green Sedge	<i>Nettle Family</i>	
<i>Carex pennsylvanica</i>	Pennsylvania Sedge	<i>Pilea pumila</i>	Clearweed
<i>Carex rosea</i>	Rose Sedge	<i>Boehmeria cylindrica</i>	Bog-hemp
<i>Carex squarrosa</i>	Squarrose Sedge		
<i>Carex volpinoidea</i>	Foxtail Sedge		
<i>Carex willdenowii</i>	Willdenow's Sedge		
<i>Cyperus ovals</i>	Oval-headed Cyperus		
<i>Cyperus strigosus</i>	Straw-colored Cyperus		
<i>Eleocharis engelmannii</i>	Engelmann's Spikerush		

<i>Sandalwood Family</i>	
<i>Comandra umbellata</i>	Bastard Toadflax
<i>Birthwort Family</i>	
<i>Asarum canadense</i>	Wild Ginger
<i>Aristolochia serpentaria</i>	Virginia snakeroot
<i>Buckwheat Family</i>	
<i>Polygonum pennsylvanica</i>	Pennsylvania Smartweed
<i>Polygonum species</i>	Bindweed
<i>Polygonum tenue</i>	Slender Knotweed
<i>Pokeweed Family</i>	
<i>Phytolaca americana</i>	Pokeweed
<i>Purslane Family</i>	
<i>Claytonia virginica</i>	Spring Beauty
<i>Pink Family</i>	
<i>Cerastium arvense</i>	Field Chickweed
<i>Silene antirrhina</i>	Sleepy Catchfly
<i>Silene caroliniana</i>	Wild Pink
<i>Silene stellata</i>	Starry Champion
<i>Crowfoot Family</i>	
<i>Anemone virginiana</i>	Thimbleweed
<i>Anemonella thalictroides</i>	Rue Anemone
<i>Aquilegia canadensis</i>	Columbine
<i>Cimicifuga racemosa</i>	Black Cohosh
<i>Ranunculus abortivus</i>	Kidney-leaved Crowfoot
<i>Ranunculus hispidus</i>	Hispid Buttercup
<i>Ranunculus recurvatus</i>	Hooked Crowfoot
<i>Thalictrum revolutum</i>	Wax-leaved Meadowrue
<i>Barberry Family</i>	
<i>Podophyllum peltatum</i>	apple May
<i>Poppy Family</i>	
<i>Sanguinaria canadensis</i>	Bloodroot
<i>Fumitory Family</i>	
<i>Corydalis flavula</i>	Yellow Corydalis
<i>Mustard Family</i>	
<i>Cardamine parviflora</i>	Small-flowered cress
<i>Dentaria heterophylla</i>	Slender Toothwort
<i>Dentaria laciniata</i>	Cut-leaved Toothwort
<i>Saxifrage Family</i>	
<i>Penthorum sedoides</i>	Ditch Stonecrop

<i>Saxifrage viriniensis</i>	Early Saxifrage
<i>Rose Family</i>	
<i>Agrimonia parviflora</i>	Many-flowered Agrimony
<i>Agrimonia pubescens</i>	Hairy Agrimony
<i>Agrimonia rostellata</i>	Woodland Agrimony
<i>Aruncus dioicus</i>	Goat's-beard
<i>Fragaria virginiana</i>	Wild Strawberry
<i>Geum canadense</i>	White Avens
<i>Porteranthus trifoliatus</i>	Bowman's Root
<i>Potentilla canadensis</i>	Dwarf cinquefoil
<i>Legume Family</i>	
<i>Amphicarpa bracteata</i>	Hog Peanut
<i>Baptisia tinctoria</i>	Wild Indigo
<i>Desmodium canescens</i>	Hoary Tick-trefoil
<i>Desmodium nudiflorum</i>	Naked-flowered Tick- trefoil
<i>Desmodium paniculatum</i>	Panicled Tick-trefoil
<i>Lepedeza procumbens</i>	Trailing Bush-clover
<i>Lepedeza repens</i>	Creeping Bush-clover
<i>Lepedeza violacea</i>	Violet Bush-clover
<i>Lepedeza virginica</i>	Slender Bush-clover
<i>Strophostyles umbellata</i>	Pink Wild Bean
<i>Flax Family</i>	
<i>Linum virginianum</i>	Yellow Flax
<i>Wood-sorrel Family</i>	
<i>Oxalis stricata</i>	Upright sorrel
Wood	
<i>Oxalis violacea</i>	Violet sorrel
Wood	
<i>Geranium Family</i>	
<i>Geranium carolinianum</i>	Carolina Cranesbill
<i>Geranium maculatum</i>	Wild Geranium
<i>Milkwort Family</i>	
<i>Polygala sanguinea</i>	Purple Milkwort
<i>Spurge Family</i>	
<i>Acalypha species</i>	Three-seeded Mercury
<i>Euphorbia corollata</i>	Flowering Spurge
<i>Water-starwort Family</i>	
<i>Callitriche deflexa</i>	Austin's starwort
Water	
<i>St. John's-wort Family</i>	
<i>Hypericum gentianoides</i>	Pine weed
<i>Hypericum mutilum</i>	Dwarf St. John's wort

<i>Hypericum punctatum</i>	Dotted St. John's wort
<i>Rockrose Family</i>	
<i>Lechea minor</i>	Thyme leaved Pinweed
<i>St. John's-wort Family</i>	
<i>Viola fimbriatula</i>	Ovate-leaved Violet
<i>Viola hirsutula</i>	Southern Wood Violet
<i>Viola palmata</i>	Wood Violet
<i>Viola primulifolia</i>	Primrose-leaved Violet
<i>Viola sagittata</i>	Arrow-leaved Violet
<i>Passion Flower Family</i>	
<i>Passiflora lutea</i>	Yellow Passion Flower
<i>Loosestrife Family</i>	
<i>Cuphea petiolata</i>	Clammy Cuphea
<i>Evening-Primrose Family</i>	
<i>Ludwigia alterniflora</i>	Seedbox
<i>Ludwigia palustris</i>	Water-Purslane
<i>Oenothera tetragona</i>	Sundrops
<i>Oenothera perennis</i>	Sundrops
<i>Water-Milfoil Family</i>	
<i>Proserpinaca palustris</i>	Seedbox
<i>Carrot Family</i>	
<i>Angelica venenosa</i>	Hairy Angelica
<i>Cicuta maculata</i>	Water Hemlock
<i>Osmorbiza claytoni</i>	Sweet Cicely
<i>Sanicula canadensis</i>	Black Snakeroot
<i>Thaspium barbinode</i>	Hairy-jointed Meadow Parsnip
<i>Wintergreen Family</i>	
<i>Chimaphila maculata</i>	Spotted Wintergreen
<i>Monotropa uniflora</i>	Indian Pipe
<i>Primrose Family</i>	
<i>Lysimachia quadrifolia</i>	Whorled Loosestrife
<i>Lysimachia ciliata</i>	Fringed Loosestrife
<i>Samolus parviflorus</i>	Brookweed
<i>Gentian Family</i>	
<i>Sabatia angularis</i>	Rose-Pink
<i>Gentiana villosa</i>	Striped Gentian
<i>Dogbane Family</i>	
<i>Apocynum cannabinum</i>	Indian Hemp
<i>Milkweed Family</i>	
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Asclepias purpurascens</i>	Purple Milkweed

<i>Asclepias syriaca</i>	Common Milkweed
<i>Asclepias viridiflora</i>	Green Milkweed
<i>Morning-Glory Family</i>	
<i>Calysteugia sepium</i>	Hedge Bindweed
<i>Ipomoea pandurata</i>	Wild Potato-vine
<i>Borage Family</i>	
<i>Myosotis verna</i>	Spring Forget me not
<i>Vervain Family</i>	
<i>Verbena urticifolia</i>	White Vervain
<i>Mint Family</i>	
<i>Collinsonia canadensis</i>	Stoneroot
<i>Cunila origanoides</i>	Dittany
<i>Hedeoma pulegioides</i>	Pennyroyal
<i>Lycopus virginicus</i>	Water-horehound
<i>Pycnanthemum tenuifolium</i>	Narrow-leaved Mt. Mint
<i>Salvia lyrata</i>	Lyre-leaved Sage
<i>Scutellaria elliptica</i>	Hairy Skullcap
<i>Scutellaria integrifolia</i>	Hyssop Skullcap
<i>Scutellaria lateriflora</i>	Mad-dog Skullcap
<i>Scutellaria parvula</i>	Small Skullcap
<i>Satureja vulgaris</i>	Wild Basil
<i>Teucrium canadense</i>	Germander
<i>Trichostema dichotomum</i>	Blue Curls
<i>Nightshade Family</i>	
<i>Solanum carolinense</i>	Horse-nettle
<i>Physalis heterophylla</i>	Clammy Ground Cherry
<i>Figwort Family</i>	
<i>Agalinis tenuifolia</i>	Slender Agalinis
<i>Aureolaria virginica</i>	Downy False Foxglove
<i>Chelone glabra</i>	Turtlehead
<i>Gratiola neglecta</i>	Clammy Hedge-hyssop
<i>Linaria canadensis</i>	Blue Toadflax
<i>Mimulus ringens</i>	Square-stemmed Monkey Flower
<i>Penstemon hirsutus</i>	Hairy Beard-tongue
<i>Veronica officinalis</i>	Speedwell
<i>Veronica peregrina</i>	Purslane Speedwell
<i>Veronicastrum virginicum</i>	Culver's Root
<i>Broomrape Family</i>	
<i>Conopholis americana</i>	Squawroot
<i>Lopseed Family</i>	
<i>Phryma leptostachya</i>	Lopseed
<i>Bedstraw Family</i>	
<i>Diodia teres</i>	Rough Buttonweed

<i>Galium aparine</i>	Cleavers	<i>Senecio pauperculus</i>	Balsam Ragwort
<i>Galium circaeazans</i>	Wild Licorice	<i>Seriocarpus asteroides</i>	Toothed White-topped Aster
<i>Galium pilosum</i>	Hairy Bedstraw	<i>Seriocarpus linifolius</i>	Narrow-leaved White-topped Aster
<i>Galium species</i>	Bedstraw	<i>Solidago bicolor</i>	Silver-rod
<i>Houstonia caerulea</i>	Bluets	<i>Solidago caesia</i>	Blue-stemmed Goldenrod
<i>Houstonia purpurea</i>	Large Houstonia	<i>Solidago nemoralis</i>	Gray Goldenrod
<i>Bluebell Family</i>		<i>Solidago juncea</i>	Early Goldenrod
<i>Triodanis perfoliata</i>	Venus Looking glass	<i>Solidago altissima</i>	Tall Goldenrod
<i>Lobelia Family</i>		<i>Solidago canadensis</i>	Canada Goldenrod
<i>Lobelia cardinalis</i>	Cardinal Flower	<i>Solidago rugosa</i>	Rough-stemmed Goldenrod
<i>Lobelia inflata</i>	Indian Tobacco	<i>Solidago graminifolia</i>	Grass-leaved Goldenrod
<i>Lobelia spicata</i>	Pale-spike Lobelia	<i>Vernonia noveboracensis</i>	New York Ironweed
<i>Composite Family</i>			
<i>Ambrosia artemisiifolia</i>	Ragweed		
<i>Antennaria neglecta</i>	Field Pussy toes		
<i>Antennaria plantaginifolia</i>	Plantain - leaved Pussy toes		
<i>Aster divaricatus</i>	White Wood Aster		
<i>Aster ericoides</i>	Dense-flowered Heath Aster		
<i>Aster infirmus</i>	Cornel-leaved Aster		
<i>Aster laevis</i>	Smooth Aster		
<i>Aster lateriflorus</i>	Calico Aster		
<i>Aster pilosus</i>	White Heath Aster		
<i>Aster schreberi</i>	Schreber's Aster		
<i>Aster undulatus</i>	Wavy leaved Aster		
<i>Cirsium discolor</i>	Field Thistle		
<i>Coreopsis verticillata</i>	Whorled Coreopsis		
<i>Erectites hieracifolia</i>	Fireweed		
<i>Erigeron strigosus</i>	Prairie Fleabane		
<i>Eupatorium altissimum</i>	Tall Thoroughwort		
<i>Eupatorium aromaticum</i>	Smaller White Snakeroot		
<i>Eupatorium coelestinum</i>	Mistflower		
<i>Eupatorium fistulosum</i>	Hollow Joe-Pye		
<i>E. hyssopifolium</i> var. <i>laciniatum</i>	Torrey's Thoroughwort		
<i>Eupatorium perfoliatum</i>	Boneset		
<i>E. rotundifolium</i> var. <i>ovatum</i>	Hairy Thoroughwort		
<i>Eupatorium rugosum</i>	White Snakeroot		
<i>Eupatorium sessilifolium</i>	Upland Boneset		
<i>Gnaphalium obtusifolium</i>	Sweet Everlasting		
<i>Gnaphalium purpureum</i>	Purple Cudweed		
<i>Helianthus divaricatus</i>	Woodland Sunflower		
<i>Hieracium venosum</i>	Rattlesnake-weed		
<i>Krigia virginica</i>	Dwarf Dandelion		
<i>Krigia dandelion</i>	Potato Dandelion		
<i>Prenanthes serpentaria</i>	Lion's-foot		
<i>Rudbeckia hirta</i>	Black-eyed Susan		

Appendix C: Fauna List

Mammals

<i>Marmota monax</i>	Wood Chuck
<i>Odocoileus virginianus</i>	White-tailed Deer
<i>Procyon lotor</i>	Raccoon
<i>Sciurus carolinensis</i>	Gray Squirrel
<i>Sylvilagus floridanus</i>	Eastern Cottontail
<i>Tamias striatus</i>	Eastern Chipmunk
<i>Vulpes vulpes</i>	Red Fox

Birds

<i>Buteo jamaicensis</i>	Red-tailed Hawk
<i>Cardinalis cardinalis</i>	Northern Cardinal
<i>Carduelis tristis</i>	American Goldfinch
<i>Cathartes aura</i>	Turkey Vulture
<i>Contopus virens</i>	Eastern Wood Pewee
<i>Corvus brachyrhynchos</i>	American Crow
<i>Cyanocitta cristata</i>	Blue Jay
<i>Dendroica discolor</i>	Prairie Warbler
<i>Dryocopus pileatus</i>	Pileated Woodpecker
<i>Epidonax virescens</i>	Acadian Flycatcher
<i>Geothlypis trichas</i>	Common Yellowthroat
<i>Helmitheros vermivorus</i>	Worm-eating Warbler
<i>Hylocichla mustelina</i>	Wood Thrush
	Red-bellied
<i>Melanerpes carolinus</i>	Woodpecker
<i>Myiarchus crinitus</i>	Great Crested Flycatcher
<i>Papilo erythrophthalmus</i>	Rufous-sided Towhee
<i>Parus carolinensis</i>	Carolina Chickadee
<i>Parus bicolor</i>	Tufted Titmouse
<i>Picoides pubescens</i>	Downy Woodpecker
<i>Piranga olivacea</i>	Scarlet Tanager
<i>Seiurus aurocapillus</i>	Ovenbird
<i>Siala sialis</i>	Bluebird
	White-breasted
<i>Sitta carolinensis</i>	Nuthatch
<i>Strix varia</i>	Barred Owl
<i>Thryothorus ludovicianus</i>	Carolina Wren
<i>Turdus migratorius</i>	American Robin
<i>Vireo olivaceus</i>	Red-eyed Vireo
<i>Vireo griseus</i>	White-eyed Vireo
<i>Zenaidura macroura</i>	Mourning Dove

Reptiles

<i>Terrapene carolina</i>	Box Turtle
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Amphibians

<i>Ambystoma opacum</i>	Marbled Salamander
<i>Bufo americanus</i>	American Toad
<i>Hyla crucifer</i>	Spring Peeper

<i>Hyla versicolor</i>	Grey Treefrog
<i>Plethodon glutinosus</i>	Slimy Salamander
<i>Rana clamitans</i>	Green Frog
<i>Rana sylvatica</i>	Wood Frog

Butterflies and Skippers

<i>Ancyloxypha numitor</i>	Least Skipper
<i>Atalopedes campestris</i>	Sachem
<i>Atrytonopsis bianna</i>	Dusted Skipper
<i>Calycopis cecrops</i>	Red-banded Hairstreak
<i>Celastrina ladon</i>	Spring Azure
<i>Colias eurhytheme</i>	Orange Sulphur
<i>Colias philodice</i>	Clouded Sulphur
<i>Cercyonis pegala</i>	Wood Nymph
<i>Epargyreus clarus</i>	Silver-spotted Skipper
<i>Erynnis horatius</i>	Horace's Duskywing
<i>Erynnis juvenalis</i>	Juvenal's Duskywing
<i>Euptoieta claudia</i>	Variiegated Fritillary
<i>Eurytides marcellus</i>	Zebra Swallowtail
<i>Everes comyntas</i>	Eastern Tailed Blue
<i>Junonia coenia</i>	Buckeye
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple
<i>Megisto cymela</i>	Little Wood Satyr
<i>Nastra lberminier</i>	Swarthy Skipper
<i>Nymphalis antiopa</i>	Mourning Cloak
	Eastern Tiger
<i>Papilio glaucus</i>	Swallowtail
<i>Papilio troilus</i>	Spicebush Swallowtail
<i>Polites peckius</i>	Peck's Skipper
<i>Phyciodes tharos</i>	Pearl Crescent
<i>Polygonia interrogationis</i>	Question Mark
<i>Polygonia comma</i>	Eastern Comma
<i>Poanes zabulon</i>	Zabulon Skipper
<i>Speyeria cybele</i>	Great Spangled Fritillary
<i>Strymon melinus</i>	Grey Hairstreak
<i>Satyrium calanus</i>	Banded Hairstreak
<i>Vanessa virginiensis</i>	American Lady
<i>Vanessa atalanta</i>	Red Admiral

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***Serpentine Barrens Conservation Park
Operation & Use Plan***

Maryland - National Capital Park & Planning Commission, Montgomery County