

Remnant Natural Areas in Parks, Waterways, and
Undeveloped Sites in the City of Alexandria, Virginia:
North Ridge Area



Photo by Paula Sullivan

Prepared by:
Rod Simmons
Natural Resources Division
Department of Recreation, Parks, and Cultural Activities
City of Alexandria, Virginia
2900-A Business Center Drive
Alexandria, VA 22314

Natural Resources Technical Report 14-1
March 2014

Table of Contents

Overview	2
Timberbranch Parkway	4
Robert Leider Park	5
Beverly Park	6
George Mason Park	7
Monticello Park	8
Four Mile Run Park	12
Hillside Park	20
Landover Park	20
Gentry Park	20
Goat Hill Park	21
Timberland Park	21
Beach Park	22
10 Russell Road	23
Woodbine Tot Lot	23
LeBosquet at Sunnyside	23
Elbert Triangle Park	23
Hume Springs Park	23
3550 Commonwealth Avenue	23
Sunset Mini Park	23
Parkfairfax Woods	25
Lloyd Apartments Woodland	27
Kust Conservation Easement	29
Reservoir Woods	29
St. Stephen's & St. Agnes School Woods: Lower School Campus	30
Ivy Hill Cemetery	31
Acknowledgments	35
References	35

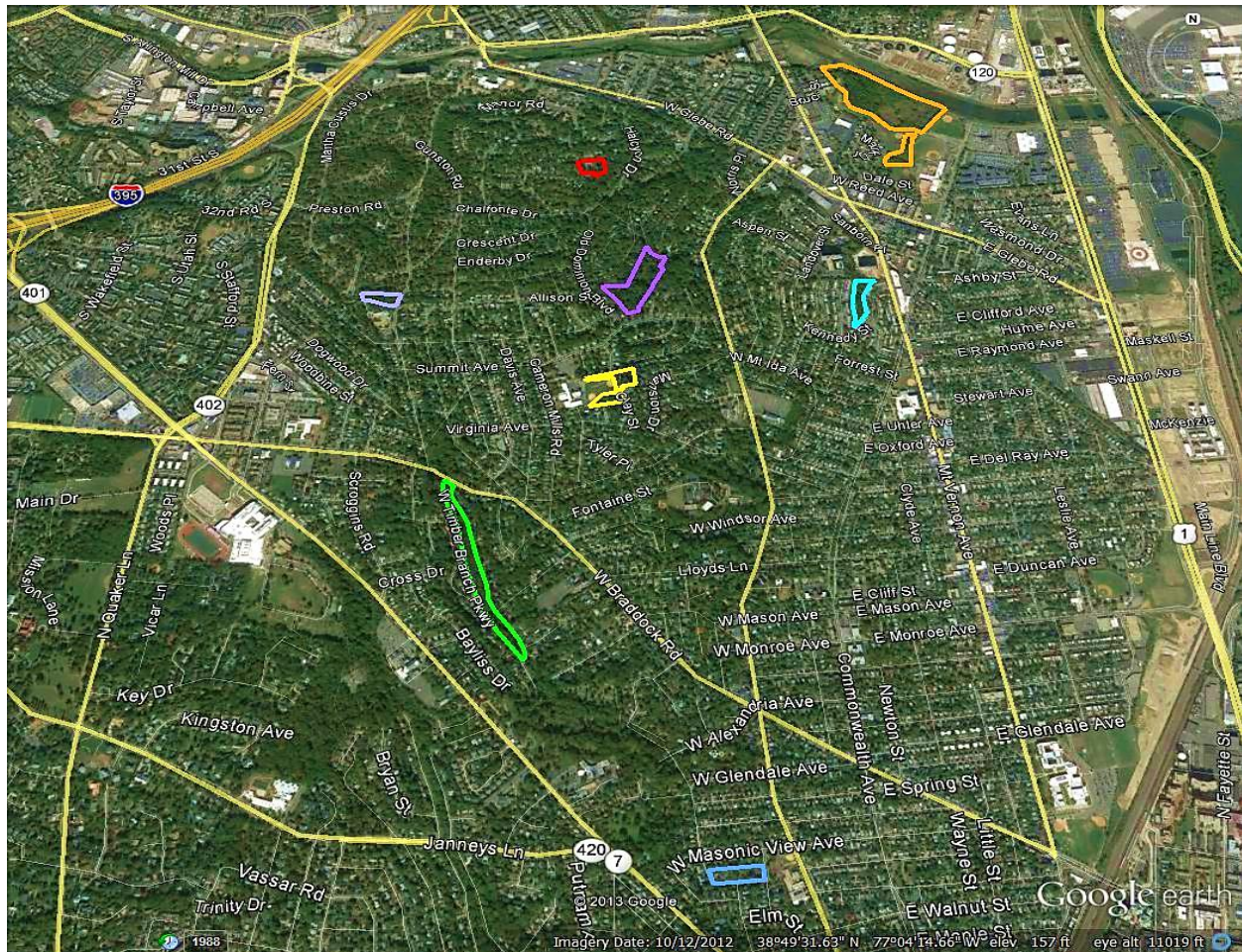


Fig. 1. Remaining natural areas and parks (outlined in color) of the North Ridge area that are regularly stewarded by City natural resource management staff: Timberbranch Parkway (green), Robert Leider Park (lavender), Beverly Park (red), George Mason Park (yellow), Monticello Park (purple), Four Mile Run Park (orange), Goat Hill Park (turquoise), and Beach Park (blue). (Sites too small to map are not included in this figure.)

Overview:

The North Ridge area encompasses lands north of King Street (Rt. 7); east of N. Quaker Lane and Shirley Highway (395) (a small section of City land lies between Shirlington Road, Four Mile Run, and Shirley Highway); south of Four Mile Run; and west of Commonwealth Avenue (Fig. 1).

It was formed in two separate annexations in the early 20th century: Hooff's Run west to near Robert's Lane and the intersection of Janney's Lane and King Street northeast to just above Braddock Road from Fairfax County in 1915 and remaining lands to the north from Arlington County in 1930 (Alexandria Public Library, Arlington County 1967).

This area is characterized by upland terraces and escarpments, extremely steep, dissected ravines, numerous springs and tributary headwaters, stream valleys and alluvial floodplains, bottomland swamps, and remnant freshwater tidal marsh communities along lower Four Mile Run.



Fig. 2. Mush Pot Road (Braddock Road), c. 1900, with the Alexandria highlands to the northwest in the background. Difficult travel over deeply-rutted roads of muddy clay – coined mush-pots – as in the above photo is probably the source of the old name for what is known today as Braddock Road. Photo courtesy Alexandria Library, Special Collections.

Most of the highlands in this part of the City were heavily forested and largely unpopulated from the early days of settlement to the mid-20th century when the neighborhoods of Braddock Heights, Jefferson Park, Beverley Hills, and others were carefully built amid the old forest groves (Civil War Map of Environs of Washington 1865, USGS 1917). Many old-age remnants of this forest are still preserved today throughout parks, natural areas, and neighborhoods, including the City champion White Oak (*Quercus alba*), Northern Red Oak (*Quercus rubra*), Southern Red Oak (*Quercus falcata*), Black Oak (*Quercus velutina*), Blackjack Oak (*Quercus marilandica*), Willow Oak (*Quercus phellos*), Pignut Hickory (*Carya glabra*), Sweet Pignut Hickory (*Carya ovalis*), Pitch Pine (*Pinus rigida*), Tulip Tree (*Liriodendron tulipifera*), Ironwood (*Carpinus caroliniana*), and Persimmon (*Diospyros virginiana*).

The underlying geology of the North Ridge area is largely exposed along slopes and stream valleys and is composed of six, locally distinct and overlapping members of ancient river deposits of the Potomac Formation, including from bottom to top: a small section of Cameron Valley sand in lowlands on either side of Valley Drive in the Parkfairfax community near the Four Mile Run floodplain; a section of Lincolnia silty clay that forms the base and slopes of Mount Eagle in the Parkfairfax community; a small wedge of Winkler sand to the north of Mount Eagle; Chinquapin Hollow fine sandy clay throughout; a massive wedge of Arell clay extending from Ivy Hill Cemetery south along the east slope of King Street to the base of the Masonic Temple; and a thin band of Shooters Hill gravel following the outcropping of Arell clay (Fleming 2008).

Overlying and “capping” the Potomac Formation units are two distinct terraces, including from highest to lowest: Chinquapin Village terrace, with a surface elevation between 180 and 200 feet, and Beverley Hills terrace, with an average elevation of 145 to 150 feet. The Jefferson Park escarpment separates these two terraces (Fleming 2008).

Running southward along the toe slope of the cliff-like Mount Ida escarpment, which looms to the west above Commonwealth Avenue and “separates the central and western highlands of the City from the massive late Pleistocene river terrace occupied by Del Ray and Old Town,” is the “southward continuation beneath the coastal plain of the Rock Creek Shear Zone (RCSZ, Fleming and Drake 1998), a major fault zone well exposed for many miles in the Washington West and Kensington Quadrangles to the north” (Fleming 2008). It remains unclear whether the present-day landform of the Mount Ida escarpment was formed over the long ages by episodes of strike-slip and reverse fault motion along the fault zone or largely through weathering when the escarpment was an ancient Potomac River shoreline.

See “Bedrock Geology of the Coastal Plain” in *Plate 3: Bedrock Geology and Topography Expanded Explanation*; *Plate 4: Potomac Formation Expanded Explanation*; and *Plate 5: Surficial Geology and Landforms Expanded Explanation* (Fleming 2008) at <http://alexandriava.gov/22560> for more on the geology of this area.

For further information on the flora and natural communities of this area, as well as natural resource management in the City, see <http://alexandriava.gov/22560> and <http://alexandriava.gov/48838>.

Natural areas that are actively managed by the Dept. Recreation, Parks, and Cultural Activities (RPCA), Natural Resources Division, are listed below, including other significant sites.

Timberbranch Parkway:

This 6.19-acre, natural area park (property class 731; City Parks/Playgrounds) extends south of the 1100 block of W. Braddock Road between W. Timber Branch Parkway and E. Timber Branch Parkway, occupying both sides of the narrow stream valley and banks along the upper headwaters of Timber Branch. (Parcel information is not available for this site.) The park is also designated a “Native Plant Conservation Zone” for its exceptional floristic diversity.

A diverse mixture of old and large canopy trees grows along both sides of the stream, with Red Maple (*Acer rubrum*), Sweetgum (*Liquidambar styraciflua*), and Sycamore (*Platanus occidentalis*) co-dominant. At the north end of the park along a gravelly rise of the stream bank is a variety of upland oaks, including a state co-champion Blackjack Oak (*Quercus marilandica*) – the third largest known in Virginia. The mature forest canopy shading the stream is also important as a wildlife connector.

The shrub and herb layers are equally diverse, with Common Wood Reedgrass (*Cinna arundinacea*) – a beautiful, fall-blooming native grass of stream banks, wet woods, and floodplains – perhaps the dominant herbaceous species throughout the park.

Uncommon to rare species in Alexandria that occur here include Greenish-white Sedge (*Carex albolutescens*), Branched Panic Grass (*Dichanthelium dichotomum* var. *ramulosum*), Autumn Bluegrass (*Poa autumnalis*), Meadow Garlic (*Allium canadense* var. *canadense*), Sessile-leaved Bellwort (*Uvularia sessilifolia*), Smooth Carrion-flower (*Smilax herbacea*), Wild Blue Phlox (*Phlox divaricata*),



Fig. 3. Blackjack Oak (*Quercus marilandica*), right foreground, on the flat, silty Chinquapin Village terrace at Robert Leider Park. Photo by R.H. Simmons.

Virgin's-bower (*Clematis virginiana*), Canada Moonseed (*Menispermum canadense*), Silverleaf Grape (*Vitis aestivalis* var. *bicolor*), and Clustered Snakeroot (*Sanicula odorata*).

Timberbranch Parkway is also one of two locations in the City for Greenish-white Sedge and Wild Blue Phlox.

Unfortunately, much of the stream banks and forest floor throughout the park are overrun with a variety of pervasive, difficult to eradicate non-native invasive plants like English Ivy (*Hedera* sp.), Periwinkle (*Vinca minor*), Multiflora Rose (*Rosa multiflora*), Japanese Knotweed (*Reynoutria* sp.), Lesser Celandine (*Ficaria verna*), Kudzu (*Pueraria montana* var. *lobata*), Arrow Bamboo (*Pseudosasa japonica*), and many others, along with a nearly continuous cover of shrubby Poison Ivy (*Toxicodendron radicans*).

Natural resource management at this site consists of routine control of non-native invasive plants, ecological restoration plantings, floristic inventories, and environmental review.

Robert Leider Park:

This 1.33-acre, natural area park (property class 731; City Parks/Playgrounds) at 3002 Valley Drive preserves the last surviving remnant of intact mature forest of the Chinquapin Village terrace (Fleming 2008) in Alexandria (Fig. 3).

Central Appalachian / Inner Piedmont Low-Elevation Chestnut Oak Forest: *Quercus montana* - (*Quercus coccinea*, *Quercus rubra*) / *Kalmia latifolia* / *Vaccinium pallidum* Forest (USNVC: CEGL006299) is the predominant vegetation of the site, as is the case with most of the upland terraces and north-facing slopes in the City.

White Oak (*Quercus alba*) and Scarlet Oak (*Quercus coccinea*) are the dominant canopy trees, together with scattered, mature Virginia Pine (*Pinus virginiana*). The fairly sparse understory is largely represented by Sassafras (*Sassafras albidum*) and Black Gum (*Nyssa sylvatica*). Extensive colonies of Black Huckleberry (*Gaylussacia baccata*), Deerberry (*Vaccinium stamineum*), and Pinxterbloom Azalea (*Rhododendron periclymenoides*) comprise the shrub layers, with sparsely scattered Mountain Laurel (*Kalmia latifolia*). Highbush Blueberry (*Vaccinium corymbosum*) is a locally rare species that also occurs here.

Much of the park is in remarkably undisturbed condition and is largely free of non-native invasive plants. However, several small colonies of European Lily of the Valley (*Convallaria majalis*) have become established, as well as a small, intermixed stand of Arrow Bamboo (*Pseudosasa japonica*), English Ivy (*Hedera* sp.), and White Mulberry (*Morus alba*) at the eastern corner of the park.

The enigmatic occurrence of two small Sourwood (*Oxydendrum arboreum*) trees in a heath thicket at the center of the park is likely the result of a past out-planting, as this otherwise native tree is considered “absent from northern Virginia” (VBA 2014).

Natural resource management at this site consists of routine control of non-native invasive plants, maintenance of natural trails, infrequent floristic inventories, and environmental review.

Beverly Park:

This 1.7-acre park (property class 731; City Parks/Playgrounds) at 620 N. Overlook Drive comprises an abandoned gravel pit, a sandlot playground at the floor of the pit, a wooded spring, and a narrow strip of cove-like forest that slopes southeastward to Halcyon Drive.

The upper section of the park is situated on the edge of the Beverley Hills terrace - the lowest of several high terraces in Alexandria (Fleming 2008). White Oak (*Quercus alba*), Chestnut Oak (*Quercus montana*), and Scarlet Oak (*Quercus coccinea*) mainly comprise the sparse canopy. An enormous, old Southern Red Oak (*Quercus falcata*) once grew at the southeast edge of the forest and gravel pit. Opposite the park in front of the residence at 611 Overlook Drive was a large, old Blackjack Oak (*Quercus marilandica*) that was blown over on October 29, 2012 during Hurricane Sandy. A count of radial growth rings revealed the tree to be well over 100 years of age.

The old-age canopy of the wooded slope and spring is composed of White Oak, Northern Red Oak (*Quercus rubra*), Black Oak (*Quercus velutina*), Mockernut Hickory (*Carya alba*), and Pignut Hickory (*Carya glabra*). The understory and shrub layer is mainly composed of Flowering Dogwood (*Cornus florida*), Black Haw (*Viburnum prunifolium*), Pinxterbloom Azalea (*Rhododendron periclymenoides*), and Witch-hazel (*Hamamelis virginiana*). The herb layer is lush, with Mayapple (*Podophyllum peltatum*), Wild Yam (*Dioscorea quaternata*), Naked-stem Tick-trefoil (*Hylodesmum nudiflorum*), Eastern Solomon's-plume (*Maianthemum racemosum* ssp. *racemosum*), Blue-stemmed Goldenrod (*Solidago caesia* var. *caesia*), White Wood Aster (*Eurybia divaricata*), and Virginia Creeper (*Parthenocissus*



Fig. 4. Common Black Cohosh (*Actaea racemosa*). Photo by R.H. Simmons.

quinquefolia) prominent. Common Black Cohosh (*Actaea racemosa*) is a locally uncommon to rare wildflower that also occurs here (Fig. 4).

A single tree on the southwest rim of the gravel pit is the sole occurrence in Alexandria for *Quercus x incomita*, a naturally occurring hybrid between Southern Red Oak and Blackjack Oak. The open, grassy area of the floor of the gravel pit is also the only known location in the City for Reflexed Sedge (*Carex retroflexa*).

Norway Maple (*Acer platanoides*), Rose-of-Sharon (*Hibiscus syriacus*), English Ivy (*Hedera* sp.), Wintercreeper (*Euonymus fortunei*), Greater Periwinkle (*Vinca major*), Helleborine (*Epipactis helleborine*), and Big Blue Lilyturf (*Liriope muscari*) are troublesome weeds at the park.

Natural resource management at this site consists of routine control of non-native invasive plants, infrequent floristic inventories, and environmental review.

George Mason Park:

This 9.35-acre site at 2601 Cameron Mills Road (property class 740; Ed. Public Schools) encompasses George Mason School, the school grounds, athletic fields (George Mason Fields), tennis courts, and

woodland groves at the far eastern ends of the property. The natural features of the park occupy app. 2.5 acres and consist of two remnant forest groves.

White Oak (*Quercus alba*), Scarlet Oak (*Quercus coccinea*), Chestnut Oak (*Quercus montana*), Southern Red Oak (*Quercus falcata*), and Pignut Hickory (*Carya glabra*) are the dominant canopy trees of the upper grove on the flat terrace at the southeast side of the property. A continuous carpet of Poverty Oatgrass (*Danthonia spicata*), mosses, and sedges (*Carex* spp.), as well as the absence of shrubs and understory vegetation, gives the appearance of a woodland glade. Locally uncommon American Pennyroyal (*Hedeoma pulegioides*) – a diminutive native wildflower in the Mint Family (Lamiaceae) - grows at sunny south edge of the grove.

The lower grove is situated at the edge of the gently sloping terrace and drainage swale at the northeast corner of the site. White Oak, Scarlet Oak, Chestnut Oak, Willow Oak (*Quercus phellos*), Pignut Hickory, and Virginia Pine (*Pinus virginiana*) are the dominant canopy species here. Several old-age Pignut Hickory trees that grow along the border of the grove are City co-champions.

The app. 2.5 acres of natural turf athletic fields are important for groundwater infiltration and recharge, as well as protecting water resources and waterways downslope.

A large colony of Wisteria (*Wisteria* sp.) escaping into the northeast corner of the property from residences along Mansion Drive is a major weed problem at the park. Other troublesome non-native invasive plants here are White Mulberry (*Morus alba*), English Ivy (*Hedera* sp.), Rose-of-Sharon (*Hibiscus syriacus*), and Helleborine (*Epipactis helleborine*).

Natural resource management at this site consists of routine control of non-native invasive plants, ecological restoration plantings, infrequent floristic inventories, and environmental review.

Monticello Park:

This floristically diverse, 6.18-acre natural area park at 320 Beverley Drive is regionally renowned for its exceptional diversity of migratory warblers that frequent the forest and perennial stream each spring. The park is composed of three contiguous parcels: the 2.7-acre parcel at 2908-A Richmond Lane at the south end of the park (property class 731; City Parks/Playgrounds); the 2.78-acre northernmost parcel at 320 Beverley Drive that includes the park entrance and kiosk (property class 731); and the 30,000 sq. ft. eastern section at 3104-A Russell Road (property class 731). A small, mostly spring-fed, perennial stream originating just below the intersection of Crestwood Drive and Old Dominion Boulevard evenly divides the park.

The park's remarkable wildlife diversity is likely owed to a combination of factors: an old-age canopy and multi-layered understory, shrub, and herb strata; steep slopes that give rise to cove-like forest communities; a situation at the convergence of the fall line and coastal plain where disjunct plants along ancient migration routes persist; the underlying geology of Potomac Formation soils; and the presence of a shallow, perennial stream.

“The New World Warblers [also known as ‘Wood-Warblers’] are a broad group of highly-migratory songbirds that are amongst the most colorful and eagerly anticipated birds seen in the United States” (Nolley 2007, CLO 2011). Most of the warblers that occur in the eastern U.S. have been seen at



Fig. 5. Canada Warbler at Monticello Park. Photo by Paula Sullivan.

Monticello Park, including Bay-breasted, Black-and-White, Blackburnian, Blackpoll, Black-throated Blue, Black-throated Green, Blue-winged, Canada (Fig. 5), Cape May, Cerulean, Chestnut-sided (front cover), Golden-winged, Hooded, Kentucky, Magnolia, Mourning, Nashville, Palm, Pine, Prairie, Prothonotary, Tennessee, Wilson's, Worm-eating, Yellow, and Yellow-rumped (Farmer 1994). Many of these continue to be regularly seen at the park, although some like Cerulean, Golden-winged, and others are rarely encountered as a result of population declines, range-wide distribution trends, or other factors (Rosenberg and Wells 2005). Monticello Park is also an excellent place to observe vireos, flycatchers, cuckoos, tanagers, thrushes, and many other birds (pers. comm., Paula Sullivan, NVCT 2005). This diverse bird community underscores the park's importance as a migratory waypoint, as well as breeding and wildlife habitat.

The environs of Monticello Park have had a long history of botanical exploration and collecting, especially in the late 19th and early 20th centuries when Mr. and Mrs. Edward S. Steele, G.S. Miller, Jr., Paul C. Standley, Nellie C. Knappen, Agnes Chase, W. L. McAtee, Ellsworth P. Killip, Carleton R. Ball, and others regularly frequented the area. Many of the plants historically seen in the once-extensive forests of the lower Four Mile Run valley collectively represent an ancient refugia for species with a



Fig. 6. Blue Monkshood (*Aconitum uncinatum*). This species is very rare in the coastal plain of northern Virginia (VBA 2014) and has long vanished from the City of Alexandria. It was collected by Paul C. Standley from “moist woods near St. Elmo” in Alexandria on September 17, 1910 (Simmons 2009). Photo by Gary P. Fleming.

primary range in the inner piedmont and mountains (Fig. 6). Large, old, east-west flowing waterways, such as Four Mile Run, Holmes Run, and Accotink Creek, provided migration corridors for plants and wildlife which in turn became established over long periods of time in specialized habitats. Sadly, most of the plants historically known from the lower portions of these watersheds have long vanished.

Monticello Park still serves as a refugium for many species and is by far the most diverse easternmost forest community remaining in Alexandria. The vegetation of the slopes and stream bank along the northwest side of the stream is a good example of old-age Northern Coastal Plain / Piedmont Mesic Mixed Hardwood Forest: *Fagus grandifolia* - *Quercus (alba, rubra)* - *Liriodendron tulipifera* / (*Ilex opaca* var. *opaca*) / *Polystichum acrostichoides* Forest (USNVC: [CEGL006075](#)), with Northern Red Oak (*Quercus rubra*), White Oak (*Quercus alba*), Tulip Tree (*Liriodendron tulipifera*), Spicebush (*Lindera benzoin*), and Mayapple (*Podophyllum peltatum*) prominent.

Uncommon to rare species in Alexandria that occur in this section of the park include Bearded Shorthusk (*Brachyelytrum erectum*), Turk’s Cap Lily (*Lilium superbum*), Smooth Carrion-flower (*Smilax herbacea*), Red Mulberry (*Morus rubra*), Common Black Cohosh (*Actaea racemosa*), Early Meadow Rue

(*Thalictrum dioicum*), Wild Geranium (*Geranium maculatum*), Silverleaf Grape (*Vitis aestivalis* var. *bicolor*), Yellow Passionflower (*Passiflora lutea*), Clustered Snakeroot (*Sanicula odorata*), and Elm-leaved Goldenrod (*Solidago ulmifolia*).

The northwest side of the park is also the sole location in Alexandria for Pointed-leaved Tick Trefoil (*Hylodesmum glutinosum*) and Woodland Agrimony (*Agrimonia rostellata*), as well as one of two stations in the City for Aniseroot (*Osmorhiza longistylis*) and Green Hawthorne (*Crataegus viridis*).

The steep slope variant of Central Appalachian / Inner Piedmont Low-Elevation Chestnut Oak Forest: *Quercus montana* - (*Quercus coccinea*, *Quercus rubra*) / *Kalmia latifolia* / *Vaccinium pallidum* Forest (USNVC: [CEGL006299](#)), characterized by co-dominant Witch-hazel (*Hamamelis virginiana*) and Northern Red Oak, comprises the vegetation of the steep, acidic, gravelly slopes along the southeast side of the stream. This section of the park and the large, north-facing slope at the Winkler Botanical Preserve are the best remaining examples of this community type in Alexandria.

Old-age Chestnut Oak (*Quercus montana*), Northern Red Oak, and White Oak are the dominant canopy trees of the dry to mesic, north-facing slopes, with an understory of Black Gum (*Nyssa sylvatica*) and Red Maple (*Acer rubrum*) and shrub colonies of Mountain Laurel (*Kalmia latifolia*), deciduous ericads (plants in the Heath Family), Maple-leaf Viburnum (*Viburnum acerifolium*), Witch-hazel, and others. The ridgetop trail here is also one of two stations in the City for Slender Wedgegrass (*Sphenopholis obtusata* var. *major*), Woodland Bluegrass (*Poa sylvestris*), and Ribbed Sedge (*Carex virescens*).

As part of the U.S. National Vegetation Classification (USNVC) – National Capital Region (NCR) project to broaden our understanding of local vegetation types, quantitative compositional and environmental data were collected from a 400 m² Oak-Heath Forest plot on the southeast side of the park by Rod Simmons in 2004.

Near the entrance to the park at the toe slope above the southeast side of the stream is a small Skunk Cabbage (*Symplocarpus foetidus*) seep. This forested wetlands was more diverse in the past, but was damaged years ago during stream restoration work and is slowly recovering. A seepage area here along the stream is one of two locations in the City for Drooping Sedge (*Carex prasina*).

Nearly all of the stream banks and forest floor throughout the northwest side of the park are carpeted with layers of pervasive, non-native invasive plants like English Ivy (*Hedera* sp.), Wintercreeper (*Euonymus fortunei*), Periwinkle (*Vinca minor*), Chinese Yam (*Dioscorea polystachya*), Helleborine (*Epipactis helleborine*), Multiflora Rose (*Rosa multiflora*), Bush Honeysuckle (*Lonicera maackii*), White Mulberry (*Morus alba*), Arrow Bamboo (*Pseudosasa japonica*), and many others, along with a nearly continuous cover of shrubby Poison Ivy (*Toxicodendron radicans*). Lesser Celandine (*Ficaria verna*), which is escaping downslope into the park from the back yard of a neighboring residence on Circle Hill Road, is also a major threat. In contrast, the southeast side of the park is largely free of non-native invasive plants, except for scattered infestations mainly at the south end along the stream.

Staff-supervised efforts to eradicate non-native invasive plants from the park have been modified at the request of the birding community to be confined to the removal of low-growing species from the forest floor (herbaceous weeds, small saplings, and vines) and balancing the removal of each invasive shrub and woody understory plant with a one-for-one planting of an approximate-sized, appropriate native species.



Fig. 7. View eastward from the convergence of swamp forest along Bruce Creek and freshwater tidal marsh at Four Mile Run Park, with Broad-leaved Arrowhead (*Sagittaria latifolia*) in the foreground. Photo by R.H. Simmons.

This is to prevent significant gaps in the shrub and understory strata and a resulting loss of perch areas, especially along the stream banks, that may negatively affect neotropical migrants which regularly bathe in the stream (pers. comm., Paula Sullivan, Farmer 1994).

Blowdowns of very large and old canopy trees resulting from strong wind-shearing and over-saturation of soils during periodic storms have increasingly become a threat to the park since the early 2000s. Fortunately, there appears to be good natural recruitment of seedlings and saplings, including oaks, which are expected to regenerate the native canopy.

Natural resource management at the park consists of regular control of non-native invasive plants, maintenance of natural trails, ecological restoration plantings, floristic inventories, and environmental review.

Four Mile Run Park:

This 46.75-acre park (property class 731; City Parks/Playgrounds), with entrances at 3700 Commonwealth Avenue and 4131 Mount Vernon Avenue, preserves the last remaining freshwater tidal marsh communities of lower Four Mile Run. Surrounding the tidal wetlands on three sides are athletic

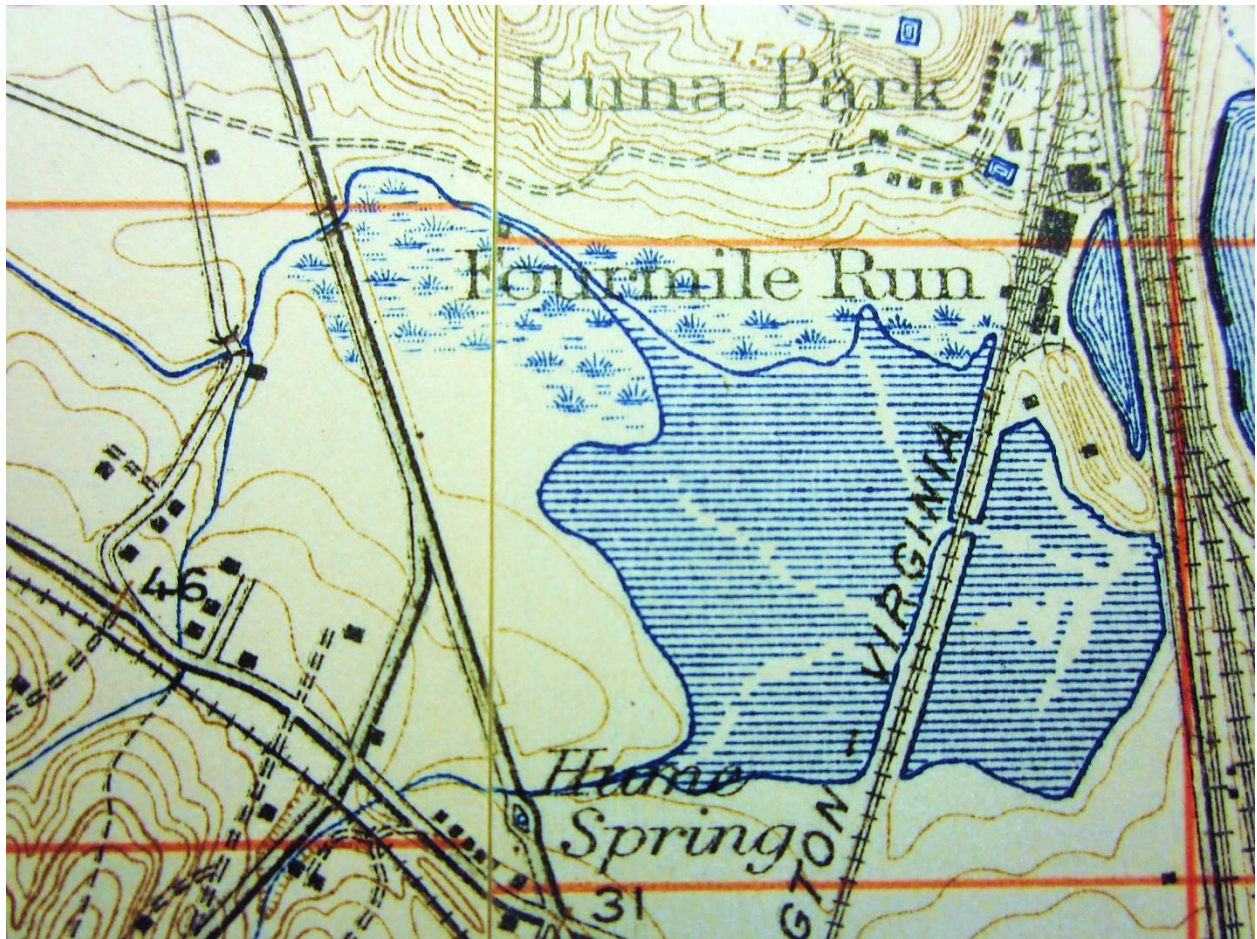


Fig. 8. Detailed 1917 USGS topographic map showing the full upstream extent of the freshwater tidal marsh communities of lower Four Mile Run, including the Bruce Creek seepage tributary (far lower left) and the Hume Spring tributary (bottom left and center).

fields, mowed turf, and playgrounds built on artificial fill. (An additional 1.47 acres of parkland have recently been acquired.)

Originating from seeps and springs on the hillsides high above Four Mile Run to the southwest are several streams that increase in size and eventually braid together on the floodplain below. Historically, these seepage streams formed an extensive mosaic of temporarily to seasonally flooded bottomland swamp forest and backswamps that stretched along the floodplain on the south side of Four Mile Run from Shirley Highway to U.S. Route 1.

Major seepage flow emanating from the east side of Cameron Mills Road, which is more or less the drainage divide between Four Mile Run and Holmes Run on the upper terrace, formed a stream valley over long periods of time under present-day Old Dominion Boulevard. This stream comprises the headwaters of Bruce Creek, which conjoins the inner reaches of the Four Mile Run tidal channel at the northwest side of the park (Fig. 7). Today, all of the upland portions of Bruce Creek are paved over, with the part-engineered section through the park representing the only open segment of stream.

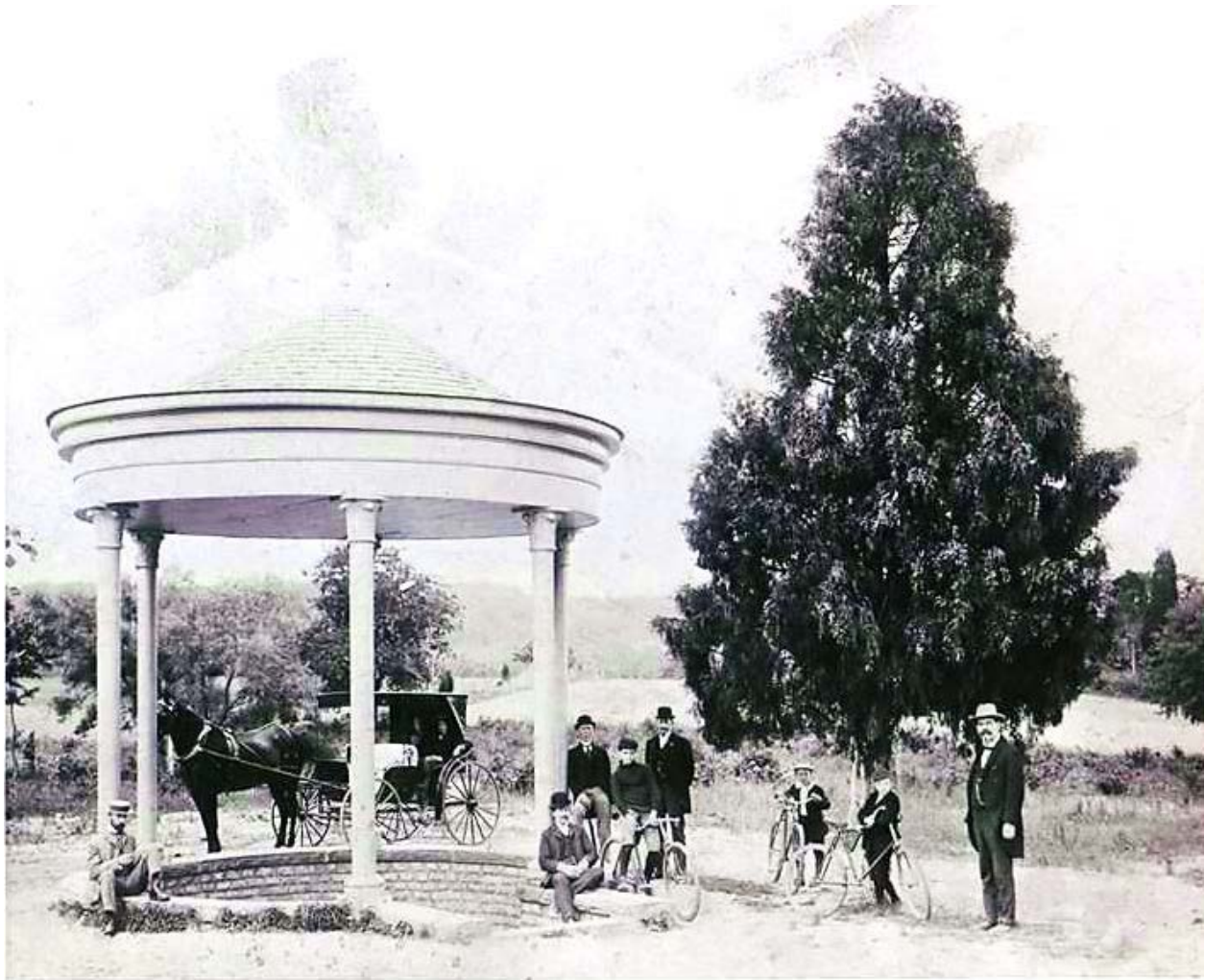


Fig. 9. A photograph of the famous Hume Spring as it appeared c. 1900. The high ridge of Oakcrest, Fort Scott Park, and Aurora Hills appears in the background beyond the Four Mile Run floodplain and wetlands. Pictured at the far right is probably Frank Hume. Photo courtesy Alexandria Library, Special Collections.

The Hume Spring tributary that truncates the south side of the park is largely formed by the spring-fed, perennial stream that originates at the south end of Monticello Park and flows northeast under present-day Russell Road to the Four Mile Run floodplain. Another seepage stream that historically flowed eastward from the eastern flank of Richmond Lane to Russell Road and downslope to the convergence with the Monticello Park stream comprises the eastern headwaters of the tributary. The section of stream through Monticello Park and a shallow, gravelly stretch behind Cora Kelly School are the only natural portions of the Hume Spring tributary that remain today.

All of Four Mile Run Park is situated within the historic boundaries of a large freshwater tidal estuary and marsh that encompassed most of the land on the south side of Four Mile Run to Reed Avenue and eastward from Mount Vernon Avenue to the mouth of Four Mile Run at U.S. Route 1 and Potomac Yard (Fig. 8).

The famous Hume Spring (Fig. 9) was historically located in the middle of old Mount Vernon Avenue at or very near the intersection with present-day Reed Avenue but was eventually destroyed for road expansion and commercial development in the area (Alexandria Library, Webb 1980). This location – marked as a bulge in the center of Mount Vernon Avenue – is also shown in the 1917 USGS map as just left of the “S” in “Spring” and just south of the Hume Spring tributary (Fig. 8). Local botanist Nellie C. Knappen evokes a sense of the past quality of Hume Spring and environs from flora findings at the site in early August of 1922: Eastern Yellow Stargrass (*Hypoxis hirsuta*), “immense numbers in bloom, back of Hume Springs”, and the otherwise undocumented and long-vanished in Alexandria Curlyheads (*Clematis ochroleuca*) and Small White Fringed Orchid (*Platanthera blephariglottis*), “spring near Alexandria” (Simmons in prep.).

In the early 1890s, the old Washington, Alexandria, and Mount Vernon Electric Railway (the footprint of present-day Commonwealth Avenue) was built and crossed the wetlands by bridge and artificially filled ground, as do U.S. Route 1, Potomac Yard, and the George Washington Memorial Parkway. Beginning in the early 1940s, large sections of tidal marsh were filled to accommodate the Hume Springs neighborhood, commercial venues along Mount Vernon Avenue, and Cora Kelly School and environs. During the late 1950s and early 1960s, a new bridge was installed at Mount Vernon Avenue and the channel was significantly widened eastward to Commonwealth Avenue (Moser 2009). Later in the mid-1970s through the early 1980s, at the request of Arlington and Alexandria and under the authorization of Congress, the U.S. Army Corps of Engineers began and completed a major flood control project for this section of the stream.

Ultimately, to limit flooding and compensate for the lack of a naturally functioning floodplain resulting from the ever-increasing urbanization of the lower watershed, the naturally meandering main channel of Four Mile Run along the north side of the tidal marsh was straightened, deepened, and again widened. Dredged material from the new channel and imported fill were used to fashion a stream bank and levee along the north side of the wetlands where none naturally occurred, causing the majority of the tidal marsh community to be severed from the main tidal channel of Four Mile Run.

Today, all that remain of the natural features of Four Mile Run Park are approximately 11 acres of unfilled, original tidal marsh and swamp forest; a one-acre grove of remnant bottomland canopy trees surrounding the playground in an old seepage braid of Bruce Creek; and an acre or so of unfilled, though highly degraded, remnant tidal marsh along the open section of the Hume Spring tributary behind Cora Kelly School. The marsh and swamp forest are designated a “Permanent Wildlife Sanctuary” by the City of Alexandria.

Tidal Freshwater Wetlands comprise a number of diverse, regularly or irregularly flooded, lunar tidal communities, several of which once occurred at Four Mile Run Park – such as the Common Spatterdock Mudflat Type: *Nuphar advena* Tidal Herbaceous Vegetation (USNVC: [CEGL004472](#)) (Fig. 10). Remnant tidal marshes are somewhat isolated from direct tidal flooding as a result of altered land-use in the past, but they have remained largely intact owing to the deep, permanently saturated mucky soils that existed in these places for millennia. Unfortunately, most freshwater tidal wetlands are now globally uncommon to rare as a result of restricted global range, sea level rise, non-native invasive plants, habitat loss, and other factors (Fleming et al. 2013).



Fig. 10. Rare photograph from July 1899 by G.S. Miller, Jr. of a Common Spatterdock (*Nuphar advena*) mudflat along the lower Four Mile Run tidal channel near Four Mile Run Park. Photo courtesy the DC Herbarium (US).

Tidal Freshwater Marsh (Mixed High Marsh Type): *Impatiens capensis* - *Persicaria arifolia* - *Peltandra virginica* - (*Typha angustifolia*) Tidal Herbaceous Vegetation (USNVC: [CEGL006325](#)) is the principal freshwater tidal marsh community in northern Virginia, Maryland, and Delaware (NatureServe 2014), as well as Four Mile Run Park.

Herbaceous vegetation characterizes these communities, with River Bulrush (*Bolboschoenus fluviatilis*), Bottlebrush Sedge (*Carex comosa*), Soft-stem Bulrush (*Schoenoplectus tabernaemontani*), Rice Cutgrass (*Leersia oryzoides*), Wild Rice (*Zizania aquatica* var. *aquatica*), Cattails (*Typha* spp.), Halberd-leaf Tearthumb (*Persicaria arifolia*), Pennsylvania Smartweed (*Persicaria pensylvanica*), Dotted Smartweed (*Persicaria punctata*), Arrow-leaf Tearthumb (*Persicaria sagittata*), Water-hemp (*Amaranthus cannabinus*), Orange Jewelweed (*Impatiens capensis*), Swamp Rose-mallow (*Hibiscus moscheutos*), Halberd-leaf Rose Mallow (*Hibiscus laevis*), Common Dodder (*Cuscuta gronovii*), Nodding Bur-marigold (*Bidens cernua*), Smooth Bur-marigold (*Bidens laevis*), and Climbing Hempweed (*Mikania scandens*) the dominant species (Simmons 2009).

Broad-leaved Arrowhead (*Sagittaria latifolia*), Common Three-square (*Schoenoplectus pungens* var. *pungens*), Arrow-arum (*Peltandra virginica*), and Pickerelweed (*Pontederia cordata* var. *cordata*) are



Fig. 11. High-quality freshwater tidal channel of Farm Creek meandering through Freshwater Tidal Marsh at Featherstone National Wildlife Refuge, Prince William County, Virginia. The marsh at left in the photo is virtually identical in vegetation and landscape position to the remnant Freshwater Tidal Marsh at Four Mile Run Park. Photo by R.H. Simmons.

also common species of freshwater tidal marshes, but typically form extensive, nearly monospecific or co-dominant stands in the low intertidal zone between the mixed marsh and mudflats.

W.L. McAtee (1918), in *A Sketch of the Natural History of the District of Columbia*, gives an excellent historical perspective of this community and associated tidal vegetation and wildlife at Four Mile Run and nearby locales: “these waters constitute a vegetational unit, characterized by the abundance of submerged aquatics, as Wild Celery (*Vallisneria americana*), Common Waterweed (*Elodea canadensis*), and various pondweeds as Northern Naiad (*Najas flexilis*), Horned Pondweed (*Zannichellia palustris*), and [*Potamogeton* spp. and *Stuckenia pectinata*]...The marshes bordering such waters have as their principal elements Wild Rice, cattails, bulrushes, cord-grass, Pickerelweed, Spatterdock, *Peltandra*, and *Sagittaria*...Four collecting areas on the Virginia side which share more or less the vegetation above described are Four Mile Run, Hunting Creek, Dyke, and Mount Vernon. Wherever there is...marsh along this stretch of shore, occur the Cowbell Frog or Tink-Tank (*Hyla cinerea*) and the Least Bittern (*Ixobrychus exilis*). A plant that has about the same range is *Isoetes riparia* [Shore Quillwort]...Four Mile Run has a distinct tidal marsh near the mouth in which all three of these species occur. The low

ground about the mouth of the creek and the bordering hills are interesting collecting grounds. Various southern craneflies have been collected here and St. Elmo in this area is the type locality for a remarkable robber fly (*Asilus angustipennis*) and the sole station in our area for a striking southern species of the same family, namely, *Laphria saffrana*...”

Regularly flooded Tidal Hardwood Swamp Forest, characterized by hummock-and-hollow microtopography and diverse hydrophytic herbs and shrubs, occurs to a lesser extent on the slightly higher ground between the marsh and the floodplain. The original extent of this community was substantially diminished following the construction of the artificial levees, resulting in a degraded form of alluvial floodplain forest that occupies the levee to the north and northwest of the tidal wetlands. Characteristic species of Tidal Hardwood Swamp Forest here include Green Ash (*Fraxinus pennsylvanica*), American Elm (*Ulmus americana*), Silky Dogwood (*Cornus amomum*), Lizard’s-tail (*Saururus cernuus*), Common Wood Reedgrass (*Cinna arundinacea*), Blunt Broom Sedge (*Carex tribuloides* var. *tribuloides*), and others. Broad-leaved Arrowhead borders Bruce Creek at the convergence of the main tidal channel and interior swamp forest (Fig. 7).

Extensive floristic inventories of the tidal marsh and swamp forest at the park, as well as gravel bars and stream banks along Four Mile Run, were conducted in the early 2000s. In addition, quantitative compositional and environmental data were collected from one relatively undisturbed 400 m² swamp forest plot for the U.S. National Vegetation Classification (USNVC) – National Capital Region (NCR) project by Rod Simmons in 2004.

Locally uncommon to rare species of tidal marsh, forest, and shore that occur here are Field Horsetail (*Equisetum arvense*), Broad-leaved Arrowhead, Fowl Mannagrass (*Glyceria striata*), River Bulrush, Large Stalk-grain Sedge (*Carex stipata* var. *maxima*), Common Three-square, Common Duckweed (*Lemna minor*), Arrow-arum, Lizard’s-tail, Halberd-leaved Tearthumb, Pale Dock (*Rumex altissimus*), Water-hemp, Rough Cinquefoil (*Potentilla norvegica*), Swamp Rose-mallow, Wing-leaved Primrose-willow (*Ludwigia decurrens*), Biennial Gaura (*Oenothera gaura*), Water-hemlock (*Cicuta maculata* var. *maculata*), Canada Germander (*Teucrium canadense*), and Cardinal Flower (*Lobelia cardinalis*). Additionally, River Bulrush is assigned a rank of S2 – “at high risk of extirpation from the state” – by the Virginia Department of Conservation and Recreation, Division of Natural Heritage (Townsend 2014).

Four Mile Run Park is also the sole location in Alexandria for Wild Rice, Lesser Clearweed (*Pilea fontana*), Water Parsnip (*Sium suave*), and Smooth Oxeye (*Heliopsis helianthoides* var. *helianthoides*), as well as one of two locations in the City for Bottlebrush Sedge, Common Spatterdock (*Nuphar advena*), Celery-leaved Crowfoot (*Ranunculus sceleratus* var. *sceleratus*), Marsh Yellow Cress (*Rorippa palustris* ssp. *fernaldiana*), Common Dodder, Nodding Bur-marigold, Three-lobed Beggar-ticks (*Bidens comosa*), and Smooth Bur-marigold.

Reflecting major past soil disturbance in forested areas throughout the park are large expanses of especially troublesome non-native invasive plants, including English Ivy (*Hedera* sp.), Bush Honeysuckle (*Lonicera maackii*), Multiflora Rose (*Rosa multiflora*), White Mulberry (*Morus alba*), Sweet Autumn Clematis (*Clematis terniflora*), Arrow Bamboo (*Pseudosasa japonica*), Orange Day-lily (*Heemerocallis fulva*), and others. The City’s largest population of Lesser Celandine (*Ficaria verna*) carpets virtually all of the artificially filled areas of interior forest. Common Reed (*Phragmites australis* ssp. *australis*), a



Fig. 12. Rough Greensnake (*Opheodrys aestivus*), a small, non-venomous native snake that inhabits upland thickets at Goat Hill Park and similar forested ridges along both sides of the lower Four Mile Run valley. Photo courtesy Amphibian and Reptile Diversity Research Center at the University of Texas at Arlington.

noxious weed of the open marsh community that aggressively displaces native vegetation, is also a top priority for removal.

Plans are currently underway for restoring the main Four Mile Run channel along the park to a more natural condition, thereby enhancing water quality and improving the overall condition of the site. In doing so, much of the artificial levee and stream bank between the existing wetlands and main channel will be removed or significantly lowered to restore the historical extent of the wetlands. Removing the artificial fill and returning the area to wetlands will also effectively remove large amounts of otherwise entrenched non-native invasive plants. Imported quarried rock, in the form of riprap and gabions that were used to armor the stream banks of the main channel during the 1970s and 1980s flood control project, will also be removed along the section of stream from Mount Vernon Avenue to U.S. Route 1. All planned work must meet the U.S. Army Corps of Engineers “no-rise” requirements for the mandated stream channel flows.

Natural resource management at the park consists of regular control of non-native invasive plants, litter and debris clean-up, floristic inventories, and environmental review.

Hillside Park:

This small, 0.32-acre park (property class 731; City Parks/Playgrounds) at 264 Burgess Avenue occupies a steep, gravelly slope amidst a grove of mostly mature White Oak (*Quercus alba*) and an understory of Mockernut Hickory (*Carya alba*) and Black Gum (*Nyssa sylvatica*). Black Oak (*Quercus velutina*) and Virginia Pine (*Pinus virginiana*) occur to a lesser extent at the park edge. Unfortunately, nothing remains of the natural woodland shrub and herb layers that once existed here.

The park overlooks the old stream valley of the Hume Spring tributary along Russell Road to the northwest and is important for groundwater infiltration and recharge, as well as protecting waterways and maintaining water quality downstream.

Natural resource management at this site consists of infrequent vegetation inventories.

Landover Park:

This small park (property class 731; City Parks/Playgrounds) comprises the 0.8-acre “Warwick Pool” parcel at 3301 Landover Street and the adjoining 1.04-acre “Landover Park” parcel of open playground at 3315 Landover Street. The park is situated along the lower north slope of the easternmost large hill overlooking the lower Four Mile Run valley and Arlington highlands to the north.

Historic Mount Auburn, the home of Helen Chapman Calvert and Calvert’s grandfather Thomas Swann, once stood just above the park at the upper parking lot of adjacent Aspen House, which was built in 1963 following the demolition of Mount Auburn shortly after Helen Calvert’s death (OHA 2010b).

All that remain of the natural features of the park are scattered Eastern Red Cedar (*Juniperus virginiana*), Black Cherry (*Prunus serotina*), Black Locust (*Robinia pseudoacacia*), and Willow Oak (*Quercus phellos*) trees along the park edges. Nonetheless, the pervious, gravelly soils and natural turf function as a “rain garden” and are important for groundwater recharge.

Natural resource management at this site consists of infrequent vegetation inventories.

Gentry Park:

This very small, 0.2-acre park (property class 731; City Parks/Playgrounds), situated just uphill to the west of Landover Park at 210-A Guthrie Avenue, occupies a steep, northeast-facing slope and colluvial bench of heavy clay surrounded on all sides by the backyards of residences fronting Guthrie Avenue, Mosby Street, and Gentry Avenue. The park is accessed by a walkway between 210 and 212 Guthrie Avenue.

The remaining natural features of the site include a large Silver Maple (*Acer saccharinum*) at the back corner of 212 Guthrie Avenue and a mature Green Ash (*Fraxinus pennsylvanica*). Massive, old Willow Oak (*Quercus phellos*) trees bordering the park in the backyards of residences along Mosby Street and ones in the 2900 block of Landover Street are probably relics of the historic Warwick estate from which the Warwick Village neighborhood was developed. Warwick was the 19th century summer home of Frank Hume and stood approximately at the 2900 block of present-day Landover Street before it was razed in 1953 (OHA 2010a).

Natural resource management at Gentry Park consists of regular control of non-native invasive plants, such as English Ivy (*Hedera* sp.) creeping into the park from neighboring residences, and ecological restoration plantings.

Goat Hill Park:

This 2.47-acre park (property class 731; City Parks/Playgrounds) at 35 Kennedy Street occupies an erosional remnant spanning a high, upland ridge and extremely steep, southeast-facing slope along the Mount Ida escarpment. Most of the park is a natural wooded area and includes a small playground along Kennedy Street.

Southern Red Oak (*Quercus falcata*) is the dominant tree on the dry to mesic, southwest-facing, gravelly ridge and upper slope, along with Black Oak (*Quercus velutina*), Post Oak (*Quercus stellata*), Chestnut Oak (*Quercus montana*), Black Cherry (*Prunus serotina*), and Mockernut Hickory (*Carya alba*). The largest and oldest of these are probably relics of the old Hume estate.

Also occurring here and seen fairly regularly is the Rough Greensnake (*Opheodrys aestivus*), a small, non-venomous native snake (Fig. 12) of wooded thickets that is also seen at Fort Scott Park and other locales on the Arlington County side of the lower Four Mile Run valley. Unfortunately, it is now considered “uncommon” in the greater Washington, D.C. region (Abugattas and White 2011).

Deep, weathered exposures of Chinquapin Hollow fine sandy clay (Fleming 2008) crop out along the steep lower slopes of the park. Though little of the natural understory, shrub, and herb layers remain, the high quality soils and remnant seed bank are expected to eventually regenerate the native vegetation. For instance, Downy Ground-cherry (*Physalis pubescens*), which was last collected in the City by Lester Ward in 1877, was rediscovered here in 2014 following the removal of smothering invasive plants.

Extensive infestations of Tree-of-heaven (*Ailanthus altissima*), Bush Honeysuckle (*Lonicera maackii*), Kudzu (*Pueraria montana* var. *lobata*), White Mulberry (*Morus alba*), and other highly invasive weeds comprise much of the vegetation of the upper slope and ridge that are not regularly mowed.

Natural resource management at the park consists of regular, large-scale control of non-native invasive plants, ecological restoration plantings, infrequent floristic inventories, and environmental review.

Timberland Park:

This small 0.53-acre park (property class 731; City Parks/Playgrounds) at 66-A Kennedy Street is another open space remnant of the old Hume estate in Warwick Village. It is situated downslope and due south of Goat Hill Park and is accessed by a walkway between 66 and 68 Kennedy Street.

The site is mostly open, except for several Black Cherry (*Prunus serotina*) and Black Locust (*Robinia pseudoacacia*) trees and a large Eastern Boxelder (*Acer negundo* var. *negundo*) at the bottom of the slope. A large, old Pin Oak (*Quercus palustris*) at the park entrance along Kennedy Street likely dates to the old Hume estate. The porous, gravelly soils are important for groundwater infiltration and recharge.

Arrow Bamboo (*Pseudosasa japonica*), Multiflora Rose (*Rosa multiflora*), Japanese Honeysuckle (*Lonicera japonica*), English Ivy (*Hedera* sp.), and White Mulberry (*Morus alba*) are prominent non-native invasive plants, though are mainly confined to the park's edges.



Fig. 13. The locally-famous “Federal Spring” as it appears today. This ancient spring sits at the toe slope of the Mount Ida escarpment at 1904 Russell Road near the intersection with Lloyd’s Lane and was once part of the historic Federal Hill estate. The name of the spring was later renamed “Prosise” by John Prosise who acquired the property in 1901 (Weber 2000). Photo by R.H. Simmons.

Natural resource management at this site consists of non-native invasive plant control and ecological restoration plantings.

Beach Park:

This gently-sloping, 1.42-acre park (property class 731; City Parks/Playgrounds) at 201 Rucker Place is mostly comprised of open, mowed turf, playgrounds, and a shallow drainage swale spanning the north edge of the park.

Several stately, native canopy trees occur throughout the site – all relics of pre-development - including two large, old Pin Oak (*Quercus palustris*), a large Silver Maple (*Acer saccharinum*), and a City co-champion Persimmon (*Diospyros virginiana*).

Before there was extensive development in the area, seepage braids along natural contours drained a section of the Old Town terrace from the intersection of Leslie Avenue and E. Bellefonte Avenue south to E. Alexandria Avenue (just west of present-day Simpson Stadium Park) and westward to Hancock Avenue where the waterway flowed due south to the intersection of Braddock Road and present-day Commonwealth Avenue. The upper headwaters of Timber Branch originate under present-day Valley

Drive, just south of Crestwood Drive near the summit of the Chinquapin Village terrace (Fleming 2008), and flow southward to the end of W. Glendale Avenue and W. Spring Street where Timber Branch bends sharply and flows due east to the convergence with the above stream at the intersection of Braddock Road and Commonwealth Avenue. The combination of these two streams gives rise to Hooff's Run, which flows southward along the east side of Commonwealth Avenue to its confluence with Cameron Run (USGS 1917).

Beach Park is situated a short distance south of Timber Branch along the toe slope of the steep Mount Ida escarpment and is an important component in maintaining water quality and groundwater recharge of the Hooff's Run watershed and Old Town terrace below.

Natural resource management at this site consists of non-native invasive plant control and infrequent vegetation inventories.

10 Russell Road:

This very small, 0.25-acre park (property class 731; City Parks/Playgrounds) at 10 Russell Road is situated at the toe slope of the northeast side of Shuter's Hill (Shooter's Hill) and the grounds of the George Washington Masonic Memorial just above the replacement stone for the original SW2 boundary marker (second marker stone of the southwest boundary) of the 1791-1846 limits of the District of Columbia. The coordinates of the original SW2 boundary stone, installed in 1791, place it within or very near the park (Baker 1897).

The park is essentially a remnant grove of mature Green Ash (*Fraxinus pennsylvanica*), Persimmon (*Diospyros virginiana*), Sweetgum (*Liquidambar styraciflua*), Pin Oak (*Quercus palustris*), Black Cherry (*Prunus serotina*), and non-native Osage Orange (*Maclura pomifera*). Nothing remains of the natural woodland shrub and herb layers that once existed here. However, the native turf of Poverty Oatgrass (*Danthonia spicata*), Blue Sedge (*Carex glaucoidea*), and other low-growing plants provides an attractive, low maintenance, glade-like setting.

Stringy Stonecrop (*Sedum sarmentosum*), a persistent non-native invasive plant, is slowly spreading downslope into the interior of the park from the edge of King Street and needs to be eradicated.

Natural resource management at this site consists of non-native invasive plant control and infrequent vegetation inventories.

Woodbine Tot Lot, LeBosquet at Sunnyside, Elbert Triangle Park, Hume Springs Park, 3550 Commonwealth Avenue, and Sunset Mini Park:

All of these sites (property class 731; City Parks/Playgrounds) are very small neighborhood parks consisting mainly of sitting areas and small playgrounds ("tot lots"). All are artificial landscapes with no remaining natural features. Elbert Triangle Park and Hume Springs Park feature planted, mature native shade trees, including a large Cherrybark Oak (*Quercus pagoda*) at Hume Springs Park. (The northernmost extent of this tree in Virginia is several counties south of Alexandria in the coastal plain).

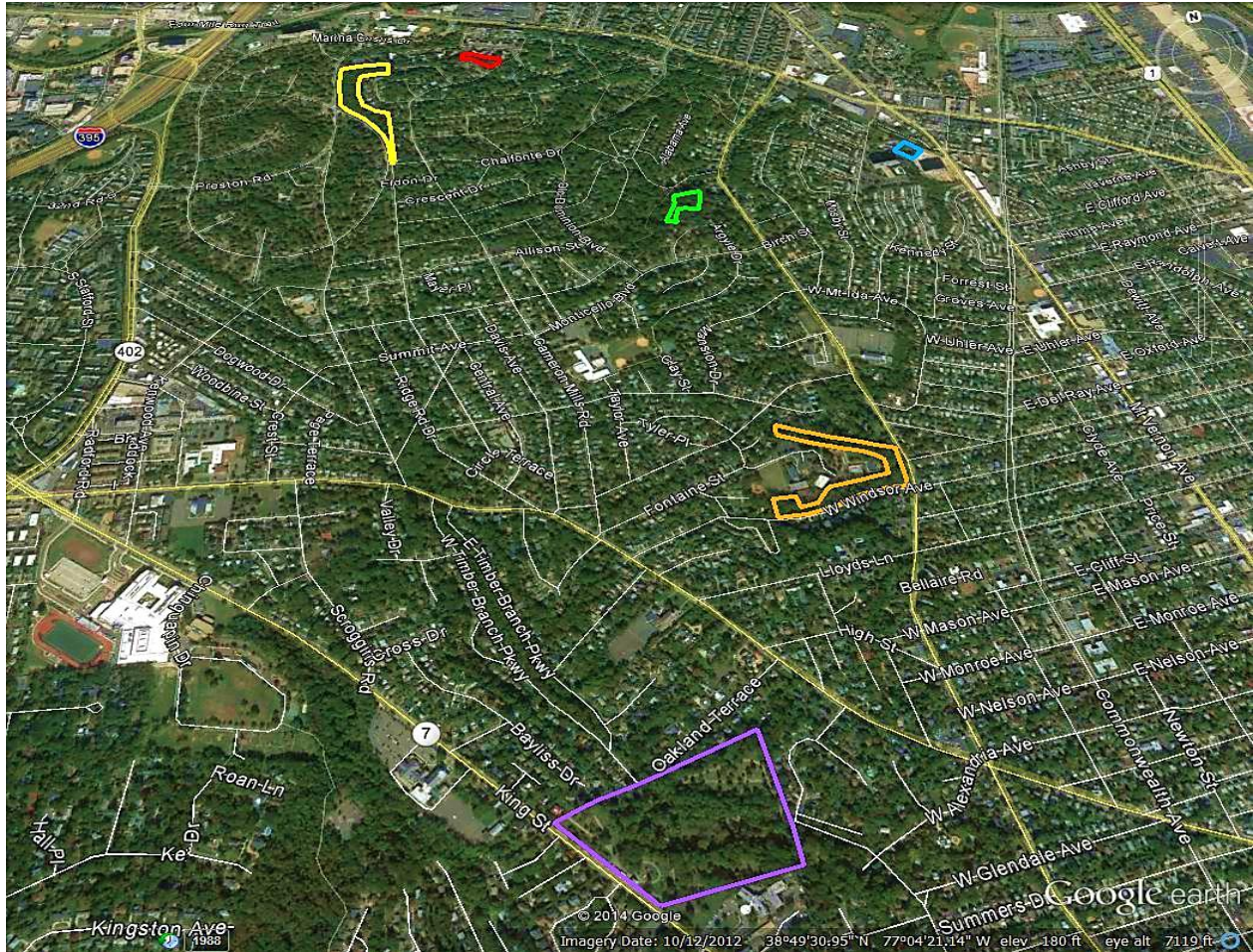


Fig. 14. Important remaining forested areas, undeveloped sites, and natural features (outlined in color) of the North Ridge area that are not actively stewarded by City natural resource management staff: Parkfairfax Woods (yellow), Lloyd Apartments Woodland (red), Kust Conservation Easement (green), Reservoir Woods (blue), St. Stephen's & St. Agnes School Woods: Lower School Campus (orange), and Ivy Hill Cemetery (purple).

Additional Remnant Forest Areas, Undeveloped Sites, and Natural Features of the North Ridge Area

The following sites are privately owned and are not regularly stewarded by natural resource management staff but nonetheless include some of the largest and most important natural areas remaining in the City. Many of these sites are in some form of protective easement. Over the years, RPCA Natural Resources Division staff have worked with the various landowners and stewards of these sites in an advisory capacity regarding non-native invasive plant control, best management practices, resource assessments, and natural lands management.

These properties represent significant concentrations of native biodiversity and natural features, forest canopy, including notable and old-age trees, and water resources. All of these places together are critical in maintaining forest connectivity and ecological sustainability throughout Alexandria and vicinity.



Fig. 15. Ancient White Oak (*Quercus alba*) trees in old-age stand of Mesic Mixed Hardwood Forest on the north-facing, colluvial slope at Parkfairfax Woods, City of Alexandria, Virginia. Photo by R.H. Simmons.

Parkfairfax Woods:

Parkfairfax was developed by the Metropolitan Life Insurance Company in the early 1940s as a “low-rise, low-density community” that retained large areas of open space and woodlands (VDHR 2014). In recognition of this, the entire 132-acre site – designated the Parkfairfax Historic District – is listed on the National Register of Historic Places and the Virginia Landmarks Register.

Except for the flat summit of Mount Eagle and a small portion of the Chinguapin Village terrace that follows the southwest edge of Martha Custis Drive (Fleming 2008), most of the property is characterized by a canyon-like series of steep, colluvial slopes and ravines. Before the site was developed, it was largely forested and present-day Valley Drive north of Kenwood Avenue and Allison Street was a stream that flowed to Four Mile Run (USGS 1917). Today, Parkfairfax remains one of the most heavily canopied places in Alexandria, including numerous old-age trees, remnant groves and forest stands, and many now-mature oaks and other trees planted throughout the property at the time it was developed.

Of the 22 acres of remnant forest throughout the property, the 7.3-acre Parkfairfax Woods or “600 Woods” (WCPM 2012) is by far the least disturbed and is one of the most floristically diverse natural areas remaining in Alexandria. This site overlooks lower Valley Drive and is situated along the east side of Gunston Road from Chalfonte Drive north to the intersection of Valley Drive, and Valley Drive north to the intersection with Holmes Lane.



Fig. 16. Starry Campion (*Silene stellata*). Photo by Alan Cressler.

The geology, topography, vegetation types, flora, and landscape position of Parkfairfax Woods are representative of old-age forest communities just east of the fall line in the greater Washington, D.C. region and are virtually identical to those at Arlington Woods, various Fort Circle Parks, and other similar sites nearby (Simmons 2014).

Central Appalachian / Inner Piedmont Low-Elevation Chestnut Oak Forest: *Quercus montana* - (*Quercus coccinea*, *Quercus rubra*) / *Kalmia latifolia* / *Vaccinium pallidum* Forest (USNVC: CEGL006299) comprises the vegetation of the steep, acidic, gravelly slope that runs along Gunston Road to the very steep bluff overlooking the intersection of Gunston Road and Valley Drive. This community type is naturally sparse, with Chestnut Oak (*Quercus montana*) and Mountain Laurel (*Kalmia latifolia*) the dominant plants and decaying leaves and organic debris the functioning groundcover. The associated steep slope variant, characterized by co-dominant Witch-hazel (*Hamamelis virginiana*) and Northern Red Oak (*Quercus rubra*) occupying the mid-to-lower slopes, also occurs here. In 2004, quantitative compositional and environmental data were collected from one 400 m² forest plot at this site by Rod Simmons for the U.S. National Vegetation Classification (USNVC) – National Capital Region (NCR) project.

Several small groundwater seeps flow from the toe slope of the gravelly hillside along Gunston Road and are indicated by small stands of Red Maple (*Acer rubrum*) and Tulip Tree (*Liriodendron tulipifera*). Historically, these springs would have given rise to an extensive Skunk Cabbage (*Symplocarpus foetidus*) seepage swamp that likely once bordered the lower stretches of Gunston Road near the intersection with Valley Drive.

Much of Parkfairfax Woods to the north of this section, on west-facing, upper colluvial slopes of weathered Potomac Formation clay, is Piedmont Acidic Oak - Hickory Forest: *Quercus alba* - *Quercus rubra* - *Carya alba* / *Cornus florida* / *Vaccinium stamineum* / *Desmodium nudiflorum* Forest (USNVC: CEG008475). Typical examples of this community are often much more species rich than Oak-Heath Forest, with a diversity of upland oaks and hickories (*Carya* spp.) in the canopy, a fairly diverse understory, and a host of woodland sedges, grasses, and wildflowers in the herb layer (forest floor). This type generally occurs as a gradient between Oak-Heath Forest and Mesic Mixed Hardwood Forest, often on dry to mesic, acidic, southwest-facing slopes with high solar exposure (Simmons 2013).

In addition to the City's largest population of Starry Campion (*Silene stellata*), other locally uncommon to rare species that occur here include Bosc's Rosette Grass (*Dichanthelium boscii*), Downy Carrion-flower (*Smilax pulverulenta*), American Pennyroyal (*Hedeoma pulegioides*), Hairy Thoroughwort (*Eupatorium pubescens*), Upland Boneset (*Eupatorium sessilifolium* var. *sessilifolium*), and Pale-leaved Sunflower (*Helianthus strumosus*).

The Acidic Oak-Hickory Forest section is also the sole location in Alexandria for Smooth Forked Nailwort (*Paronychia canadensis*) and Godfrey's Thoroughwort (*Eupatorium godfreyanum*), and one of two locations in the City for Wild Pink (*Silene caroliniana* var. *pensylvanica*).

Northern Coastal Plain / Piedmont Mesic Mixed Hardwood Forest: *Fagus grandifolia* - *Quercus (alba, rubra)* - *Liriodendron tulipifera* / (*Ilex opaca* var. *opaca*) / *Polystichum acrostichoides* Forest (USNVC: CEG006075) occupies the gravelly colluvial slope at the north side of the woods (Fig. 15). This regionally common forest community is the classic vegetation type of forested stream banks and lower slopes where soils are richer and do not dry out significantly throughout the year. Old-age Tulip Tree, White Oak (*Quercus alba*), and Northern Red Oak are the dominant canopy trees of this section, along with lesser covers of hickories, White Ash (*Fraxinus americana*), and other hardwoods. Black Haw (*Viburnum prunifolium*), American Hazelnut (*Corylus americana*), and Spicebush (*Lindera benzoin*) are the dominant plants of the relatively sparse shrub layer. Ericaceous plants (Heath Family) are largely absent from this type, although Pinxterbloom Azalea (*Rhododendron periclymenoides*) occasionally crops out along lower slopes and stream banks (ancestral here). Cut-leaf Toothwort (*Cardamine concatenata*) and Mayapple (*Podophyllum peltatum*) are the dominant herbaceous plants, along with a variety of summer and fall wildflowers. Bloodroot (*Sanguinaria canadensis*) and Early Meadow Rue (*Thalictrum dioicum*) are locally rare wildflowers that also occur in this section.

Lloyd Apartments Woodland:

The natural features of this 5.29-acre site (property class 310; Garden Apt.) at 3850 Cameron Mills Road occupy app. 1.06 acres and consist of a thin remnant of woodland along the lower slope of the steep middle section of Beverley Hills that overlooks the Four Mile Run valley.



Fig. 17. Intermixed Mountain Laurel (*Kalmia latifolia*), left front, and Witch-hazel (*Hamamelis virginiana*), right center, in old-age Oak-Heath Forest above Monticello Park at the Kust Conservation Easement, City of Alexandria, Virginia. Photo by R.H. Simmons.

Much of the woodland is highly disturbed, as indicated by the presence of successional vegetation; weedy thickets of English Ivy (*Hedera* sp.), Multiflora Rose (*Rosa multiflora*), Bush Honeysuckle (*Lonicera maackii*), White Mulberry (*Morus alba*), Higan Cherry (*Prunus subhirtella*), Arrow Bamboo (*Pseudosasa japonica*), and many others; a nearly continuous cover of shrubby Poison Ivy (*Toxicodendron radicans*) and Common Greenbrier (*Smilax rotundifolia*); and the lack of a herbaceous layer. Moreover, the traces of an old road flank the lower slope perpendicular to Cameron Mills Road.

Nonetheless, the original vegetation of the site appears to have been high quality Mesic Mixed Hardwood Forest dominated by Northern Red Oak (*Quercus rubra*), with numerous, old and large specimens remaining today. An ancient, multi-trunked Black Gum (*Nyssa sylvatica*) – one of the largest and oldest in the City – grows atop the slope at the western corner of the woodland.

Two large, old trees at the woodland edge along Cameron Mills Road represent the sole occurrence in Alexandria for Bender's Oak (*Quercus x benderi*), a naturally occurring hybrid between Scarlet Oak (*Quercus coccinea*) and Northern Red Oak. The City's largest population of the locally uncommon to rare Frosted Hawthorne (*Crataegus pruinosa*) also grows here. (Critical examination of City of Alexandria specimens of Frosted Hawthorne is needed to determine varietal status; see Weakley et al. 2012.)

Kust Conservation Easement:

This mostly forested, 2.82-acre site is situated on a hilltop adjoining Monticello Park to the east and is composed of two parcels: the 1.56-acre parcel at 3104 Russell Road that includes the private residence of the Kust family (property class 100; Detached House) and the 1.26-acre parcel at 3104-B Russell Road that borders the park (property class 910; Vacant Land – Residential). The entire property is protected in perpetuity under a conservation easement held by the Northern Virginia Conservation Trust, thanks to a lifelong commitment by the Kust family to environmental preservation and stewardship in Alexandria.

The residence was built in 1922 and is surrounded by stately, old Black, White, and Chestnut oaks. Together, both parcels are important in protecting the interior forest of Monticello Park and maintaining forest connectivity in this area of the City. Moreover, the 1.26-acre parcel bordering the park (represented in Fig. 14) is especially valuable because it preserves a mostly undisturbed remnant of old-age Oak-Heath Forest beyond the park's boundaries.

The steep slope variant of Central Appalachian / Inner Piedmont Low-Elevation Chestnut Oak Forest: *Quercus montana* - (*Quercus coccinea*, *Quercus rubra*) / *Kalmia latifolia* / *Vaccinium pallidum* Forest (USNVC: [CEGL006299](#)) extends up from the park throughout the north-facing upper slopes of the property, with Chestnut Oak (*Quercus montana*), White Oak (*Quercus alba*), Flowering Dogwood (*Cornus florida*), Mountain Laurel (*Kalmia latifolia*), Pinxterbloom Azalea (*Rhododendron periclymenoides*), Lowbush Blueberry (*Vaccinium pallidum*), Maple-leaf Viburnum (*Viburnum acerifolium*), Witch-hazel (*Hamamelis virginiana*), and Eastern Solomon's-plume (*Maianthemum racemosum* ssp. *racemosum*) the dominant vegetation (Fig. 17).

Reservoir Woods:

This 1-acre site at 3198 Mount Vernon Avenue (property class 616; Water Corp. SCC) is situated just east of adjoining Landover Park on the lower slope of the easternmost large hill overlooking the lower Four Mile Run valley. The property is owned by the Alexandria Water Company, which built a reservoir here in 1927 on land that was formerly part of the historic Mount Auburn estate (OHA 2010b).

Deep, very sandy lenses of Chinquapin Hollow fine sandy clay characterize the soil of this site, much the same as at nearby Goat Hill Park (Fleming 2008). Sandy-loamy soils and a southeast exposure have given rise to diverse thickets of White Oak (*Quercus alba*), Pin Oak (*Quercus palustris*), Bush's Oak (*Quercus x bushii*) – a naturally occurring hybrid between Blackjack Oak (*Quercus marilandica*) and Black Oak (*Quercus velutina*), Black Gum (*Nyssa sylvatica*), Mockernut Hickory (*Carya alba*), Pignut Hickory (*Carya glabra*), Virginia Pine (*Pinus virginiana*), Persimmon (*Diospyros virginiana*), Common Greenbrier (*Smilax rotundifolia*), and shrubby Poison Ivy (*Toxicodendron radicans*), which encircle the covered reservoir in the middle of the property. Some of the Black Gum, hickories, and oaks are old and large, including a state co-champion Blackjack Oak – the fourth largest known in Virginia.

Alexandria's largest and perhaps sole remaining, naturally occurring station for Sweet Crabapple (*Malus coronaria*) occurs here along the upper slope below the Aspen House parking lot. Fairly extensive colonies of locally uncommon to rare Pasture Rose (*Rosa carolina*) also grow here. (City of Alexandria specimens of Pasture Rose have not yet been determined to subspecies; see Weakley et al. 2012.)



Fig. 18. Greg Zell and ancient Northern Red Oak (*Quercus rubra*) in deep, cove-like ravine on the northeast side of St. Stephen's & St. Agnes School Woods: Lower School Campus, City of Alexandria, Virginia. Photo by R.H. Simmons.

St. Stephen's & St. Agnes School Woods (Lower School Campus):

This 16.46-acre site (property class 780; Private Ed. Insts.) is situated atop the east-facing edge of the Mount Ida escarpment and is composed of three contiguous parcels: the main 15.21-acre parcel at 400 Fontaine Street that includes the school buildings and the historic Richard B. Lloyd House; the 0.64-acre section at 400-B Fontaine Street; and the 0.61-acre playground area at 401 Thomas Street. The natural features of this site consist of app. 8 acres of woodland that surround the property on the north, east, and south.

A deep, cove-like ravine, formed by an intermittent, spring-fed stream draining the eastern edge of the Beverley Hills terrace (Fleming 2008), spans the north boundary of the property from Woodland Terrace to Russell Road. Over millennia, the stream has cut down through the Mount Ida escarpment to impervious Potomac Formation clay along the stream bed. Numerous large, quartzite boulders, presumably relics of the terrace above, are scattered about the lower slopes and stream banks, along with small fragments of iron-conglomerate sandstone ("bog iron").

Hidden largely from view is an old-age remnant of Northern Coastal Plain / Piedmont Mesic Mixed Hardwood Forest: *Fagus grandifolia* - *Quercus* (*alba*, *rubra*) - *Liriodendron tulipifera* / (*Ilex opaca* var. *opaca*) / *Polystichum acrostichoides* Forest (USNVC: CEGL006075), which occupies the length of the

ravine. Gigantic Northern Red Oak (*Quercus rubra*), Chestnut Oak (*Quercus montana*), and Tulip Tree (*Liriodendron tulipifera*) comprise the lush canopy, including a City co-champion Chestnut Oak and a state co-champion Northern Red Oak – the third largest known in Virginia (Fig. 18). Spicebush (*Lindera benzoin*) and Mayapple (*Podophyllum peltatum*) are the dominant plants of the shrub and herb strata, with Christmas Fern (*Polystichum acrostichoides*), Richweed (*Collinsonia canadensis*), and Enchanter's Nightshade (*Circaea canadensis* ssp. *canadensis*) prominent along the lower slopes and stream banks. A fairly sizable colony of Pawpaw (*Asimina triloba*) grows along the stream in an oxbow cove near the eastern end of the ravine.

Uncommon to rare species in Alexandria that occur here include Spinulose Wood Fern (*Dryopteris carthusiana*), American Chestnut (*Castanea dentata*), Common Wild Ginger (*Asarum canadense*), Bloodroot (*Sanguinaria canadensis*), and the City's largest population of Silverleaf Grape (*Vitis aestivalis* var. *bicolor*). This site represents the easternmost station in Alexandria for all of these plants, as well as one of two locations in the City for Common Wild Ginger.

Despite a weedy cover of English Ivy (*Hedera* sp.) and shrubby Poison Ivy (*Toxicodendron radicans*) throughout, along with an invasion of Norway Maple (*Acer platanoides*), Sugar Maple (*Acer saccharum* var. *saccharum*), and Red Buckeye (*Aesculus pavia* var. *pavia*) in the understory, this site is one of the most important remaining forested tracts in the City.

Past-cleared Mesic Mixed Hardwood Forest occupies the east-facing slope along Russell Road, as evidenced by a predominance of now-mature Tulip Tree in the canopy, numerous stands of American Holly (*Ilex opaca* var. *opaca*) in the understory and shrub layers, and a heavy cover of English Ivy and Poison Ivy. American Basswood (*Tilia americana* var. *americana*) is a locally uncommon to rare tree that also occurs in this section of woodland.

Old and large Southern Red Oak (*Quercus falcata*), Black Oak (*Quercus velutina*), and Chestnut Oak are prominent along the upper, south-facing slopes above W. Windsor Avenue, along with White Oak (*Quercus alba*), Mockernut Hickory (*Carya alba*), Sweet Pignut Hickory (*Carya ovalis*), Sassafras (*Sassafras albidum*), and others. Tulip Tree and Northern Red Oak occupy the mid-to-lower slopes, forming a virtually impenetrable thicket with Common Greenbrier (*Smilax rotundifolia*), Silverleaf Grape, shrubby Poison Ivy, and a host of non-native invasive weeds. Massive, old-age Chestnut Oak grow on a wooded, northwest-facing knoll on the west side of the tennis courts near the edge of the property, together with a City co-champion Downy Serviceberry (*Amelanchier arborea*).

At nearly 8 acres in size, this property represents the City's largest section of contiguous woodland along the Mount Ida escarpment and is especially valuable in maintaining connectivity with nearby forested areas, such as Monticello Park and Ivy Hill Cemetery, as well as preserving mature, native tree canopy in Alexandria.

Ivy Hill Cemetery:

This old, historic cemetery at 2823 King Street (property class 792; Private Cemeteries) preserves 22.67 acres of remnant stands, groves, and old trees of the mostly oak-dominated forest that once



Fig. 19. Old-age oaks on the flat Beverley Hills terrace at Ivy Hill Cemetery, City of Alexandria, Virginia. Photo by R.H. Simmons.

extended across the Beverley Hills terrace (Fleming 2008), as well as the only natural remaining segment of Timber Branch in Alexandria. The earliest interments date to 1811 when the property was used as a family burial ground; and in 1854 it was established as a nondenominational, non-profit, community cemetery (Miller 2000, IHC 2014). Through the years, the cemetery has maintained its parklike expanse of old trees and open space and is widely regarded as one of the most scenic places in the City (Fig. 19).

A several acre section of upland forest occupies the mid-to-upper, north-facing slope overlooking Timber Branch at the eastern half of the property. As with similar sites in the North Ridge area, Chestnut Oak (*Quercus montana*) and Northern Red Oak (*Quercus rubra*) comprise the canopy, along with scattered White Oak (*Quercus alba*) and Mockernut Hickory (*Carya alba*). Perhaps reflecting a transition from upland Oak-Heath Forest to the more lowland Mesic Mixed Hardwood Forest is the intermixture of Black Gum (*Nyssa sylvatica*) as the dominant understory tree; Downy Serviceberry (*Amelanchier arborea*), Pinxterbloom Azalea (*Rhododendron periclymenoides*), Lowbush Blueberry (*Vaccinium pallidum*), and Summer Grape (*Vitis aestivalis* var. *aestivalis*) as the prominent shrubs; and Eastern Solomon's-plume (*Maianthemum racemosum* ssp. *racemosum*), Solomon's-seal (*Polygonatum biflorum* var. *biflorum*), Virginia Creeper (*Parthenocissus quinquefolia*), and White Wood Aster (*Eurybia divaricata*) representing the herb layer.

The cove-like, mid-to-lower slopes also include Christmas Fern (*Polystichum acrostichoides*), Eastern Bracken Fern (*Pteridium aquilinum* ssp. *latiusculum*), Deerberry (*Vaccinium stamineum*), Richweed



Fig. 20. Massive, “ice-rafterd” quartzite boulders along the banks of Timber Branch at Ivy Hill Cemetery. This enigmatic assemblage is perhaps the region’s best display of these interesting geologic artifacts. Photo by R.H. Simmons.

(*Collinsonia canadensis*), Summer Bluets (*Houstonia purpurea* var. *purpurea*), and Blue-stemmed Goldenrod (*Solidago caesia* var. *caesia*), with Mayapple (*Podophyllum peltatum*) and Naked-stem Tick-trefoil (*Hylodesmum nudiflorum*) the dominant herbs.

Uncommon to rare species in Alexandria that occur here include Bearded Shorthusk (*Brachyelytrum erectum*), Starry Campion (*Silene stellata*), Early Meadow Rue (*Thalictrum dioicum*), Bloodroot (*Sanguinaria canadensis*), and Wild Geranium (*Geranium maculatum*). Trailing Arbutus (*Epigaea repens*) grows on a mossy, acidic bank and American Pennyroyal (*Hedeoma pulegioides*) grows in dry, gravelly soil at the woods edge. This is also the sole location in the City for the regionally rare Sweet Joe-pye-weed (*Eutrochium purpureum* var. *purpureum*).

Perennial springs emerge from the toe slope at the far eastern end of the property near the intersection of Ruffner Road and Timber Branch Parkway, forming a small woodland seep that supports Red Maple (*Acer rubrum*), Fowl Mannagrass (*Glyceria striata*), Sallow Sedge (*Carex lurida*), and other wetland plants.

At the bottom of the ravine along both sides of Timber Branch for much of the length of the property are several acres of Mesic Mixed Hardwood Forest. Despite heavy infestations of non-native invasive weeds, the vegetation here is largely represented by a canopy of White Oak and Tulip Tree (*Liriodendron*

tulipifera); an understory of Red Maple, Ironwood (*Carpinus caroliniana*), and Dogwood (*Cornus florida*); a shrub layer mainly of Spicebush (*Lindera benzoin*); and extensive carpets of Mayapple (*Podophyllum peltatum*) and Yellow Trout Lily (*Erythronium americanum* ssp. *americanum*) in spring. Intermixed occasionally near seepages on the south side of the stream are stands of Coastal Plain / Piedmont Small Stream Forest: *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* Forest (USNVC: [CEGL004418](#)), as indicated by small glades of New York Fern (*Parathelypteris noveboracensis*), Sweetgum (*Liquidambar styraciflua*), and others.

The stream banks are also one of two locations in the City for Wild Blue Phlox (*Phlox divaricata*). Other Alexandria rare species of this section of Timber Branch include Bearded Shorthusk, Bottlebrush Grass (*Elymus hystrix*), and American Basswood (*Tilia americana* var. *americana*). The state co-champion Ironwood and City champion Tulip Tree are also found here, along with the City champion Pitch Pine (*Pinus rigida*) in an open area on the north side of the stream.

Much of Timber Branch at Ivy Hill Cemetery is in relatively natural condition, providing a shallow, cobbly streambed and numerous small pools that harbor Blacknose Dace (*Rhinichthys atratulus*) and other aquatic wildlife. In addition, the steep banks above Potomac Formation clay near the northwestern end of the stream feature perhaps the best collection of massive quartzite boulders in the Washington, D.C. region (Fig. 20). The largest of these boulders are at least 6 feet long and are situated within an alluvial terrace that is derived from the Beverley Hills terrace on the hillside above (Fleming 2008). These puzzling geologic phenomena interested C.K. Wentworth (1930), who extended the theory that they may be the result of “ice flotation and stranding of ice blocks” during past glacial episodes that influenced the ancestral Potomac River drainage.

In 2006, the Ivy Hill Cemetery Historical Preservation Society was formed, in part for the protection and conservation of native flora, wildlife, and remaining natural features on the cemetery grounds. In keeping with this mission, a baseline inventory of all large, naturally occurring, native trees throughout the property was conducted in the spring of 2008. Most of the trees are species of upland oaks, some of which were discovered to have musket balls lodged halfway or so into their trunks from target practice when the site was a Civil War encampment (pers. comm., Tom Bowling).

All of these places like Ivy Hill Cemetery are remnants of the past natural landscape of our region, each generated from a point in time long ago. They are not replicable and are sustainable so long as they are spared from human disturbance and encroachment. Like priceless works of art, but far more valuable, they can only be preserved in perpetuity by not altering their makeup. Therefore, the best form of management is a hands-off, do-no-harm approach that centers on carefully removing threats like non-native invasive plants and preventing manmade disturbance, such as introduced plantings (native plants included) and material, landscape design features, trails and access into sensitive areas, and so forth.

W.L. McAtee’s concerns of 1918 reflect this well and hold even truer today: “The antiquity of some of these little waifs and the vicissitudes they have survived entitles them to our respect, while the slender thread upon which their continued existence depends commends them to our most considerate care.” Perhaps the urgency for refined stewardship and the adoption of unprotected sites will inspire the formation of more preservation societies and organizations and guide their activities.

ACKNOWLEDGMENTS

Appreciation is extended to the following individuals, organizations, and City staff for their contributions and support: City of Alexandria Dept. Recreation, Parks, and Cultural Activities (RPCA), especially James Spengler, Dinesh Tiwari, Bob Taylor, Scott Graham, John Noelle, Mark Kelly, Jane Yeingst, James Nichols, Russell Taylor, Dana Wedeles, Beth Znidersic, Judy Lo, Jack Browand, Kelly Gilfillen, Oscar Mendoza, and Park Operations staff; Tony Fleming; Greg Zell; Smithsonian Institution National Museum of Natural History; Mark Strong and the DC Herbarium of the U.S. National Herbarium (US), Rob Soreng, and the Department of Botany, Smithsonian Institution; Gary Fleming; John Townsend; Carl Taylor; Mike Davenport; Alonso Abugattas; John White; Sam Droege; Kirsten Buhls; Robin Everly and the Botany-Horticulture Library, Smithsonian Libraries; George Combs and the Alexandria Library, Special Collections; Dianne Simmons; Friends of the City of Alexandria Herbarium; Eric Wiseman, Jeff Kirwan, Tracey Sherman, and the Virginia Big Tree Program; Virginia Botanical Associates; Dennis McDonald, Debbie Funk, Karen Rugg, Eileen Grant, John and Garrett Kennedy, and the Friends of Timberbranch Parkway; Kirsten Winters, Clay Sumner, Neil Snyder, Chad Stackhouse, and the Den 5 Scouts – Pack 129 and parents; Drew and Sally Lindsay; Patrick and Bridget Hagan; Paula Sullivan, Mike Pollack, Jim Hurley, Tom Albright, Bill Young, Jeremy Flachs, Chris Ros, Lynn Sprott, and Lisa Jacobs; Kurt Moser; Mary Ann Lawler and Neil Sigmon; Peggy Ashbrook; Scott Knudsen and Jennifer Pease, Susan Crawford, Nancy Miller, Alex Lathers, Sally Burmeister, George Gardner, Neal Howlett, and Mark Miller; Montie and Kathleen Kust and Jim Huddle; Lucy Goddin, Scott Saltsgaver, Tom Bowling, Sheree Parker, Andrew Vallaster, and Bruce Johnson; TreeStewards of Arlington and Alexandria; Northern Virginia Conservation Trust; and all the property owners who kindly granted permission to conduct natural resource surveys on their lands.

REFERENCES

- Abugattas, A. and J. White. 2011. The reptiles and amphibians of the Washington, D.C. metropolitan area. Arlington, Virginia.
- Alexandria Library. Special Collections, Vertical File: Boundaries.
- Arlington County. 1967. A history of the boundaries of Arlington County, Virginia. Arlington, Virginia. [BOUNDARIES OF ARLINGTON COUNTY - Project Gutenberg.](#)
- Baker, M. 1897. The boundary monuments of the District of Columbia. Records of the Columbia Historical Society 1: 215-224.
- Bray, R. and P. Bushnell. 1976. From New England to the Old Northwest: the American odyssey of the Jeremiah Greenman family. Northern Illinois University Press.
- City of Alexandria Archaeology Museum. <http://www.alexandriava.gov/historic/archaeology>.
- City of Alexandria GIS & Maps. <http://www.alexandriava.gov/7704>.
- City of Alexandria Park Information. <http://www.alexandriava.gov/12342>.
- Civil War Map. 1865. Environs of Washington, 1861-1865.
- Cornell Lab of Ornithology (CLO). 2011. Wood-warblers. Cornell University. http://www.allaboutbirds.org/Guide/browse_tax.aspx?family=40.
- Farmer, M. 1994. Birding in Alexandria's parks. City of Alexandria Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia.
- Fleming, A.H. 2008. Geologic atlas of the City of Alexandria, Virginia and vicinity. City of Alexandria Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia.

- <http://alexandriava.gov/22560>.
- Fleming, G.P., K.D. Patterson, K.Taverna, and P.P. Coulling. 2013. The natural communities of Virginia: classification of ecological community groups. Second approximation. Version 2.6. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia.
- http://www.dcr.virginia.gov/natural_heritage/natural_communities/ncintro.shtml.
- Google Earth. 2014.
- Harrison, J.W. 2004. Classification of vegetation communities of Maryland: First iteration. NatureServe and Maryland Natural Heritage Program, Wildlife and Heritage Service, Maryland Department of Natural Resources. Annapolis, MD.
- http://www.dnr.state.md.us/wildlife/Plants_Wildlife/nhpnatcomm.asp.
- Ivy Hill Cemetery (IHC). 2014. [Ivy Hill Cemetery Home Page](#).
- Johnston, P.M. 1964. Geology and ground-water resources of Washington, D.C., and vicinity. U.S. Geological Survey Water Supply Paper 1776.
- Lea, C. 2004. Vegetation types in national capital region parks. Working draft. National Park Service, Washington, D.C.
- McAtee, W.L. 1918. A sketch of the natural history of the District of Columbia. Bulletin of the Biological Society of Washington, No. 1. Washington, D.C.
- Miller, R. 2000. Ivy Hill Cemetery. In: North Ridge lore (revisited). North Ridge Citizen's Association, Alexandria, Virginia.
- Moser, K. 2009. Four Mile Run urbanization aerial perspective. Unpublished report.
- NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>.
- Nolley, J. 2007. Taking to the skies: a photologue of birding across the United States. www.johnnolley.com.
- Northern Virginia Conservation Trust (NVCT). 2005. Winter 2005-2006 Newsletter.
- North Ridge History Committee. 2000. North Ridge lore (revisited). North Ridge Citizen's Association, Alexandria, Virginia.
- Office of Historic Alexandria (OHA). 2010a. "Warwick." Alexandria Times, Out of the Attic, June 30, 2010.
- _____. 2010b. "Mount Auburn." Alexandria Times, Out of the Attic, August 26, 2010.
- Parkfairfax Woodlands Committee. 2011. A guide to Parkfairfax woodlands. [Woodlands Map](#).
- Rosenberg, K.V. and J.V. Wells. 2005. Conservation priorities for terrestrial birds in the northeastern United States. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191.
- Simmons, R.H. 2009. Annotated checklist of the native vascular flora of the City of Alexandria, Virginia. City of Alexandria, Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia. <http://alexandriava.gov/22560>.
- _____. 2013. Remnant natural areas in parks, waterways, and undeveloped sites in the City of Alexandria, Virginia: Seminary Hill area. City of Alexandria, Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia. <http://alexandriava.gov/48838>.
- _____. 2014. Arlington Woods through the ages. City of Alexandria, Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia. <http://alexandriava.gov/22560>.
- _____. In prep. The native vascular flora of the City of Alexandria, Virginia. City of Alexandria, Department Recreation, Parks, and Cultural Activities, Alexandria, Virginia.

- Townsend, J.F. 2014. Natural heritage resources of Virginia: rare plants. Natural Heritage Technical Report 14-02. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. Unpublished report. [Natural Heritage Resources of Virginia: Rare Plants](#).
- U.S. Geological Survey (USGS). 1917. Washington and Vicinity. Maryland, District of Columbia, Virginia.
- U.S. Geological Survey. 1965. Topographic Map of the Alexandria Quadrangle, Virginia; District of Columbia; Maryland: U.S. Geological Survey Topographic Quadrangle Map, 7.5 Minute Series. Scale 1:24,000.
- Virginia Big Tree Program. 2014. Virginia Tech, Department of Forest Resources and Environmental Conservation, Blacksburg, Virginia. [View Virginia Big Trees](#).
- Virginia Botanical Associates (VBA). 2014. Digital Atlas of the Virginia Flora (<http://www.vaplantatlas.org>). c/o Virginia Botanical Associates, Blacksburg, Virginia.
- Virginia Department of Historic Resources (VDHR). 2014. Virginia landmarks register and national register of historic places. Richmond, Virginia. *Parkfairfax Historic District 100-0151*.
- Weakley, A.S., J.C. Ludwig, and J.F. Townsend. 2012. Flora of Virginia. Bland Crowder, ed. Foundation of the Flora of Virginia Project Inc., Richmond. Fort Worth: Botanical Research Institute of Texas Press.
- Webb, W.J. 1980. Frank Hume: an Arlingtonian for all seasons. The Arlington Historical Magazine 6(4): 4-15.
- Weber, J. 2000. Federal Hill, 206 Lloyd's Lane. In: North Ridge lore (revisited). North Ridge Citizen's Association, Alexandria, Virginia.
- Wentworth, C.K. 1930. Sand and gravel resources of the coastal plain of Virginia. Virginia Geological Society Bulletin 32. Richmond, Virginia.
- Woodlands Committee and Parkfairfax Management (WCPM). 2012. Draft Parkfairfax Woodlands Management Plan.