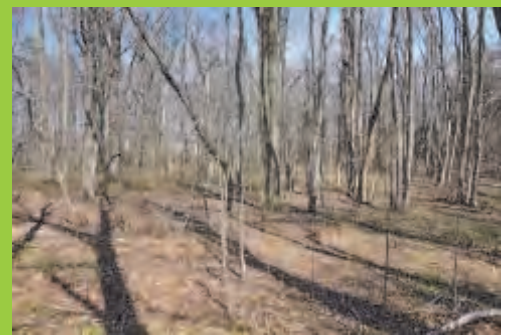


# Old Colchester Park and Preserve



## Natural Resource Management Plan



Prepared for the  
**Fairfax County Park Authority**



By

 **Lardner/Klein Landscape Architects, P.C.**

in association with

**Environmental Systems Analysis, Inc.**

**100% Submission December 15, 2011**

---

This page intentionally left blank.

---

---

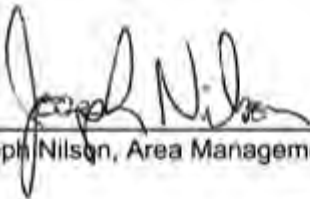
Fairfax County Park Authority  
**Old Colchester Park and Preserve Natural Resource Management Plan**  
Approval Page

The Old Colchester Park and Preserve Natural Resource Management Plan is hereby approved, effective  
12/21, 2011.



---

Heather Schinkel, Manager, Natural Resource Management and Protection Branch, Resource Management Division



---

Joseph Nilson, Area Management, Park Operations Division



---

Cindy Walsh, Director, Resource Management Division



---

Todd Johnson, Director, Park Operations Division

## **Acknowledgments**

### **Park Authority Board**

William G. Bouie, Chairman, Hunter Mill District  
Harrison A. Glasgow, Vice Chairman, At-Large  
Edward R. Batten, Sr., Lee District  
Kevin J. Fay, Dranesville District  
Linwood Gorham, Mount Vernon District  
Harold Y. Pyon, Springfield District  
Ken Quincy, Providence District  
Kala Leggett Quintana, At-Large  
Marie Reinsdorf, At-Large  
Harold L. Strickland, Sully District  
Frank S. Vajda, Mason District, Treasurer  
Anthony Vellucci, Braddock District

### **Senior Staff**

John W. Dargle, Jr., Director  
Cindy Messinger, Deputy Director/Chief Operating Officer  
David Bowden, Director, Planning & Development Division  
Barbara Nugent, Director, Park Services Division  
Cindy Walsh, Director, Resource Management Division  
Todd Johnson, Director, Park Operations Division  
Judith Pedersen, Public Information Officer

### **Project Team**

Heather Schinkel, Manager, Natural Resource Management and Protection Branch, Resource Management Division  
Charles Smith, Natural Resource Management and Protection Branch, Resource Management Division  
Kristen Sinclair, Natural Resource Management and Protection Branch, Resource Management Division  
Joseph Nilson, Area Management, Park Operations Division  
Elizabeth Cronauer, Special Projects Branch, Planning and Development Division  
Gayle Hooper, Park Planning Branch, Planning and Development Division  
Aimee Wells, Cultural Resource Management and Protection Branch, Resource Management Division

### **Consultants**

Lardner/Klein Landscape Architects, P.C.  
Environmental Systems Analysis, Inc.  
Photo credits: photos by Lardner/Klein Landscape Architects, P.C. unless otherwise noted

---

## Table of Contents

<b>Acknowledgements</b> .....	ii
<b>Table of Contents</b> .....	iii
<b>SECTION I: Executive Summary</b> .....	I:1
Introduction .....	I:1
Goal and Objectives .....	I:2
Goal.....	I:2
Objectives .....	I:2
Timeframe .....	I:2
<b>SECTION II: Introduction and Findings</b> .....	II:1
Project Intent.....	II:1
Site Description.....	II:3
Location.....	II:3
Proximity to Other Public Properties .....	II:4
Trail Networks and Links .....	II:4
Cultural and Site History .....	II:5
Cultural History.....	II:5
Past Land Use .....	II:6
Cultural Resources.....	II:6
Site Acquisition .....	II:7
Process .....	II:7
Management Authorities and Constraints .....	II:8
Land Trade Agreement.....	II:8
Natural History and Site Evaluation Findings.....	II:11
Soils and Geology .....	II:12
Water Resources Assessment.....	II:12
Water Resources Recommendations .....	II:14
Vegetation Community Assessment .....	II:15
Rare, Threatened and Endangered Species .....	II:15
Vegetation Classification .....	II:15
Vegetation Communities Description .....	II:17
Northern Coastal Plain Mesic Mixed Hardwood Forest .....	II:18
Acidic Oak-Hickory Forest .....	II:19
Coastal Plain Floodplain Forest.....	II:20
Coastal Plain Depression Swamp .....	II:21

Coastal Plain Acidic Seepage Swamp .....	II:22
Tidal Freshwater Marsh.....	II:22
Coastal Plain Floodplain Swamp.....	II:24
Forested Nontidal Wetland .....	II:25
Early Seral Pine-Hardwood Forest.....	II:26
Herbaceous Nontidal Wetland.....	II:27
Tidal Freshwater Aquatic Bed .....	II:28
Non-native Invasive Plant Species.....	II:29
NNI Recommendations .....	II:31
Carrying Capacity Assessment .....	II:31
Carrying Capacity Results and Discussion .....	II:34
Northern Coastal Plain Mesic Mixed Hardwood Forest.....	II:35
Acidic Oak-Hickory Forest.....	II:35
Coastal Plain Floodplain Forest.....	II:36
Coastal Plain Depression Swamp .....	II:36
Coastal Plain Acidic Seepage Swamp .....	II:36
Tidal Freshwater Marsh.....	II:37
Coastal Plain Floodplain Swamp.....	II:37
Forested Nontidal Wetland .....	II:37
Early Seral Pine-Hardwood Forest.....	II:38
Herbaceous Nontidal Wetland.....	II:38
Tidal Freshwater Aquatic Bed .....	II:38
Steep Slopes and Occoquan River Banks .....	II:38
Vegetation Community Recommendations .....	II:39
Recommendations Common to All.....	II:39
Northern Coastal Plain Mesic Mixed Hardwood Forest.....	II:40
Acidic Oak-Hickory Forest.....	II:40
Coastal Plain Floodplain Forest.....	II:41
Coastal Plain Depression Swamp .....	II:41
Coastal Plain Acidic Seepage Swamp .....	II:42
Tidal Freshwater Marsh.....	II:42
Coastal Plain Floodplain Swamp.....	II:43
Forested Nontidal Wetland .....	II:43
Early Seral Pine-Hardwood Forest.....	II:44
Herbaceous Nontidal Wetland.....	II:44
Tidal Freshwater Aquatic Bed .....	II:45
Steep Slopes and Occoquan River Banks .....	II:45
Deer Population .....	II:45
Small Mammal and Insect Populations.....	II:46
Data Gaps .....	II:47
Data and Research Needs.....	II:47

**SECTION III: Management Concerns and Issues** ..... III:1

    Issues ..... III:1

        Sensitive Natural Resources ..... III:1

            1A. Wetlands, Tidal Marsh, Potential Bog Community and  
                Unnamed Stream ..... III:2

            1B. Vernal Pools..... III:2

            1C. Shoreline Protection ..... III:2

            1D. Terrestrial Vegetative Communities..... III:3

            1E. Management and Development of Adjacent Properties ..... III:3

        Human Activity ..... III:4

            2A. Unauthorized Site Use ..... III:4

            2B. Unsanctioned Access Points ..... III:4

        Deer ..... III:5

            3A. Excessive Deer Populations ..... III:5

        NNI Plant Materials ..... III:5

            4A. Threat to Park ..... III:5

            4B. Monitoring Needed..... III:5

        Appropriate Integration of Passive Recreation and Interpretation ..... III:6

            5A. Sensitivity of Site to Human Access ..... III:6

            5B. Cultural Resource Investigations and  
                Protection of Natural Resources ..... III:6

            5C. Site Interpretation ..... III:7

            5D. Neighborhood Education and Outreach ..... III:7

        Adaptive Management ..... III:8

            6A. Reassess and Respond to Changing Site Conditions ..... III:8

    Resource Protection Zones ..... III:8

        Concept ..... III:8

        Resource Protection Zones ..... III:8

        Level 1 Resource Protection Zone (RPZ) ..... III:9

            Natural Resources..... III:9

            Public Use and Access Level ..... III:9

        Level 2 Resource Protection Zone (RPZ) ..... III:9

            Natural Resources..... III:9

            Public Use and Access Level ..... III:9

        Level 3 Resource Protection Zone (RPZ) ..... III:10

            Natural Resources..... III:10

            Public Use and Access Level ..... III:10

        Opportunity Area ..... III:10

        Creating the Map..... III:10

        Mapping Levels for Old Colchester Park and Preserve RPZ ..... III:11

        Definitions as Related to Resource Protection Zones..... III:12

            Rare, Threatened and Endangered Species ..... III:12

            Regionally Rare Species or Natural Communities ..... III:13

            High Quality Forest..... III:13

High Quality Streams .....	III:13
High Quality Natural Communities .....	III:14
Vernal Pools.....	III:14
Trail Location and Development Guidelines .....	III:14

**SECTION IV: Management Goal and Objectives .....** IV:1

Goal .....	IV:2
Objectives, Strategies and Actions .....	IV:2
Objective 1 with Strategies and Actions.....	IV:2
Objective 2 with Strategies and Actions.....	IV:5
Objective 3 with Strategies and Actions.....	IV:6
Objective 4 with Strategies and Actions.....	IV:6
Objective 5 with Strategies and Actions.....	IV:7
Objective 6 with Strategies and Actions.....	IV:7

**SECTION V: Implementation .....** V:1

Operational Plan .....	V:1
Funding .....	V:2
Park Authority Staffing at Current Level .....	V:2
Additional (Partial) Funding Available .....	V:2
Funding Fully Available .....	V:2
Other Capital .....	V:3
Monitoring Plan .....	V:3
Why Monitor .....	V:3
Monitoring Needs .....	V:3
Measuring Success.....	V:5
Long Term—Next Steps .....	V:5
Implementation Actions .....	V:5
Objectives, Strategies and Actions Matrix Explanation.....	V:5
Priorities .....	V:5
Matrices of Objectives, Strategies and Actions.....	V:6

**SECTION VI: Master Planning and Development Considerations .....** VI:1

Considerations for Future Planning Efforts .....	VI:1
Master Planning .....	VI:1
List of Issues and Ideas to Carry Forward .....	VI:2
Master Planning .....	VI:2
Site Development .....	VI:2
Trail Considerations .....	VI:3
Working Together .....	VI:4
Principles for Cultural and Natural Resource Management Staff	
Collaboration on Site.....	VI:4



---

## Section VII. Bibliography

### APPENDICES (Concise)

---

- A. Old Colchester Park and Preserve Vegetation Assessment (ESA) Executive Summary
- B. Species List from Old Colchester Park and Preserve Vegetation Assessment (ESA)
- C. Old Colchester Park and Preserve Deer Population Survey 2011
- D. Water Resources Assessment (Versar), Executive Summary
- E. Land Transfer Documents (including Exhibit C)
- F. Application for Site Acquisition—Federal Lands to Parks Program, Old Colchester Park and Preserve, Analysis of Public Park Potential, Program of Utilization and Development Schedule
- G. Working Together—Natural and Cultural Resource Best Practices
- H. Matrix of Objectives, Strategies and Actions
- I. The Natural Communities of Virginia: Ecological Groups and Community Types, Virginia Department of Conservation and Recreation Division of Natural Heritage
- J. Site Resource Mapping and Map Folio

#### Plates:

- 1. Natural Resources Inventory
  - 2. Human Activities Inventory
  - 3. Hydrologic Resources Inventory
  - 4. Vegetation Communities Inventory
  - 5. Non-Native Invasives Assessment and Prioritization (NNIAP)
  - 6. Resource Protection Zones: Step 1
  - 7. Resource Protection Zones: Step 2
  - 8. Resource Protection Zones: Step 3
  - 9. Carrying Capacity
  - 10. NRCS, SSURGO Soils Survey
- 

#### ADDITIONAL APPENDICES FOR FAIRFAX COUNTY PARK AUTHORITY ONLY

- 1. Human Activities and Cultural Resources
- 2. Natural and Cultural Resources Protection Area
- 3. Synthesis of Natural and Cultural Resources Protection Areas
- 4. Acquisition History: “Exhibit C”

**List of Tables**

Table 1:	Site Monitoring	V:4
Table 2:	Actions	V:6

---

## List of Figures

- Figure 1: Forested Lands at Old Colchester Park and Preserve
- Figure 2: Marshland at Bailey's Gut, above the Occoquan River
- Figure 3: Location
- Figure 4: Nearby public lands
- Figure 5: Existing and proposed trail connections
- Figure 6: 1937 Aerial map of Old Colchester Park and Preserve site
- Figure 7: Cultural resource investigation on-site, summer 2011
- Figure 8: Land acquisition map and park acreage totals
- Figure 9: Existing uses—Human Activities map
- Figure 10: Osprey nest at park
- Figure 11: Hydrologic Resources map
- Figure 12: Vegetation Communities map
- Figure 13: Northern Coastal Plain Mesic Mixed Hardwood Forest
- Figure 14: Acidic-Oak Hickory Forest
- Figure 15: Coastal Plain Floodplain Forest
- Figure 16: Coastal Plain Depression Swamp
- Figure 17: Coastal Plain Acidic Seepage Swamp
- Figure 18: Tidal Freshwater Marsh
- Figure 19: Coastal Plain Floodplain Swamp
- Figure 20: Forested Nontidal Wetland
- Figure 21: Early Seral Pine-Hardwood Forest
- Figure 22: Herbaceous Nontidal Wetland
- Figure 23: Tidal Freshwater Aquatic Bed
- Figure 24: NNIAP Unit P treated for wineberry, a NNI
- Figure 25: NNI units and scores
- Figure 26: Trampling plot in Vegetation Plot #2
- Figure 27: Carrying Capacity summary map and locations
- Figure 28: Image captured for the deer population survey
- Figure 29: Natural Resources map
- Figure 30: Natural Resource Management Plan project team
- Figure 31: Occoquan River
- Figure 32: Unsanctioned access point from adjacent residential neighborhood
- Figure 33: Old Colchester Road, as it terminates in the Occoquan River
- Figure 34: View towards Belmont Bay, an old, abandoned barge in Occoquan River
- Figure 35: Resource Protection Zone: Step 1
- Figure 36: Resource Protection Zone: Step 2

- Figure 37: Resource Protection Zone Levels 1-3
- Figure 38: Tidal Freshwater Marsh
- Figure 39: Salamander eggs found in a vernal pool
- Figure 40: Flagged resource site

# SECTION I: EXECUTIVE SUMMARY



Elisabeth Lardner

Figure 1: Forested lands at Old Colchester Park and Preserve

## Introduction

Old Colchester Park and Preserve, a 140-acre site, is a significant natural resource asset for Fairfax County, VA. One of the last remaining large forested tracts in the county, and one of two tidal river parks owned and managed by the Fairfax County Park Authority, it is also home to a rich collection of cultural resources, including the Colonial-era port town of Colchester. A state rare natural community, Coastal Plain Depression Swamp, is located in the center of the park. Aggregates of what is likely a Virginia state rare plant species, river bulrush (*Schoenoplectus fluviatilis*), are found in the freshwater tidal marsh.

The park is a Resource-Based Park, as classified by Fairfax County Park Authority (Park Authority). This park type is intended to primarily preserve, protect and interpret natural and/or cultural resources. The majority of Old Colchester Park and Preserve was acquired through a land trade, partially due to the known archeological and natural resources and is governed by deed language and agreements related to use of parklands, procedures for protecting cultural resources and viewshed protections.

The Natural Resource Management Plan (NRMP) for Old Colchester Park and Preserve provides an assessment of the park's natural resources, with an emphasis on water resources and the existing natural vegetation communities. The NRMP also identifies the issues adversely facing the park— in particular the challenges related to the presence of non-native invasive species, the over population of deer and the impact of human access.

All areas within the park and its natural resources are not equally fragile or sensitive. Zones establishing the level of natural resource sensitivity have been established for Old Colchester Park and Preserve from a compilation of the inventory and analysis work done on site. Developed for this park specifically, this system of prioritization of the sensitivity of natural resources to human access and use may serve as a model for future analyses of other Park authority sites.

## Goal and Objectives

Given the unusual natural resources found on the site, a singular goal directs all of the NRMP's objectives, strategies and actions. The goal is to ***Preserve and Protect the Natural Resources at Old Colchester Park and Preserve.*** Supporting this goal are six objectives, each responding to issues and challenges facing the park and the management of its natural resources. Detailed strategies and actions are presented in Sections IV and V, providing a direct way to respond productively to the challenges facing the natural resources on this park site. The six objectives are:

- Objective 1. Protect and Manage Sensitive Natural Resources in the Park
- Objective 2. Reduce and Eliminate Human Activities that Adversely Affect Sensitive Resources in the Park
- Objective 3. Reduce the Deer Population in the Park
- Objective 4. Reduce Non-Native Invasives (NNIs) Plant Species in the Park
- Objective 5. Integrate Passive Recreation Development and Interpretive Activities while Preserving and Protecting the Sensitive Natural Resources in the Park
- Objective 6. Practice Adaptive Management Approach and Process

## Management Needs and Priorities

Old Colchester Park and Preserve is a complex and resource rich site. Its successful management requires balancing and addressing priorities if its features are to be preserved, protected and enhanced for future generations to enjoy and benefit. The management priorities are:

- Confirmation of the identification of potentially rare species and vegetation communities.
- Active management of the vegetation communities for the health of their flagship species.
- Preservation, enhancement and restoration of the varied water resources found on site: wetlands, tidal marsh, bog, stream and vernal pools.
- Continuation of the non-native invasive (NNI) suppression and eradication efforts currently underway at the park.
- Implementation of a deer reduction plan, for the park and the Mason Neck peninsula.
- Management of increased human access and activities at the park through the implementation of any park development in conjunction with the Resource Protection Zone Levels guidelines and consideration for

future planning efforts as noted in the NRMP related to master planning, site development and trail considerations.

- Collaboration with Cultural Resource Management and Protection staff to steward a resource rich and fragile cultural and natural resource site.
- Build partnerships with volunteers, other Fairfax County Divisions, public agencies and nonprofits for better resource management on and off site.
- Practice adaptive management techniques, retooling if an early approach is ineffective.
- Pursue adequate funding to shepherd the resources responsibly.

The management needs for any resource park is great. At Old Colchester Park and Preserve, it is no different. Management priorities have been identified for each of the recommended actions within this NRMP and are individually listed in Table 2, beginning on page V:6. In summary, priorities are assigned to the actions that have the largest overall impact on natural resources. This takes into account the scope of the impact and the relative importance/rarity/sensitivity of the resources impacted. In addition, should an item be an integral component of another action that is considered a priority, its priority level is elevated. The same table identifies the level of funding required to accomplish the action, from working from the current annual allocation to the need for additional capital funds.

## Timeframe

This NRMP does not have an expiration date. Its implementation plan, detailed in Section V, is to be reviewed and updated annually. The overall NRMP should be reviewed every five years to determine if additional updates or revisions are needed.

This page intentionally left blank.



# SECTION II: INTRODUCTION AND FINDINGS



Elisabeth Lardner

Figure 2: Marshland at Bailey's Gut, above the Occoquan River

## Project Intent

Old Colchester Park and Preserve, a 140-acre site, is rich in natural and cultural resources, with multiple resource protection issues and needs. The site is unique as it is home to one of the last remaining large forested tracts in Fairfax County, a freshwater marsh and rich archeological findings. Its location along the waters of the Occoquan River has attracted human inhabitants throughout history, many of whom have manipulated and changed the landscape to serve their needs. Today, the park is one of only two parks owned and managed by the Fairfax County Park Authority (Park Authority) that reflects a tidal river habitat.

The park contains forests and diverse wetlands to include submerged aquatic beds, vernal pools, three forested wetland community types and tidal marsh containing aggregates of what is likely a Virginia state rare plant species, river bulrush (*Schoenoplectus fluviatilis*). Although Park Authority and Environmental Systems Analysis (ESA) staff that have examined what they concur is *S. fluviatilis*, in over two years of observation no plants have produced inflorescences that are necessary to confirm the identification. A state rare natural community, Coastal Plain Depression Swamp, also exists in the center of the park. Forest dominates the park and includes a large block that is potentially habitat for Forest Interior Dwelling Species (FIDS). The forest at Old Colchester Park and Preserve is particularly valuable due to its location along the Occoquan/Potomac River migratory route and its proximity to the Occoquan Bay National Wildlife Refuge and the large public land holdings on Mason Neck.

Old Colchester Park and Preserve is a Resource-Based Park, as classified by Fairfax County Park Authority. This park type is intended to primarily preserve, protect, and interpret natural and/or cultural resources. The majority of Old Colchester Park and Preserve was acquired through a land trade, partially due to the known archeological and natural resources, and is governed by deed language and agreements related to use of parklands, procedures for protecting cultural resources and viewshed protections. As a remote property located on the waterfront, the site is vulnerable to uses that may damage these resources.

A Natural Resource Management Plan (NRMP) identifies the natural resources unique to an individual site and offers specific action recommendations required to maintain and improve the health of the park through careful resource management. Site specific NRMP's are critical tools to identify, protect, manage and monitor resources on parkland. Plans can set forth the process to recognize the natural resources on site; evaluating their condition, threats and needs; identifying specific actions to address those needs; identifying funding and resource requirements to take action; and determining how to adapt and grow with changing pressures. The Old Colchester Park and Preserve Natural Resource Management Plan goes beyond the basic understanding of park resources, needs and threats, and includes recommendations for compatible human activities consistent with protecting natural resources. The information developed in this study will further serve to inform the Park Authority's planning efforts for Old Colchester Park and Preserve through the identification of the park's unique and sensitive resources.

In addition to serving as a guide for managing and protecting the park's natural resources, this plan also functions as a case study for the Park Authority, offering a framework for defining a classification system for sensitive resources within a Resource Protection Zone. This system can be explored in the future management efforts for all County parkland, as the Park Authority owns over 22,000 acres of land, much of which is rich with natural resources.

The NRMP does not have an expiration date. Its implementation plan is to be reviewed and updated annually. The overall NRMP should be reviewed every five years to determine if additional updating or revisions are needed.

## Site Description

### Location

Old Colchester Park and Preserve is located in the Mount Vernon Supervisory District in southeastern Fairfax County on the Mason Neck peninsula. The peninsula, largely rural and more than 9,000 acres in size, has approximately 6,000 of those acres held in public ownership or within established Agricultural or Forestal Districts. It is bordered by the waters of Pohick Bay and Gunston Cove to the north, the Potomac River to the east, Belmont Bay and the Occoquan River to the south and by U.S. Route 1, Interstate 95 and the CSX railroad right-of-way to the west.

The park, divided into two land tracts and 20 parcels, is bisected by Old Colchester Road as it parallels the U. S. Route 1 corridor. Old Colchester Road terminates at the Occoquan River just west of the park. The smaller of the two land tracts, approximately ten acres in size, is located on the northwest side of Old Colchester Road, while the remaining portion of the 140-acre park and larger land tract is located southeast of the road.

The only commercial development located near the park is two private marinas. One, the Fairfax Yacht Club, retains an easement for access along Hyde Street within the park. The other, Beach Marina, is located at the foot of Old Colchester Road. Other boat ramps are nearby, although not adjacent to the park. Both Leesylvania State Park to the south and Pohick Bay Regional Park on the opposite side of Mason Neck have public boat ramps. (see Figure 4) Mason Neck State Park, on the eastern tip of the peninsula, has a public shore launch for boat access, that requires a user to carry a boat the last 20 feet from the parking area to the water.

Harbor View, a single family detached residential subdivision with approximately 175 homes, wraps around the northern and eastern edges of the park, separated from the park by an unnamed stream. Served by a privately-run sewage treatment system, the houses are sited on lots that are a minimum one-half acre in size. The neighborhood is bounded on its eastern side by Massey Creek, a navigable stream with dock facilities and the neighborhood's private marina.

Approximately fifteen single family homes line Old Colchester Road between the Occoquan River and Anita Drive. The residence located at 10712 Old Colchester Road is listed on the National Register of Historic Places. Once the old ordinary (a British term for tavern or eating house, used in Colonial Virginia), it is known as the Fairfax Arms, (c. 1756-1758). Located across the road from the park, the Fairfax Arms is the only above-ground reminder of the town of Colchester. A privately-owned, single family residence is located at 10725 Old Colchester Road, between



Figure 3: Location



Figure 4: Nearby public lands

the park and Beach Marina. The property, currently listed for sale, has driveway access that is located on parkland. The Park Authority acquired one of the residential properties on the eastern side of the road, located at 10709 Old Colchester Road, and has used it as a field office for the ongoing cultural resource work. Plans are to demolish the structure at the end of the field work. Another cluster of buildings were acquired on the western side of Old Colchester Road, north of Furnace Road. (see Figure 8) One is known as the Station Master house, c. 1800s, a structure that was moved to its present location and is located at 10605 Furnace Road.

The park lies immediately east of the fall line that separates the Coastal Plain and Piedmont physiographic provinces. Although the park is located fully within the Coastal Plain province, it is downstream and downwind from the Piedmont physiographic province. The park’s vegetation is influenced by these dispersal patterns. Its location on the Occoquan and near the Potomac River (tidal) brings additional influences to its vegetation pattern from water flow patterns, periodic flooding and seed migrations corridors.

**PROXIMITY TO OTHER PUBLIC PROPERTIES**

The large number of public properties located on the Mason Neck peninsula are owned and managed by a wide array of agencies. Pohick Bay Regional Park and Golf Course (approximately 1,000 acres) is owned and managed by the Northern Virginia Regional Park Authority; Mason Neck West Park acreage is owned and managed by the Fairfax County

Park Authority; Meadowood Recreation Area (800 acres) is owned and managed by the Bureau of Land Management (U.S. Department of the Interior); Mason Neck State Park (1,825 acres) is owned and managed by the Virginia Department of Conservation and Recreation (DCR); and the Elizabeth Hartwell Mason Neck National Wildlife Refuge (2,000 acres ) is owned and managed by U.S. Fish and Wildlife Service.

**TRAIL NETWORKS AND LINKS**

A network of trails exist on the public properties immediately to the north and east of Old Colchester including Pohick Bay Regional Park and Golf Course, Meadowood Recreation Area, Mason Neck West Park and Mason Neck State Park. Additional trails are proposed. (see Figure 5) The Mason Neck Loop of the Virginia Birding and Wildlife Trail travels south from Alexandria through the Accotink and Occoquan Bays and terminates in Mason Neck State Park. A proposed segment of the Potomac Heritage National Scenic Trail will connect the proposed Pohick Kiosk Trail with the proposed Washington-Rochambeau Revolutionary Route National Historic Trail in Meadowood. The Potomac Heritage National Scenic Trail is a network of approximately 830 miles of existing and planned trails extending along both sides of the Potomac from the Chesapeake Bay to the Allegheny Highlands in the upper Ohio River basin.

Informal, unauthorized, trails currently loop through the park. Some follow the alignment of Hyde Street, a paved road serving the privately operated Fairfax Yacht Club or old logging roads. Other trails have been created by cultural resource staff for field work access.

## Cultural and Site History

### Cultural History

Old Colchester Park and Preserve has a long cultural history beginning with known Native American seasonal occupations on the site dating to the Archaic Period (8,000-1,200 BP), through the Late Woodland Period (900-1600 CE). Native Americans used the land for hunting, fishing and as seasonal camp sites. In the mid-1600's, land was granted to British land speculators who then sold parcels for profit. The land that would later become Old Colchester Park and Preserve was initially granted to William Bourne, an Englishman, in 1666. As European settlers began inhabiting land previously settled by Native Americans, the Indians were pushed out to the hinterlands. By 1684, the non-native population had grown enough that George Mason II found it economically feasible to establish a ferry across the Occoquan, at what is now, the terminus of Old Colchester Road. The ferry remained in use and was owned by the Mason family for over one hundred years.

The current alignment of Old Colchester Road is along the original Potomac Path, a Native American trail which ran along the fall line where river crossings were possible. This path later became known as Kings Highway, a road that traversed the colonies from Boston to Charleston. The road's formation was a byproduct of increased settlement of Europeans who became landlords, tenant farmers, merchants and craftsmen as well as the enslaved Africans who were pressed into service as laborers, craftsmen and servants.

The Town of Colchester, chartered in 1753, was platted in what is now the southwestern portion of Old Colchester Park and Preserve. The town was centered around a tobacco economy, with area farmers bringing hogsheads of tobacco down Old Colchester Road to tobacco warehouses near Mason's Ferry. The warehouses and port created the opportunity for a small merchant economy, including stores, taverns and craftsmen, to grow up along the road.

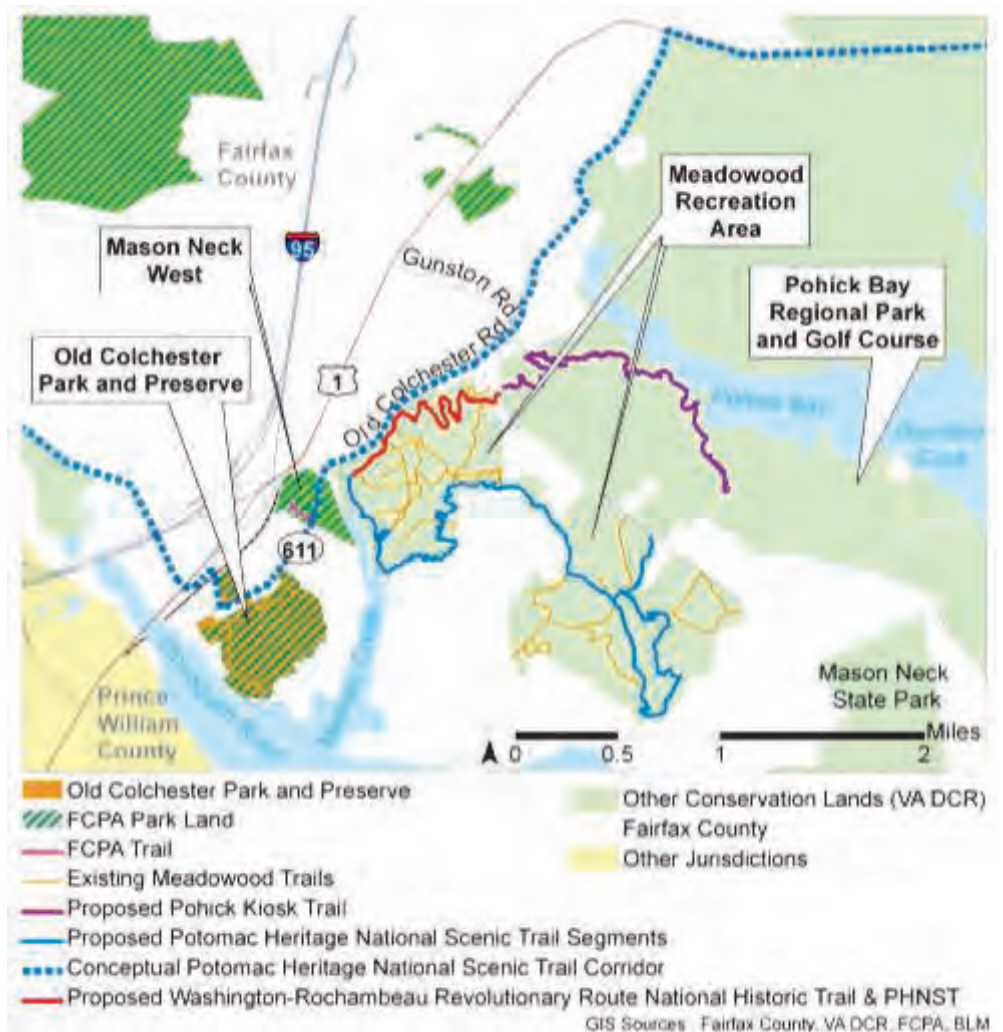


Figure 5: Existing and proposed trail connections



Figure 6: 1937 Aerial map of Old Colchester Park and Preserve site

The town saw a decline in population in the early-1800s when the tobacco economy in Northern Virginia declined. Eventually the Occoquan River began to silt in due to soil erosion along its length, making the river impassible to trade vessels. Though trade declined, the town was not deserted. Instead, the area changed into a rural farming community. This demographic remained through the mid-20th century when it slowly changed into a rural residential community. Many residents worked for the railroad, the nearby federal prison or at local farms. Although planned for suburban housing developments in the 1950s and the late 1990s, no development occurred on the site of the current parkland, possibly due to the lack of public sewer facilities on much of the Mason Neck peninsula.

### Past Land Use

In work completed by ESA during their study of the vegetative communities at the park, a review of historic maps suggested that the land has gone through many perturbations, with the latest and most influential being logging and the abandonment of agricultural fields. (see Figure 6) A stormwater management pond, referred to in this document as the dry basin, is now abandoned. The fields naturally regenerated into forest cover. Pockets of remnant primary successional forest species, such as Virginia pine (*Pinus virginiana*) and black locust (*Robinia pseudoacacia*), occur at several locations within the park.

### Cultural Resources

Remnants of Old Colchester Park and Preserve’s vast cultural history has been documented in over thirty known archaeological sites. Of these, nineteen have been identified as being potentially eligible for inclusion on the National Register of Historic Places. These findings incorporate sites reflective of the colonial-era town, a colonial-period cemetery and potential chapel site and many of the identified Native American sites.

A large part of the cultural resource value of Old Colchester Park and Preserve lies in the preservation of the historic landscape, a history that encompasses many eras. The National Park Service defines a historic landscape as ‘*a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity or person or exhibiting other cultural or aesthetic values.*’

The Cultural Resource Management and Protection Branch of the Park Authority has undertaken Phase II archaeological testing of the nineteen potentially eligible sites. A technical report outlining the findings from their work is anticipated to be completed in September 2012.

## Site Acquisition

### Process

The property known today as the Old Colchester Park and Preserve was acquired by the Fairfax County Park Authority through a series of interrelated land transactions.

Vulcan Materials Company has operated the Graham Quarry located on Ox Road in Lorton, Virginia since 1979. Much of this property was previously owned by the Federal government which granted Vulcan the rights to operate the quarry through a Special Use Permit. Upon expiration of this permit, the National Park Service, acting on behalf of the federal government, elected to not renew Vulcan's permit for the site and, instead, divested the property through the Federal Lands to Park program. This program seeks to create new parks through the transfer of surplus Federal land to local and state governments with assurance of public access and resource stewardship. In April of 2002 two parcels (identified in Fairfax County tax records as 106-3 ((1)) parcel 9 and 112-2 ((1)) parcel 14), totaling approximately 115 acres, were transferred to the Fairfax County Park Authority with restrictions limiting usage of the property defined in documents generally referred to as Exhibits A and C. (see Appendix E)

Years of intense mining operations had, understandably, created significant impacts to the quarry site, limiting its usefulness as a public park. Vulcan Materials, however, deemed there still to be valuable resources to extract from the site and sought to purchase the property from the Park Authority. Sale of the quarry site would permit the Park Authority to seek alternate land that would better align with the Park Authority's mission of providing publicly accessible parks while protecting natural and cultural resources. Exhibit A acknowledged the right of the Fairfax County Park Authority to sell the quarry site to Vulcan Materials Company, pursuant to acquisition of a suitable replacement site and transfer of the conditions of Exhibits A and C to the new property. The Fairfax County Park Authority sold the Vulcan Property to Rosewood Acquisitions LLS in October 2009.

The Park Authority identified the original parcel consolidation of what is now Old Colchester Park as a suitable replacement property, with high expectations for the significant cultural and natural resources there. Additionally,



Figure 7: Cultural resource investigation on-site, summer 2011

Elisabeth Lardner

its location in proximity to the quarry site would insure retention of parkland to serve residents of the Mount Vernon Supervisory District. In 2007, the Park Authority acquired 20 parcels, commonly referred to as the McCue Property, totaling approximately 135 acres. These properties are identified on Fairfax County Tax Maps as 113-1 ((1)) parcels 19, 34, 35 and 36; 113-3 ((2)) (2) parcels 14, 15, 16, 17 and 18; 113-3 ((2)) (3) parcels 8, 12, 13 and 14; 113-4 ((7)) (2) parcels 8, 9, 10, 12 and 13; and 117-1 ((1)) parcels 2 and 3. Although additional property has subsequently been added to what is now Old Colchester Park, only these parcels associated with the original consolidation are subject to the restrictions defined in Exhibits A and C. Since the original acquisition of the McCue Property, an additional five acres have been added to the park with the acquisition of two parcels in 2008 [113-3 ((2)) (3) parcel 6 and 113-3 ((1)) parcel 33], one parcel in 2009 [113-2 ((2)) (4) parcel 4], and one parcel in 2011 [113-3 ((1)) parcel 19A].

## Management Authorities and Constraints

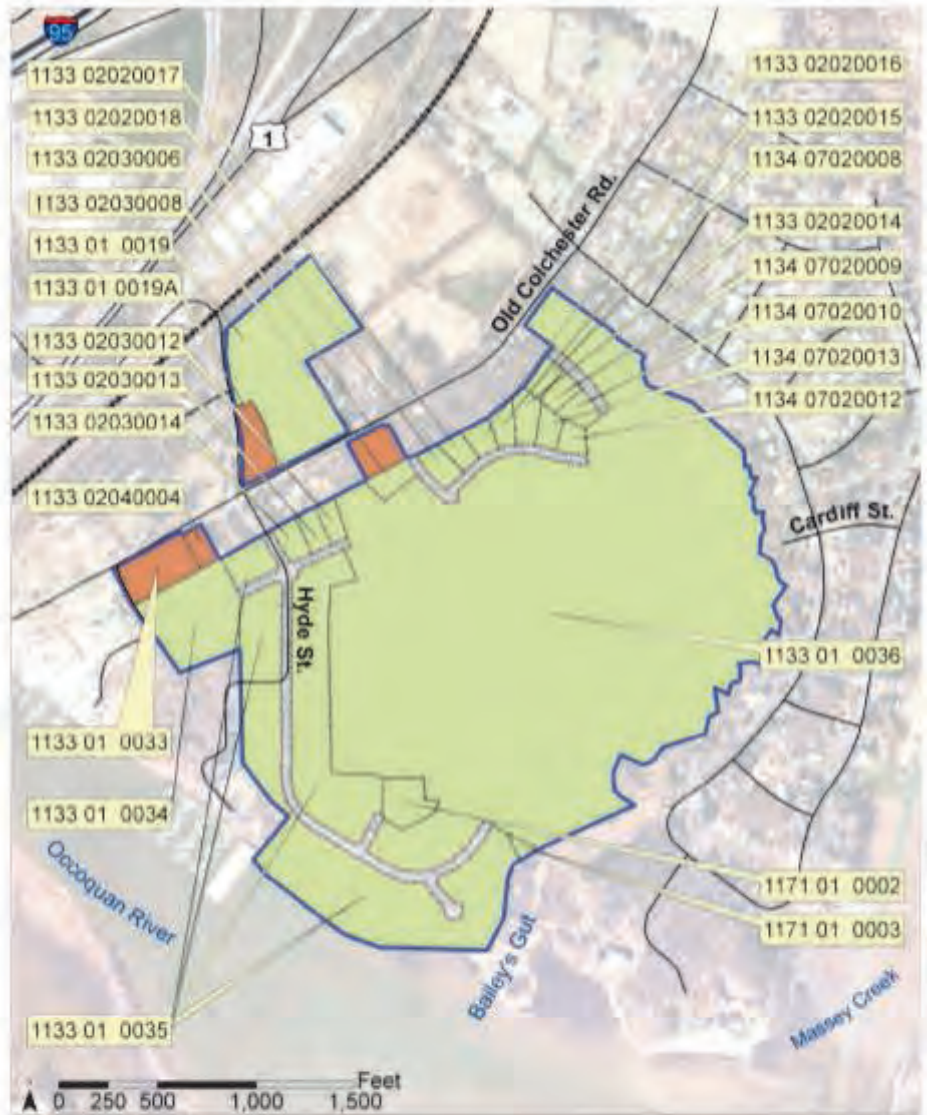
### LAND TRADE AGREEMENT

The majority of Old Colchester Park and Preserve is governed by specific legal language as expressed in the Covenant Release deed language. (see Appendix E) The Fairfax County Park Authority is obligated to abide by the terms, conditions, covenants and restrictions explicit in Exhibits “A” and “C.” Exhibit “A” fundamentally articulates that the property shall be ‘*used and maintained for the public park and recreation purposes,*’ and outlines additional public use compliance requirements. Exhibit “C” outlines the procedures for protecting cultural resources and park viewsheds as required by the Fairfax County Cultural Resource Management and Protection Section (CRMPS).

As explicitly stated in Exhibit “C”, Item 1, cultural resources specifically identified by archeological and architectural inventory numbers ‘*shall be permanently protected by placing a one hundred (100) foot, or more, buffer around each site*’. These buffers, including the sites, ‘*shall be designated Environmentally Sensitive Zones (ESZ)*’. Item 2 of Exhibit “C” maintains that ‘*The County shall take all reasonable precautions to protect all designated ESZ on the property from excavation, looting, vandalism, erosion, mutilation, or destruction from any cause.*’ Additionally, as explained in Item 4 of Exhibit “C,” ‘*No buildings, structures, roads, trails, utilities, playing fields, boat ramps, or other improvements shall be constructed, nor any disturbance of the ground, shall take place within an ESZ, without completion of an evaluation Phase IT [sic—Phase II] archaeological survey consistent with the CRMPSs archaeological guidelines and the Commonwealth of Virginia’s Guidelines for Conducting Cultural Resource Survey in Virginia: Additional Guidance for the Implementation of the Federal Standards Entitled Archaeology and Historic Preservation: Secretary of the Interior’s Standards and Guidelines*’. If the resulting evaluation survey concludes that the site will not be harmed or does not meet National Register criteria, proposed construction plans can proceed. If the evaluation finds that the site does meet National Register criteria, ‘*a treatment plan to avoid, minimize or mitigate the adverse impacts of the proposed action shall be developed and approved in writing by the CRMPS prior to implementation*’ (Exhibit “C,” Covenant Release, p. 27).

Item 4 in Exhibit C also addresses the process for approval of any buildings, structures, roads or other improvements proposed for construction within the viewshed of any dwellings 50 years of age or older adjacent to the property boundaries, within the portion of Old Colchester Road located in the northeast corner of the property or within the viewshed of Old Colchester Road. In order to protect the viewsheds of both the park at Old Colchester Road and the properties adjacent to the park containing dwellings 50 years of age or older, Exhibit “C” requires written approval from the Architectural Review Board (ARB) and the CRMPS prior to the construction of buildings, structures, roads or other improvements.





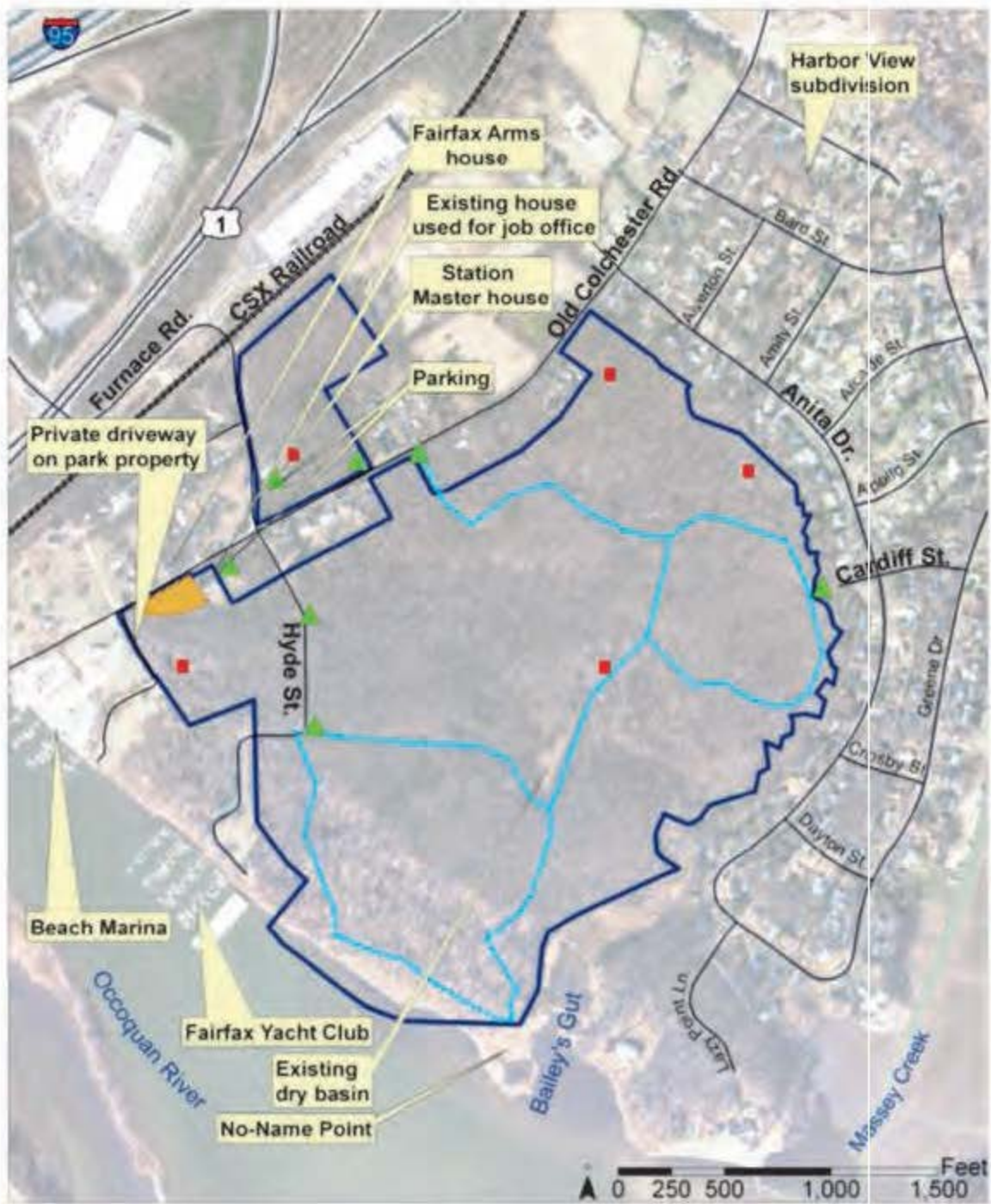
**Acquisition Parcels**  
**Old Colchester Park and Preserve Natural Resources Management Plan**

- Park Boundary
- McCue Property (subject to Exhibits A and C)
- Properties acquired separate from McCue Property
- Parcel ID Number


Lardner/Klein Landscape Architects, P.C.  
 In association with Environmental Systems Analysis, Inc.      GIS Sources: Fairfax County

Date of Acquisition	Parcel reference	Former Owner	Area
3/17/2006	consolidation	McCue	135.7391
5/20/2008	113-3 ((1)) 33	Pease	1.9615
5/20/2008	113-3 ((2)) (3) 6	Williams	1.0900
9/24/2009	113-3 ((2)) (4) 4	Roysdon	0.5000
3/18/2011	113-3 ((1)) 19A	Enyedi	1.4507
<b>Total Acreage</b>			<b>140.7413</b>






Figure 8: Land acquisition map and park acreage totals



**Human Activities**

 **Old Colchester  
Park and Preserve  
Natural Resources  
Management Plan**

 **Lardner/Klein Landscape Architects, P.C.**  
In association with Environmental Systems Analysis, Inc.

-  Park Boundary
-  Existing informal trails
-  Active excavation at Old Colchester Town Site
-  Access point
-  Unauthorized trash site

GIS Sources: Fairfax County

Figure 9: Existing uses—Human Activities map

## Natural History and Site Evaluation Findings

Old Colchester Park and Preserve has numerous natural resources worthy of preservation. The resources include submerged aquatic vegetation along the Occoquan shoreline and both high and low marshland. The high marsh habitat includes unconfirmed aggregates of the Virginia state rare river bulrush, an obligate wetland species that is considered ‘impaired’ (S2) in Virginia by the Virginia Natural Heritage Program and at high risk of extirpation in Virginia with fewer than 20 populations. This species is considered to be common elsewhere in other parts of its range. Old Colchester Park and Preserve is at the southern-most extent of its range.

The park’s waterfront is used by osprey (*Pandion haliaetus*), a migratory raptor species, for the purpose of nesting and fledging of offspring. Bald eagle (*Haliaeetus leucoccephalus*), a federally listed species, can be seen at the park daily roosting and foraging for food. The waterfront submerged aquatic vegetation beds and marsh are used as nursery and

breeding grounds for both anadromous (migratory) and endemic (year-round) fisheries. Forest dominates the park and includes a large block (greater than 60 acres) that is habitat for the FIDS. The forest is diverse due to its underlying topography, soils, geology, hydrology and past land use.



Mark Burchick

Figure 10: Osprey nest at the park

A review of other natural resource

reports from public landowners located on the Mason Neck peninsula indicates that the mature forest type for areas outside of the floodplain may be the Acidic Oak-Hickory Forest.

A number of research documents were prepared for the Old Colchester Park and Preserve property in the preparation of the Natural Resource Management Plan. They are summarized below and where applicable, their Executive Summaries are included in the Appendices. These documents report the work done to date on the site and provide valuable information for the NRMP’s development of goals, objectives and strategies. Where terminology differed among report authors, it has been standardized after first mention in these summaries.

All of the natural resources found on the site are summarized in Figure 29, Natural Resources map.

## Soils and Geology

The park encompasses a number of hydric and highly erodible soils. Relatively flat topographically, there are four areas of steep banks that are fragile and easily damaged by foot traffic or removal of vegetation. Other than the noted steep banks, most slopes in the park are gentle to moderate in steepness.

## Water Resources Assessment

Old Colchester Park and Preserve is heavily influenced by its location on the water and its relatively flat and poorly draining landscape. Versar, Inc. (Versar), an ecological services company, performed field research in the spring of 2011 and analysis of the hydrology of Old Colchester Park and Preserve for the preparation of the report titled *Water Resources Assessment for Old Colchester Park*, dated June, 30 2011. The report offers a summary of the condition of aquatic resources and assesses the park's water resources such as contributing landforms, tidal and nontidal wetlands, seasonal pools [sic-vernal pools], streams and a man-made pond basin. Observations of fish, amphibians and reptiles were noted by Versar. However, their list is not comprehensive as it was not the focus of their research.

The larger of the two park tracts, located southeast of Old Colchester Road, drains directly to the Occoquan River or to the unnamed stream along the park's eastern boundary. The smaller tract located north of Old Colchester Road, also drains to the unnamed stream. Past land uses, such as tobacco growing and logging, have likely increased the sedimentation level in surrounding tidal waterways from four to ten times that of pre-colonial levels, altering the hydrology of the adjacent landscape. The Occoquan River system has almost certainly become more shallow since the Town of Occoquan served as a port for loading tobacco on sea-going ships. Today, navigation charts show depths of less than six feet at mean low tide throughout Occoquan Bay. (Versar, 2011).

Versar evaluated previous mapping of on site wetlands and streams delineated as prepared by Wetland Studies and Solutions, Inc. (WSSI) when the property was in private ownership in 2006 and determined that the delineation remains reasonably accurate. Many of the herbaceous wetlands occur in the northeastern part of the site and appear to be partially fed by groundwater (Versar, 2011). Some wetlands contain ditches, culverts and other man-made drainage features. Areas of unimproved roads in the park have ponded over time and possess wetland vegetation. These areas are located on hydric soils. A rare tidal wetland at Bailey's Gut provides unusual ecological value. Tidal marsh such as Bailey's Gut is uncommon in Fairfax County, and provides habitat for species such as the river bulrush. As documented by both Versar and ESA's field work, the wetlands have infestations of non-native invasives (NNIs) in or adjacent to them.

Vernal pools were discovered by photo-interpretation of recent, low-altitude, natural-color aerial photographs. Six vernal pools were field verified and mapped. They are generally located in the northeastern and north-central parts of the larger park tract. No vernal pools were found on the tract northwest of Old Colchester Road (Versar, 2011). Three of the six vernal pools are partially influenced by a system of dirt roads and other disturbances.

The discovery of the vernal pools raised important questions regarding their protection. Further evaluation of the vernal pools on site occurred during ESA's field work. Their findings suggest that two of the vernal pools are man-made, located within the former logging road bed in the Northern Coastal Plain Mesic Mixed Hardwood natural community. These pools have developed as the result of topographic depressions within the road bed and were made wider and deeper as vehicles traversed the road in wet weather. The ground is now compacted from the weight of vehicles and the expanded ruts occur along points in the trail that have a modest on-trail drainage area. Seasonal direct precipitation and sheet flow combine to allow enough water for the pools to be viable for the purpose of amphibian breeding. During ESA's April 2011 vegetation assessment, newly-laid egg masses of spotted salamander (*Ambystoma maculatum*) were observed within both of the roadbed pools and identified by Mark Burchick of ESA.

The vernal pools occur in proximity to both Forested and Herbaceous Nontidal Wetlands. As herpetological species seasonally migrate to pools for the purpose of breeding, it is suspected that some herpetofauna may have opportunistically used the roadbed pools. Fortunately, these pools have been wet enough to allow for the viable maturation process. Being successful, herpetofauna have now imprinted to these sites and will likely continue to be used until some form of perturbation denies their use.

Herpetofauna may seek out other area pools if the current pools become overwrought with predators such as red-spotted newt (*Notophthalmus viridescens*), raccoon (*Procyon lotor*) or fish; fill with sedimentation; have changes to hydrology and/or chemistry; or should dry out.

Additional evaluation of the park's unnamed stream was performed by Versar in 2011. The stream originates on the northeastern side of the smaller of the two park tracts, northeast of Old Colchester Road. After crossing Old Colchester Road, it separates the park from the adjacent Harbor View subdivision along Anita Drive. The unnamed stream is included in the Lower

Occoquan Watershed Management Plan, prepared by Fairfax County. This plan provides recommendations for stream improvement that are in addition to and supplement the Actions noted in Section IV of this NRMP. The stream along the eastern boundary of the site changes character from its uppermost reach to its mouth at the Occoquan River. The upstream section is deeply incised and has cut its way down to hardpan clay. The banks are very unstable and subject to severe erosion. In some spots, adjacent residents have attempted to halt the damage



Figure 11: Hydrologic Resources map

and redirect the stream away from their property by placing stone along the streambank to halt the bank erosion. The lower reach of the stream has a meandering channel with a flatter slope and an accessible floodplain, as is more typical of streams in the Coastal Plain.

Fish and benthic macroinvertebrates communities within the stream received ratings of “poor” and “very poor” which are attributed to erosion. Ten of the possible twenty-four amphibian species that would be expected to live in the park were confirmed to be present on site, and eight of the thirty-five potential reptile species were confirmed. These findings do not mean other species are not present, but identifies the numbers observed in the spring of 2011 by the work team. A comprehensive wildlife inventory was not a part of Versar’s work charge.

A dry basin near the park’s center drains an area of approximately 35 acres. It no longer maintains a permanent pond and the basin is becoming vegetated with upland and wetland plant communities (Versar, 2011). Additional site explorations by Park Authority staff suggest that the area below the toe of the slope of the town site west of Hyde and south of Old Colchester Road has characteristics indicative of a bog. The area has been heavily ditched but retains active seeps and plants that are indicative of a bog. These characteristics are similar to those of both the Lorton bog (private land) and the Four Mile Run bog in Arlington County (County parkland). The presence of sweetbay magnolia (*Magnolia virginiana*), a bog species, furthers the speculation that this, too, is a bog.

#### **WATER RESOURCES RECOMMENDATIONS TO CONSIDER IN THE DEVELOPMENT OF THE NRMP**

The Versar report offered six recommendations for managing the water resources at Old Colchester Park and Preserve, including threat reduction and restoration. Versar’s suggested management techniques are listed below. Each element of these recommendations may or may not be carried forward to the overall NRMP, as the NRMP seeks a balanced approach to protect a variety of park assets and not solely water resources.

- Design interpretive trails to provide views of existing wetland habitat without disturbing it.
- Preserve and create vernal pools as a “flagship” habitat with spotted turtles (*Clemmys guttata*) as a “flagship” species in the park.
- Restore the largely dry basin in the center of the site. The Versar report recommends three treatment options for the basin’s restoration. These include restoration of the pond, ranging from its original state, to a year-long pond, to a combination of the two.
- Restore the unnamed stream (and by extension the Tidal Freshwater Marsh) along the eastern border of the site.
- Continue the program to control invasive plants, with specific recommendations directed at the control of mile-a-minute (*Persicaria perfoliata*) and marsh dewflower (*Murdannia keisak*). The report recommends that due to the pervasiveness of Japanese stilt grass (*Microstegium vimineum*) and Japanese honeysuckle (*Lonicera japonica*), it would not be realistic to eliminate them from the site.
- Monitor and adapt to the progress of management actions.

In addition to Versar’s recommendations, Park Authority staff developed recommendations for preserving and protecting vernal pools based on work published by Calhoun and Klemens in 2002 and a consultant report prepared for the Park Authority. The following zones are designated for protection of vernal pools:

- The Pool Depression—(physical footprint of the pool)
- Vernal Pool Envelope—(area within 100 feet of the pool's edge)
  - ◊ No park development or uses shall occur within the Vernal Pool Envelope (100 feet of the pool edge).
- Critical Terrestrial Habitat (CTH)—(area within 100-750 feet of the pool's edge)

- ◇ The contributing drainage area of the pool should be mapped, and it should be shown that the proposed use would not change the hydrologic characteristics of the pool.
- ◇ Park development (including trails) should not exceed 25% of the CTH area.
- ◇ If trails and facilities are built within the CTH, trail surface is not as critical as whether its base interrupts and channelizes water flows, how much disturbance it causes, what organisms breed on the site, what type and frequency of traffic it carries, and how it is maintained.

ESA recommended that if the existing, old logging road system in the park becomes the basis for a foot trail system, the vernal pools within the old road bed be filled and new pools constructed nearby within the woods, re-emulating the necessary seasonal conditions as currently present. This work cannot be performed during the migration and egg-laying season for most herpetofauna—February through April.

## Vegetation Community Assessment

### RARE, THREATENED AND ENDANGERED SPECIES

From April through September 2011, ESA conducted an analysis of the park's vegetation using the Virginia Department of Conservation and Recreation/Virginia Natural Heritage Program (DCR/VANHP) Vegetation Classification Protocol and the Park Authority's Non-Native Invasive Assessment and Prioritization (NNIAP) Protocol at Old Colchester Park and Preserve. The results of ESA's fieldwork and analysis are compiled in the report titled *Old Colchester Park and Preserve Vegetation Assessment*, dated November 4, 2011. This report provides data and results of the field work, as well as the GIS mapping of distinct habitats, vegetation communities and NNI plant units. Additionally, ESA provides recommendations for the management of on-site vegetation through the use of a carrying capacity analysis that focused on the degree of soil compaction and vulnerability of vegetation communities to various threats.

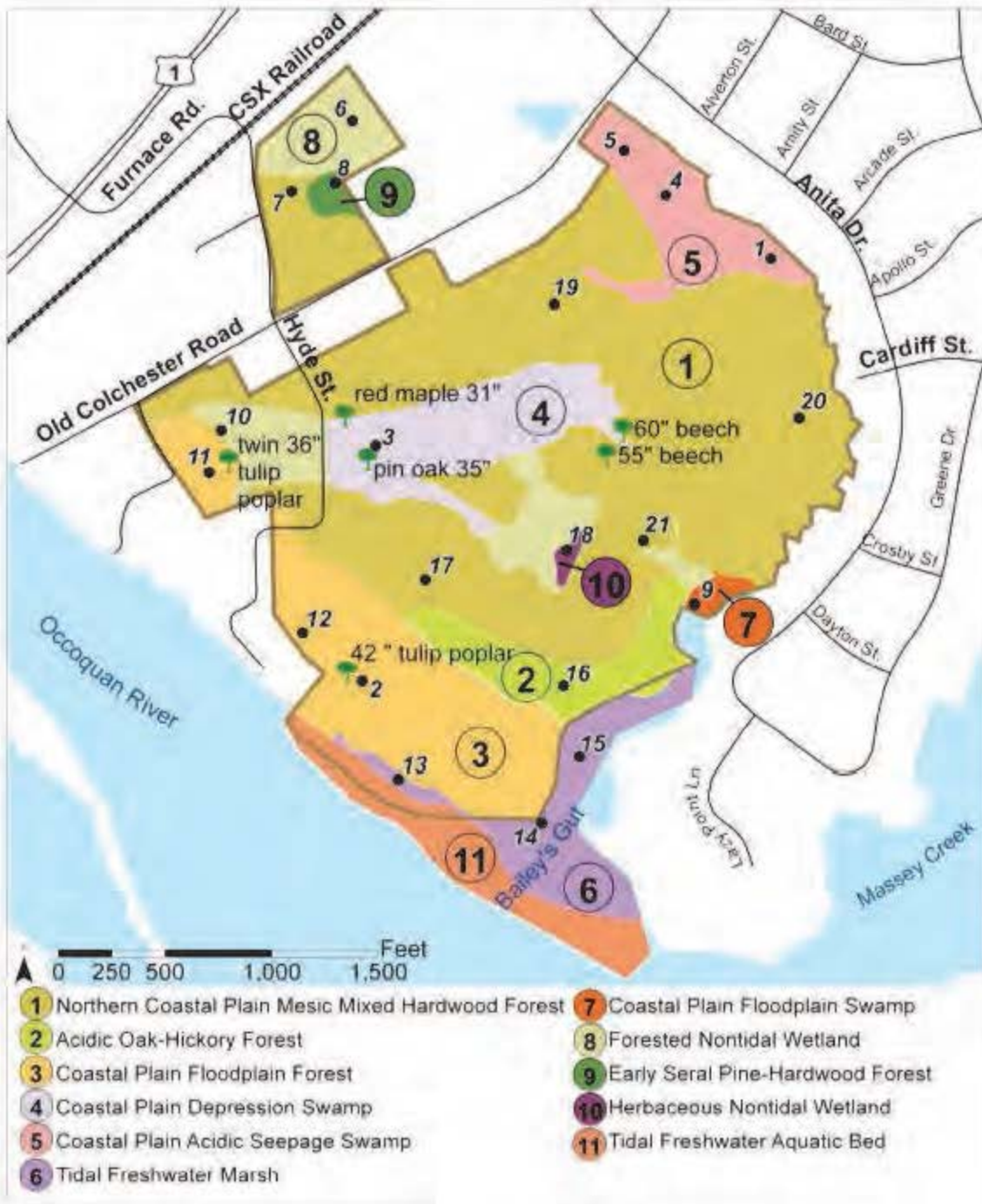
DCR/VANHP provided ESA with the GIS files of rare, threatened and endangered (RTE) species occurrence in the area around Old Colchester Park and Preserve. No known RTE species or their habitat buffers occur within the park. However, bald eagles are known to nest nearby. DCR/VANHP does track S2 species in their GIS meta-data, although river bulrush (a S2 species) is not listed in the data layer received from DCR/VANHP. This may be because river bulrush is suspected of being on the site, but it has not been confirmed.

Due to the characteristics of the site, there are other rare or uncommon species that could potentially occur on site. As such, a habitat evaluation and search was conducted on this site in 2006 (WSSI, 2006), specifically looking for a small whorled pogonia (*Isotria medeoloides*), a Federally Listed Threatened and State Listed Endangered. No related habitat or plants were found in 2006 and ESA does not believe further studies are warranted.

### VEGETATION CLASSIFICATION

ESA classified vegetation into natural communities that differ from each other in species composition and in relationships between species. Dominant factors in controlling distribution of woody species throughout the park include underlying geology, topography, soil type and disturbance history. Vegetation data plots were located within each non-aquatic habitat zone. Plots in the forest were 20m x 20m and plots in herbaceous communities were 10m x 10m. There was at least one plot in every vegetation community.

Using the field findings from site visits in April and June 2011, ESA classified each data plot as a natural community as described in the *Natural Communities of Virginia Classification of Ecological Community Groups, Second Approximation, Version 2.4*, DCR Natural Heritage Program, April 2010, a comprehensive classification of natural communities in Virginia. The report, overseen by the Virginia Department of Conservation and Recreation's Division of Natural Heritage (DCR-DNH), provides a comprehensive classification of natural communities in Virginia, with a purpose of constructing a broad framework for understanding and defining such communities at



**Vegetation Communities**

**Old Colchester Park and Preserve**  
 Natural Resources Management Plan

**Lardner/Klein Landscape Architects, P.C.**  
 In association with Environmental Systems Analysis, Inc.

GIS Sources: Fairfax County

Figure 12: Vegetation Communities map



several hierarchical levels. Because the site contains tidal and nontidal wetlands, as well as forest, there are multiple vegetation communities as described by the *Natural Communities of Virginia*, with at least one State-Rare community and a few communities that are too immature to meet the definitions of the State's natural communities. Where on-site communities did not align with the Commonwealth of Virginia's classification system, ESA developed appropriate descriptions of vegetative associations such as a description for young and disturbed vegetation communities. The initial natural community boundaries were refined based on data collected by ESA and an earlier wetland delineation (WSSI, 2006). The revised boundaries are reflected in the Vegetation Communities Map. (see Figure 12)

ESA developed a comprehensive species list based on data collected while walking transects, during orientation field walks and while collecting data within each vegetation community. Additional species were added during the NNIAP exercise. These species were added to the list started by the Park Authority with additions provided by WSSI during their 2006 field studies to identify wetlands and rare, threatened and endangered (RTE) species for the prior property owner. The list is included in Appendix B.

Besides river bulrush and pink lady's slipper (*Cypripedium acaule*), both unconfirmed but believed to be on the site, other uncommon plants including pumpkin ash (*Fraxinus profunda*) and lilies and orchids, such as Turk's cap lily (*Lilium superbum*) are found on-site. Trees greater than 30 inches in diameter were also noted during the field work and are shown in Figure 12. These citing's do not reflect a comprehensive inventory of large trees within Old Colchester Park and Preserve.

#### **VEGETATION COMMUNITIES DESCRIPTION**

Vegetation communities identified and mapped on-site include:

- Northern Coastal Plain Mesic Mixed Hardwood Forest
- Acidic Oak-Hickory Forest
- Coastal Plain Floodplain Forest
- Coastal Plain Depression Swamp
- Coastal Plain Acidic Seepage Swamp
- Tidal Freshwater Marsh
- Coastal Plain Floodplain Swamp
- Forested Nontidal Wetland
- Early Seral Pine-Hardwood Forest
- Herbaceous Nontidal Wetland
- Tidal Freshwater Aquatic Bed

The following is a summary of the natural communities found in the park, as compiled by ESA. It is expected that the communities may become more heterogeneous with edges "blending" through time. Definitions for the classification and ranking codes for each vegetation community can be found in Appendix I.



Mark Burchick

Figure 13: Northern Coastal Plain Mesic Mixed Hardwood Forest

**1** Northern Coastal Plain Mesic Mixed Hardwood Forest

This forest is common throughout the uplands in the park on both sides of Old Colchester Road and Hyde Street. American beech (*Fagus grandifolia*) dominate the canopy of this natural community and some beech are more than 30 inches in diameter. Some areas of this community have a strong canopy component of oak (*Quercus falcata*, *Q. phellos*, *Q. rubra*, *Q. velutina*), hickory (*Carya glabra* and *C. tomentosa*), and tulip poplar (*Liriodendron tulipifera*). Indicator species within this forest include American strawberry-bush (*Euonymus americana*), Christmas fern (*Polystichum acrostichoides*), partridgeberry (*Mitchella repens*), and flowering dogwood (*Cornus florida*). Some of this forest was logged at least once in the 1980s and other parts were released from grazing and agriculture. Based on a review of historical (1937 and 1953) aerial photographs, parts of this community were previously developed as agricultural fields and other areas were conifer dominated forest, most likely pine. Plots 7, 17, 19, 20, and 21 match the description for Northern Coastal Plain Mesic Mixed Hardwood Forest, provided in the *Natural Communities of Virginia Classification of Ecological Community Groups*. Deer browse is particularly apparent on strawberry-bush and the entire shrub stratum is sparse. Seeds, seedlings and saplings are being removed by deer and regeneration of shrubs will continue to be hindered if the deer population remains unchanged.

American beech dominates the side slopes and dry forest at Old Colchester. It is a native component of the forest and provides food and shelter for wildlife. However, beech is highly allelopathic and retards other vegetative species, especially as it matures. Other environmental factors favor beech and include the following list.

- Beech’s shade tolerance allows it to out-compete oaks and hickories in aging forest stands and those with dense shade.
- Past fire suppression has favored beech, maple and tulip poplar as fire usually kills thin-barked trees more often than the thicker barked species such as oaks and hickories.
- Deer browse has likely been present at elevated levels for at least 20 years and has likely influenced which trees make it through to the canopy. Deer browse also limits the number of acorns and hickories that actually germinate, and may significantly impact understory or lack thereof.

- Past logging operations that may have favored taking mature oaks and hickories and left behind beech. Beech does not have a high economic value and is difficult to convert into lumber. Because of these characteristics, beech trees are often left untouched in selective harvest operations.

**DCR Classic aon :** *Fagus grandifolia* - *Quercus (alba, rubra)* - *Liriodendron tulipifera* / (*Ilex opaca* var. *opaca*) / *Polyschu m*  
*acroschoid es*

**USNVC:** CEGL006075

**Global/State Ranks:** G5/S5



Mark Burchick

Figure 14: Acidic-Oak Hickory Forest

## 2 Acidic Oak-Hickory Forest

Although this forest is usually only found in the Piedmont region, portions of forest along a side slope and Plot 16 match the description for Acidic Oak-Hickory Forest, as defined by the *Virginia Classification of Ecological Community Groups*. This forest community is also found in nearby Mason Neck National Wildlife Refuge. The Northern Coastal Plain Mesic Mixed Hardwood Forest, previously described on page II:18, may mature into this type of vegetation community if the site experiences only limited and endemic disturbance. The Acidic Oak Hickory Forest is dominated by oaks and pignut hickory (*Carya glabra*) or mockernut hickory (*Carya tomentosa*) in the canopy and also contains deerberry (*Vaccinium stamineum*), lowbush blueberry (*Vaccinium pallidum*), flowering dogwood and lion's foot (*Prenanthes serpentaria*). Based on historical aerial photography, this area was conifer-dominated forest in 1953 and cleared fields in 1937. (see Figure 6)

**DCR Classic aon :** *Quercus alba* - *Quercus rubra* - *Carya alba* / *Cornus florida* / *Vaccinium stamineum* / *Desmodium nudiorum*

**USNVC:** CEGL008475

**Global/State Ranks:** G4G5/S4S5



Mark Burchick

Figure 15: Coastal Plain Floodplain Forest

**3** Coastal Plain Floodplain Forest

The bottomland adjacent to the Occoquan River contains a forest that is relatively young. It appears to be rarely flooded and much of it is outside of the 100-year floodplain. It also has a south-facing aspect that provides greater sun exposure than other natural communities receive. Boxelder (*Acer negundo*) dominates the sub-canopy, which is not addressed in the DCR description of this vegetation community type. Boxelder can be “weedy” and may lose dominance over time. Although not a community type as defined in the *Natural Communities of Virginia Classification of Ecological Community Groups*, this community better fits the US National Vegetation Classification’s (USNVC) *Acer negundo* Forest (Box-elder Floodplain Forest, Unique Identifier: CEGLO05033). The USNVC code serves as the basis for Virginia’s classification system. (For more information on either the USNVC or Virginia system, see Appendix I.) Other indicator species (referring ‘indicator’ as being common within this forest but less common in other forest communities based on ‘expert’ knowledge of vegetation communities) include tulip poplar, green ash (*Fraxinus pennsylvanica*) and black walnut (*Juglans nigra*) in the canopy, ironwood (*Carpinus caroliniana*) in the sub-canopy; a thick shrub layer dominated by spicebush (*Lindera benzoin*) and wineberry (*Rubus phoenicolasius*); and a strong component of grape (*Vitis* sp.), as well as other vines including Japanese honeysuckle, Virginia creeper (*Parthenocissus quinquefolia*), and Asiatic bittersweet (*Celastrus orbiculatus*). The shrub layer is dense in this community, possibly because of its southern exposure, the invasive nature of wineberry and because wineberry and spicebush are not preferred food for deer. Pumpkin ash, a secure but uncommon species is found within this community. This tree can be found in fresh tidal swamps and is associated with swamp black gum (*Nyssa aquatica*). The pumpkin ash is slow growing and larger specimens occurring in seasonal high-groundwater can develop buttressed, swollen or pumpkin-shaped butts (base of tree). Based on historical aerial photography, this area was cleared and may have been in agricultural production in 1937 (see Figure 6) and 1953. Plots 2, 11 and 12 match the description for this forest.

DCR Classic aon : see text

USNVC: CEGL005033

Global/State Ranks: G4G5/no state rank



Figure 16: Coastal Plain Depression Swamp

Mark Burchick

#### 4 Coastal Plain Depression Swamp

This potentially rare natural community will be officially defined by DCR after they analyze their data collected during a field visit on July 8, 2011. DCR will name the community and determine if it is rare after analyzing the collected data. DCR's initial determination is that the community is Coastal Plain Depression Swamp. ESA's survey results found the canopy to be dominated by red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), willow oak (*Quercus phellos*) and black gum (*Nyssa sylvatica*). Indicator species include mosses (*Polytrichum sp.*), slender spikerush (*Eleocharis tenuis*), helmet skullcap (*Scutellaria integrifolia*), blue sedge (*Carex glaucoidea*), black highbush blueberry (*Vaccinium fuscatum*) and southern blueberry (*Vaccinium formosum*). The forest is saturated and/or inundated in the winter and spring and supports sphagnum moss (*Sphagnum sp.*) with a high groundwater table being the driving source of hydrology. Plot 3 matches the description of this natural community type. More disturbed wetlands surround this natural community and are hydrologically connected to it but were defined as Forested Nontidal Wetland because these areas do not have the indicator species or saturation levels of a Coastal Plain Depression Swamp.

This community has a state ranking of "imperiled" (S2) because of rarity or other factors making it vulnerable to extirpation. A community is considered "imperiled" in Virginia if there are 6 to 20 occurrences of the community and/or these cover less than 618-acres in aggregate; or cover a larger area but are highly threatened with destruction or modification.

In 1937, this area was partially cleared. (see Figure 6) One portion appeared to be an agricultural field or meadow and had a wet signature on the aerial photograph with a few lines that may have been ditches. The other portion appeared to be a Pine-Hardwood Forest.

**DCR Classic aon :** *Quercus phellos - Acer rubrum - Liquidambar styraciflua / Vaccinium (formosum, fuscatum)* Forest

**USNVC:** CEGL006110

**Global/State Ranks:** G3/S2



Mark Burchick

Figure 17: Coastal Plain Acidic Seepage Swamp

**5** Coastal Plain Acidic Seepage Swamp

This forested wetland is hydrologically driven by groundwater seeps and drains to the tributary along the eastern boundary of the park, near Anita Drive. Indicator species include skunk cabbage (*Symplocarpus foetidus*), red maple, sweetgum, swamp white oak (*Quercus bicolor*), round seed panic grass (*Dichanthelium polyanthes sphaerocarpon*), fowl mannagrass (*Glyceria striata*), lady fern (*Athyrium filix-femina*), leafy bulrush (*Scirpus polyphyllus*), smooth carrionflower (*Smilax herbacea*) and star sedge (*Carex radiata*). Turk’s cap lily and an unknown orchid also grow in this community. Plots 1, 4 and 5 are located within this natural community. Plot 5 is the driest of these plots and is located in a transition area between the Coastal Plain Acidic Seepage Swamp as defined by the *Natural Communities of Virginia Classification of Ecological Community Groups* and the Northern Coastal Plain Mesic Mixed Hardwood Forest. This forest appears to be an even-aged stand and, based on historical aerial photographs, was released from agriculture in the late 1930s. (see Figure 6)

**DCR Classic aon :** *Acer rubrum - Nyssa sylvatica - Magnolia virginiana / Viburnum nudum / Osmunda cinnamomea - Woodwardia areolata* Forest

**USNVC:** CEGL006238

**Global/State Ranks:** G3?/S3

**6** Tidal Freshwater Marsh

One of the most unique and overt natural resource elements of Old Colchester Park and Preserve is that it is situated on the Occoquan River waterfront at Belmont Bay, near the mouth of the Potomac River. Fresh-tidal high and low marsh occur in the southwest portion of the tract. Portions of the low marsh are exposed tidal mud flats at low tide. River bulrush (not confirmed) grows among the wild rice (*Zizania aquatica*) and narrow-leaved cattail (*Typha angustifolia*). Marsh dewflower, a NNI, is found throughout the marsh and it is a prostrate plant that grows under many of the native grasses, sedges and forbs.

*The Natural Communities of Virginia* identifies four sub-classifications that are applicable per ESA’s findings. The high marsh includes components of Tidal Freshwater Marsh (Mixed High Marsh Type) because of the predominance



Figure 18: Tidal Freshwater Marsh

of narrow-leaved cattail observed on-site. The other high marsh component is the Tidal Freshwater Marsh (Wild Rice Mixed Forbs Type) due to observed wild rice and mixed forbs (around but not in plot 14). The low marsh consists of Tidal Freshwater Marsh (Spatterdock Mudflat Type) because of extensive areas of spatterdock (*Nuphar advena*) along the ill-defined, tidal stream channel and exposed mudflats at low tide. The second low marsh type is Tidal Freshwater Marsh (Arrow Arum-Pickerelweed) due to the many aggregates of observed pickerelweed (*Pontederia cordata*) in flower and arrow arum (*Peltandra virginica*) intermixed within the stands. Plots 13, 14 and 15 meet the description for Tidal Freshwater Marsh, as defined by the *Natural Communities of Virginia Classification of Ecological Community Groups*. The tidal marsh appears to have expanded slightly since 1937 with the incision of the upstream perennial stream. (see Figure 6)

**DCR Classic aon :** *Zizania aquatica - Pontederia cordata - Peltandra virginica - Polygonum punctatum* Tidal Herbaceous Vegetaon  
Tidal Freshwater Marsh (Wild Rice - Mixed Forbs Type)

**USNVC:** CEGL004202

**Global/State Ranks:** G4?/S4?

**DCR Classic aon \*:** *Impae ns capensis - Polygonum arifolium - Peltandra virginica - (Typha angusf olia)* Tidal Herbaceous Vegetaon  
Tidal Freshwater Marsh (Mixed High Marsh Type)

\*Note: This community contains the plant that has been initially identified as river bulrush that has a ranking of S2.

**USNVC:** CEGL006325

**Global/State Ranks:** GNR/S4?

**DCR Classic aon :** *Peltandra virginica - (Pontederia cordata)* Tidal Herbaceous Vegetaon  
Tidal Freshwater Marsh (Arrow-Arum - Pickerelweed Type)

**USNVC:** C EGL004706 (in part)

**Global/State Ranks:** G3G4/S3S4

**DCR Classic aon :** *Nuphar advena* Tidal Herbaceous Vegetation  
Tidal Freshwater Marsh (Spartoc ock Mud flat Type)

**USNVC:** CEGL004472

**Global/State Ranks:** G4G5/S3



Mark Burchick

Figure 19: Coastal Plain Floodplain Swamp

**7** Coastal Plain Floodplain Swamp

*The Natural Communities of Virginia* describes one of the four Coastal Plain/Piedmont Swamp Forest Types as the Red Maple - Green Ash/Lizard’s Tail Forest. Plot 9 was dominated by red maple in the overstory with green ash as an associate. The forb layer was a thick stand of near monotypic lizard’s tail (*Saururus cernuus*). This natural community is at the uppermost extent of fresh tidal influence, at the confluence of a riverine intermittent stream channel and the delta of a perennial stream. Much of the basin is saturated for most of the growing season but would appear as braided stream channels and exposed ground in the leaf-off season. Deer may be entering this community when the ground is not saturated. Based on historical aerial photographs, this very wet forest does not appear to have been logged or cleared since before the 1930s. (see Figure 6)

**DCR Classic aon :** *Acer rubrum* - *Fraxinus pennsylvanica* / *Saururus cernuus* Forest  
Coastal Plain / Piedmont Floodplain Swamp (Green Ash - Red Maple Type)

**USNVC:** CEGL006606

**Global/State Ranks:** GNR/S3S4





Figure 20: Forested Nontidal Wetland

Mark Burchick

### 8 Forested Nontidal Wetland

This forested wetland is located west of Hyde Street around a ditched channel, northwest of Old Colchester Road around an intermittent stream, and between the Herbaceous Nontidal Wetland and the Coastal Plain Depression Swamp. This is a recently disturbed, younger forest that does not match the natural community descriptions provided by DCR in the DCR *Natural Communities of Virginia Classification of Ecological Community Groups*. Instead, ESA developed an appropriate description of vegetative associations such as young and disturbed vegetation communities. The dominant canopy species are red maple, tulip poplar and hickory, though pin oak (*Quercus palustris*), sweetgum and green ash are also present. Arrowwood viburnum (*Viburnum dentatum*) is dominant in the shrub layer. An orchid, thought to be pink lady's slipper, grows on the edge of this community near the railroad tracks.

The forested wetland to the west of Hyde Street has been ditched, (ditch lines can be seen in the 1937 aerial photograph—see Figure 6) which limits the extent of the wetlands and has dried out this area. Most of these ditches are in straight lines and some still have side-cast material adjacent to the channel, which is overt evidence of man-made manipulation. Some of the extant wetland species such as sweetbay magnolia suggest that the site was historically wetter and that ditching has performed the function reducing wetland hydrology. These wetlands may mature into a Coastal Plain Depression Swamp or a Non-Riverine Wet Hardwood Forest if disturbance is minimized and hydrology restored.

**DCR Classification :** N/A

**USNVC:** N/A

**Global/State Ranks:** N/A



Mark Burchick

Figure 21: Early Seral Pine-Hardwood Forest

**9** Early Seral Pine-Hardwood Forest

An approximate two-acre area in the northern parcel of the park includes a Virginia pine grove, where the pine dominates in the overstory. Much of the pine is in decline, dying, dead and/or as woody debris on the ground. The pine occurs on depauperate dry, sandy slopes and is beginning to allow suppressed hardwoods to become sub-canopy, associate species include black locust, eastern red cedar (*Juniperus virginiana*), five oak species (including shingle oak, *Quercus imbricaria*), black cherry (*Prunus serotina*) and sweetgum. Plot 8 is within this community. This community is too young to match any descriptions within *Natural Communities of Virginia*. (ESA developed appropriate descriptions of vegetative associations such as young and disturbed vegetative communities that did not match the communities described in the DCR *Natural Communities of Virginia* document.) Given time, this community may become an Acidic Oak-Hickory Forest. This community has educational interpretive value to help explain natural succession. In aerial photographs from 1937 and 1953, it is evident that this area was not forest at either period and may have been in use as agriculture fields. (see Figure 6)

DCR Classic aon : N/A

USNVC: N/A

Global/State Ranks: N/A



Mark Burchick

Figure 22: Herbaceous Nontidal Wetland

#### 10 Herbaceous Nontidal Wetland

A temporary stormwater management pond and associated haul road was built within the central portion of the property in the 1990s. The basin was built in-line, within mapped wetlands/waters, and contains a low-hazard dam, emergency spillway and galvanized barrel riser through the dam. The riser opening is flush with the ground but the impoundment holds/ponds spring waters and acts to provide vernal pool habitat. The basin footprint is highly disturbed and is classified as palustrine emergent wetlands (wet meadow) with a palustrine forested fringe (PEM/PFO). The hydrology of the basin is saturated/inundated in the early part of the growing season and then pulses saturated wet and dry for the summer months. An aspect dominant plant is the NNI marsh dewflower. Native, but less dominant, forbs included fox sedge (*Carex vulpinoides*), soft rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), beaked spikerush (*Eliocarpus* sp.) and smartweeds (*Polygonum hydropiperoides*). Annual ragweed (*Ambrosia artemisiifolia* L.) and mile-a-minute occupy the outer perimeter and banks, along with a band of black willow (*Salix nigra*) and red maple. Plot 18 is within this community. It is also too young and too disturbed to match any descriptions within *Natural Communities of Virginia*. (ESA developed appropriate descriptions of vegetative associations such as young and disturbed vegetative communities that did not match the communities described in the DCR *Natural Communities of Virginia* document.)

**DCR Classic aon :** N/A

**USNVC:** N/A

**Global/State Ranks:** N/A



Mark Burchick

Figure 23: Tidal Freshwater Aquatic Bed

**11** Tidal Freshwater Aquatic Bed

Submerged aquatic vegetation (SAV) beds are quite apparent in the late spring through summer months and matting grasses appear thick at low tide along the Occoquan River shoreline. Functionally, the SAV bed minimizes the erosive effect on the Occoquan River’ shoreline. SAV also discourages boating and fishing activities.

Likely species include wild celery (*Vallisneria americana*), hydrilla (*Hydrilla verticillata*), common waterweed (*Elodea canadensis*), coontail (*Ceratophyllum demersum*) and water stargrass (*Heteranthera dubia*). *Natural Communities of Virginia* makes provisions for Tidal Freshwater Aquatic Bed designations, though none are dominated by hydrilla.

**DCR Classic aon :** N/A

**USNVC:** N/A

**Global/State Ranks:** N/A

### NON-NATIVE INVASIVE PLANT SPECIES

In addition to identifying the various vegetative communities within Old Colchester Park and Preserve, ESA performed an assessment of the occurrence of the non-native plant species within the park. ESA's evaluation was based on the Non-Native Invasive Plant Assessment and Prioritization Protocol (NNIAP). The NNIAP protocol provides a rapid assessment tool that enables a comparative ranking of field sites for invasive treatment. Scoring is based on three domains: ecosystem, non-native invasive species and cultural value. The Park Authority has adopted the philosophy of 'Protect the Best First', allocating their limited resources to protect the sites that score highly with an aggregate score of 12 or higher in an NNIAP assessment. The NNIAP score may be most useful in prioritizing which parks to treat within the entire park system, versus where to treat on one particular site. This is especially true for a park like Old Colchester Park and Preserve, as funding designated for the park is adequate to treat the entire park. The unit prioritization uses the following parameters to rank NNI units by:

- Ecosystem Score
  - ◇ Biodiversity—How valuable, unique and difficult to replace are the features of this unit? Are there multiple habitats, mature forest, and/or structurally complex forest?
  - ◇ Disturbance—Is there evidence of deer browse, paved trails, site scouring?
- NNI Species Score
  - ◇ Infestation level—What is the percent cover of invasive species?
  - ◇ Control difficulty – Does the unit have easy accessibility? Will a single treatment remove the majority of the invasive plants?
- Cultural Value Score
  - ◇ Visitation level – Is there structured parking, frequent trail use and/or numerous amenities?
  - ◇ Ownership – Is there an active management plan with multiple requests for management?

A maximum of five points can be assigned to each major category, with aggregate scores ranging from 3 to 15. An additional point may be added if the unit was treated for NNIs within the last 12 months, raising the total aggregate score to 16. The higher the aggregate score, the higher the priority to receive treatment for NNIs.



Figure 24: NNIAP Unit P treated for wineberry, a NNI



In performing an assessment of NNI species impact at the park, ESA divided the park into twenty-two geographic units. Each unit was examined by two inspectors from ESA. A species list of NNIs found on-site is included in the appendices of ESA’s *Old Colchester Park and Preserve Vegetation Assessment*, dated November 4, 2011. Appendix B of this NRMP contains a species list, but does not distinguish between NNIs and others. Examples of the NNIs found at Old Colchester Park and Preserve include Japanese stilt grass, wineberry, mile-a-minute, Asiatic bittersweet and marsh dewflower.

Using the NNIAP tool, ESA determined that the park has NNI plant site scores ranging from 5-13 (where 3 is the worst possible score and 15 is the best) with the lowest scores due to recent human disturbances. The Park Authority staff have treated wineberry, Japanese stilt-grass, mile-a-minute, multiflora rose (*Rosa multiflora*) and Japanese honeysuckle in the park but outside of the Resource Protection Area (RPA) in 2010 and 2011. Tree-of-heaven (*Ailanthus altissima*) and princess tree (*Paulownia tomentosa*) were also treated in 2011. An additional point was added to 14 of the 22 units to

**Non-Native Invasives Assessment and Prioritization (NNIAP)**

**Old Colchester Park and Preserve**  
Natural Resources Management Plan

Lardner/Klein Landscape Architects, P.C.  
In association with Environmental Systems Analysis, Inc.

GIS Sources: Fairfax County

Figure 25: NNI units and scores

reflect NNI treatment within the past 12 months. Two additional units were treated after ESA conducted the NNI assessment; therefore no extra point was assigned to those units.

Monitoring park use by the archeology staff and other visitors warrants future evaluation. The NNIAP tool automatically assigns a Cultural Value score of two points since there is cultural resource activity ongoing in the

park. If archeological activity or visitor levels increase in the future, this score may also need to be increased. Conversely, with the ongoing treatment of the NNIs, it is expected that the infestation score levels will decrease and the biodiversity scores will increase.

### NNI RECOMENDATIONS

Treatment of all NNIs should continue until tolerance thresholds of each species or stratum is met or exceeded. Units F, G, L, M and Q, with average scores of 12 or greater and Units J, H, K, and O, with average scores above 11 should be monitored more closely for the spread of NNIs because of their high biodiversity and low NNI infestation at this time. Unit codes, although not included in Figure 25, are included on Plate 5 in the Appendix.

### CARRYING CAPACITY ASSESSMENT

Beyond the impact from NNIs, Old Colchester Park and Preserve is susceptible to parkland overuse. Such overuse can threaten or destroy the natural resources on the site. ESA's report includes an assessment of the carrying capacity of the site, or the ability of the vegetative communities to withstand degradation as a direct result of human influence.

ESA evaluated each community's carrying capacity based on three factors: resource rarity, sensitivity and quality. Taken together, these factors dictate how susceptible each natural community is to human use, providing a method for ranking each community in terms of protection priority. This information can be used to inform resource management recommendations. ESA evaluated resource sensitivity and quality from field observations (i.e. soil compaction, presence of trash, erosion or vandalism, types of plants growing in the groundcover stratum). Resource rarity was evaluated based on known locations of rare species, communities and mapping.

Research has shown that some vegetation is more susceptible to trampling than others. Woody plants, for example, are more vulnerable to trampling than herbaceous plants; and grasses, sedges and rushes are more tolerant to trampling than forested areas (Dumitrascu et al. 2010, Jordan 2000, Cole 1995b). Vulnerability to trampling has also been shown to differ across species (Cole 1995a). Some vegetation has a threshold of vulnerability up to which they are capable of resisting damage. Once this threshold is exceeded, however, damage increases as trampling increases.

Resistance to trampling has also been shown to be a function of the erectness of plants and physiognomic types (Cole 1995b). Graminoids (grasses) are the most resistant; matted and rosette forbs (herbaceous flowering plants) and woody plants moderately resistant; and erect forbs least resistant. Resilience to trampling (ability to recover once trampling occurs) is a function of



Figure 26: Trampling plot in Vegetation Plot #2 within Vegetation Community Coastal Plain Floodplain Forest

woodiness (woodier plants are less resilient) and the location of the plant's buds. Ecological issues other than vegetation trampling can also occur from human use. A higher incidence of invasive species has been found near trail edges and invasive species are more abundant on heavily used trails (Jordan, 2000). Total species richness has also declined along trails and there is a negative correlation between distance from trailheads and species diversity. Trails and roads have also been shown to negatively impact breeding birds by decreasing nesting rates, altering bird species composition and increasing nest predation (Jordan, 2000). Microclimatic changes (i.e. increased sunlight, increased rainfall, increased wind, decreased humidity, altered temperature regime, etc.) have also been caused by trails. This, in turn, causes plant and wildlife species changes in the habitat community (Jordan, 2000).

Studies have also been conducted to examine the effects of human use on soils. Foot traffic, bicycle and ATV use can cause soil compaction, which leads to reduced microbial activity, low nutrient turnover and changes in enzyme activity in the soil (Kissling et al. 2009). Soils with a wide range of particle sizes (i.e. loams), low organic content and moderate to high moisture content are most prone to compaction; while soils with a narrow range of particle size (i.e. high silt and fine sands) are most prone to erosion (Marion, 1998). Slope and vegetative cover also factor into a soil's erodibility. In this respect, the forested habitats will be less susceptible to soil compaction while the wetland, marsh and river habitats will be more susceptible to erosion.

#### Ranking Criteria

ESA qualified the carrying capacity of the vegetative communities by ranking them in resource rarity, resource sensitivity and resource quality according to the following criteria:

#### Resource Rarity

- **High** = area contains a species that is a Federally or State-ranked RTE; or area is part of a State-ranked rare natural community.
- **Medium** = area is part of a protected natural area that is 100 contiguous acres or greater in size (Tilghman 1987, MD DNR 2011), contains wetlands, contributes hydrologically to a sensitive down-slope wetland, or abuts tidal river with fisheries (Tilghman 1987).
- **Low** = area is not part of a protected natural area that is 100 contiguous acres or greater in size and does not meet any of the above criteria for high or medium resource rarity.

#### Resource Sensitivity

- **High** = area has groundcover dominated by erect forbs (Cole 1995); area has steep slopes with erodible soils; area has steep slopes that are poorly vegetated; or area is sensitive to minor hydrological alterations.
- **Medium** = area is threatened by diseases, deer, highly invasive species or human activity that would alter the composition or structure of the area; or area has groundcover dominated by woody plants (Cole 1995); or area has saturated and/or inundated soils.
- **Low** = area has compacted soils or graminoid-dominated groundcover (Cole 1995) and does not meet any of the above criteria for high or medium resource sensitivity.

#### Resource Quality

- **High** = area provides critical habitat (nursery or breeding grounds, adult foraging habitat, etc.) for native species or targeted sensitive faunal groups (e.g., mole salamanders); area has documented FIDS or RTE ; or area has a naturally regenerating native natural community with low human disturbance, deer browse levels and invasive plant cover (Randall et al. 2008).
- **Medium** = area is located on prime agricultural soils; area contains spring seeps (Weigmann et al. 1992); area has trees greater than 18" dbh and a native shrub layer present; or area provides FIDS habitat or is FIDS habitat buffer (MD DNR 2011).



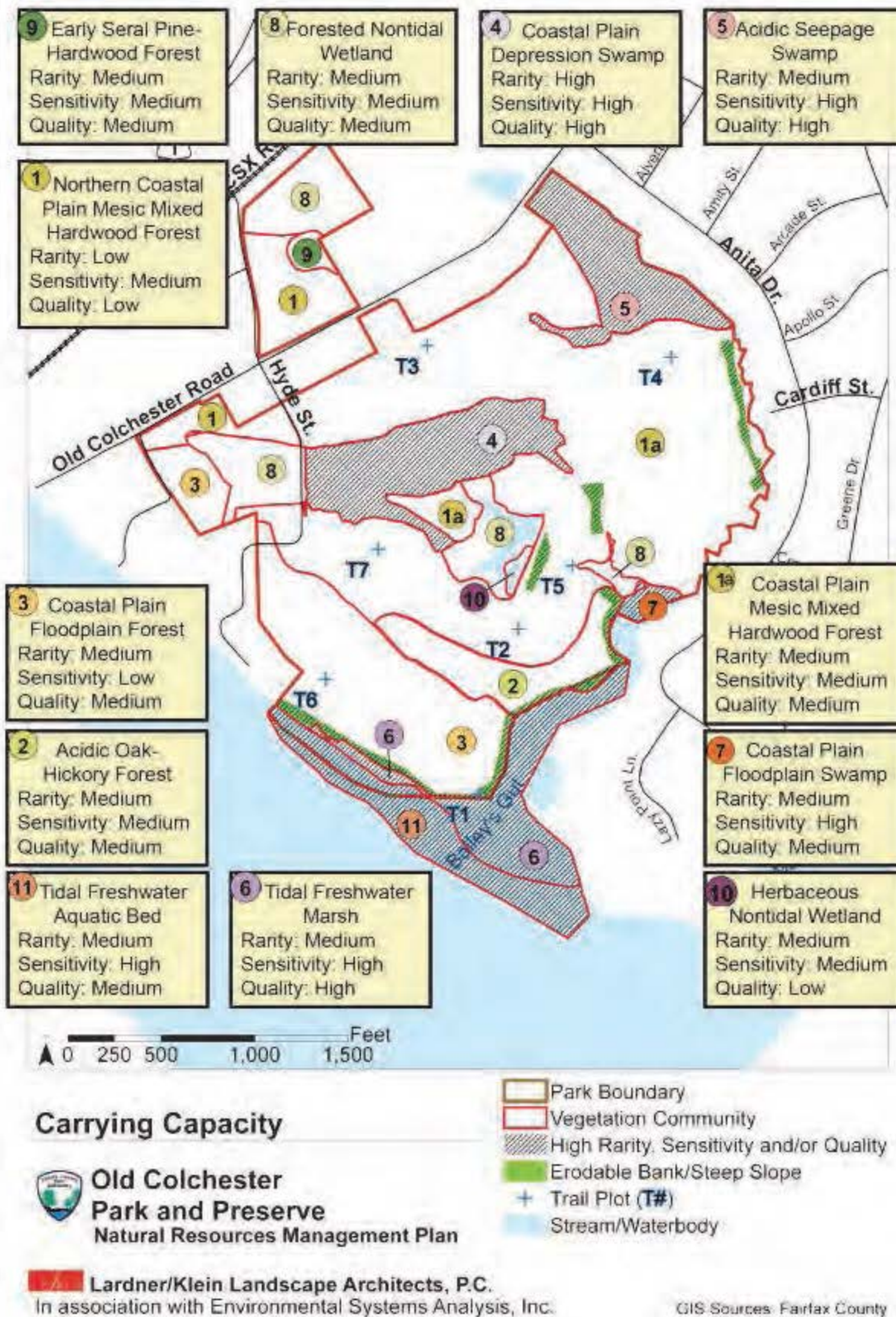


Figure 27: Carrying Capacity summary map and locations

- **Low** = area has moderate or high invasive plant cover (Randall 2008); signs of vandalism, trash or yard waste are common; provides habitat for only common suburban wildlife or fish species; and does not meet any of the above criteria for high or medium resource quality.

#### Field Methods

ESA conducted an assessment of the vegetative communities and how those communities ranked in terms of rarity, sensitivity and quality. Resource rarity rankings were based on how the vegetative community fit into the larger scale of the surrounding areas. This relied less on field evaluation and more on Federal and State RTE lists, mapping and hydrological evaluation.

Resource quality was evaluated based on field observations of trash and vandalism; evidence of deer browse, NNI species, or human disturbance; the presence of RTE species or FIDS; or the presence of spring seeps.

The analysis of resource sensitivity was focused mainly on the community's susceptibility to vegetation trampling and soil compaction. In order to monitor the effects of trampling, ESA used a protocol modeled from similar studies (Rees et al. 2007, Gorsira et al. 2006, Cole 1995a) and adapted for time and resource limitations. Indicators used for the Old Colchester assessment included changes in the percent of groundcover, invasive species cover, soil density/compaction and evidence of erosion.

ESA collected data for the specific indicators of human use at 22 one-square meter user capacity plots. These plots were located either within vegetation community plots or directly adjacent to the trails. ESA assessed the user capacity plots to better understand the impact trails have on the vegetation communities. ESA conducted a soil compaction analysis following the Dickey-John soil compaction meter (penetrometer) method and estimated the percent groundcover and invasive species cover at each plot. ESA noted the presence of erosion, deer browsing, vandalism, trash; trail width; and any other relevant characteristics of the plot. ESA also photographed each plot.

The Dicky-John soil compaction penetrometer measures the firmness (compaction) of soil. The stainless steel rod can be inserted up to 24-inches allowing for the testing of compaction levels as far down as sub-soiling depths. As the rod is inserted, the compaction needle rotates within the liquid-filled steel housing, indicating compaction levels in pounds per square inch (psi). Incremental 3-inch depth markings along the shaft allow for monitoring and recording changes in compaction levels at different depths. The scale is color-coded as green (0-200 psi), yellow (200-300 psi) and red (300-500 psi) to the point of refusal or at the end of the rod pushed into the ground. The point of refusal is generally equivalent to the compaction density of asphalt. Rain water infiltration and roots penetration occurs readily within the green range, is somewhat limited in the yellow range and is poor to non-existent in the red range.

The penetrometer was pushed slowly into the ground with steady, even pressure. As the instrument penetrates, gauge readings at three-inch increments to a depth of 18 inches were noted. Comparisons of compaction density and confining layer, plow pan, impermeable or perched zone were documented as the rod passes through the "tight" soil lens. A compacted layer or lens will be shown as the reading increases upwards into the red range and then moving downscale after passing through the compacted layer. The depth of entering and leaving the compacted layers were noted as observed.

#### **CARRYING CAPACITY RESULTS AND DISCUSSION**

Human carrying capacity varies within the park. Field data, as well as the known rarity of vegetation communities, supports a range in carrying capacities. Appendices within ESA's *Vegetation Assessment Report* (under separate cover) provide field data sheets with site and plot identification and photographs. Plots within tidal and nontidal wetlands had uncompacted soil, where the penetrometer registered little resistance. Plots located along the Occoquan floodplain measured multiple layers of impedance. ESA's interpretation is that the flat, fertile ground was used in agriculture and had a compacted plow pan with numerous incidences where tight silt-burdens were laid-down in

significant/catastrophic storm events over the past several hundred years. Vandalism and trash were usually not noted within plots.

Where trails occurred, ESA sampled both on the trail and adjacent to the trail. In each case, soils were more compacted on the trail than the adjacent natural areas. Even new, narrow trails were compacted. This level of compaction was enough to retard herbaceous vegetation from growing. ESA also noted that trails often perform the function of spreading Japanese stiltgrass along the trail edges, as that plant was observed with some degree of frequency along the dirt road network within the park, volunteer foot trails, archeology trails and/or deer trails.

Below is the carrying capacity of particular areas within Old Colchester Park and Preserve, discussed by vegetation communities. Steep slopes and Occoquan River Banks are also discussed because of their unique and fragile condition that makes them vulnerable to soil erosion.

#### Northern Coastal Plain Mesic Mixed Hardwood Forest

This is the dominant forest community in the uplands of the park and is found north and south of Old Colchester Road, as well as east and west of Hyde Street. This forest is dominated by American beech, which have sensitive root zones. The existing soils are somewhat compacted outside of the trails in this forest community and the trails are not eroded except where trucks or ATVs have created ruts. NNIs and some trash are apparent on trails, but not in the interior user capacity plots. This community was split into two sub, geographically distinct, communities, as indicated by the italicized headers below.

#### *Northern Coastal Plain Mesic Mixed Hardwood Forest East of Hyde Street and South of Old Colchester Road*

Some trees are more than 30 inches in diameter in this core forest area. Some slopes in this community are greater than 15%.

**Rarity:** Medium

**Sensitivity:** Medium

**Quality:** Medium

Threats include erosion on steep slopes, soil compaction and the spread of invasive species along trails.

#### *Northern Coastal Plain Mesic Mixed Hardwood Forest West of Hyde Street and North of Old Colchester Road*

The forest west of Hyde Street and north of Old Colchester Road is disturbed and has a significant amount of invasive plants that can potentially spread to other vegetation communities in the park. The trees are all less than 18 inches in diameter in these portions of the park. Extensive archeological digs have been performed directly adjacent to Old Colchester Road west of Hyde Street and have spread invasive species. There are also old dumps and rotting bird boxes in the forest north of Old Colchester Road.

**Rarity:** Low

**Sensitivity :** Medium

**Quality:** Low

Threats include soil compaction and spread of invasive species along trails and in archeological dig areas.

#### Acidic Oak-Hickory Forest

This forest is dominated by oaks and pignut or mockernut hickory in the canopy and deerberry, lowbush blueberry, flowering dogwood and lion's foot. This area contains steep slopes that are well vegetated. The soils of this community are not compacted and there are no signs of erosion, trash or vandalism. There is approximately 8% cover by NNIs in the user capacity plot.

Global/State Ranks: G4G5/S4S5

**Rarity:** Medium

**Sensitivity :** Medium

**Quality:** Medium

Threats include erosion on steep slopes, soil compaction and the spread of invasive species along trails.

Coastal Plain Floodplain Forest

The bottomland adjacent to the Occoquan River contains a forest that is relatively young. It appears to be rarely flooded and much of it is outside the 100-year floodplain. It also has a south-facing aspect, which provides greater sun exposure, which many invasive species favor. The soils here are somewhat compacted due to the site's agricultural history. Japanese stilt grass does not seem to be spreading along the existing trails in the community, but the trails are relatively new and are mostly used by the archeologists currently working on site. There is an active osprey nest near this community. There were no signs of trash or erosion in this community. There was evidence of cultural resource vandalism.

**Rarity:** Medium

**Sensitivity :** Low

**Quality:** Medium

Threats include soil compaction and the spread of invasive species on trails and in archeological dig areas. They also include an increase in human activity that may disturb osprey nesting.

Coastal Plain Depression Swamp

This rare vegetation community has saturated and inundated soils and plant species that are highly susceptible to trampling, particularly when the soils are saturated. Within the plot, ESA found no sign of invasive species, trash, vandalism or erosion. Soils were not compacted. There is a core area within this vegetation community that also includes vernal pools. Vernal pools are used by frogs, newts and salamanders to lay eggs in the spring and to represent an important sub-community of their own. The state rank for this community is S2, "imperiled," which is defined as *'generally with 6–20 occurrences state-wide, and/or covering less than 250 ha (618 ac) in aggregate; or covering a larger area but threatened with destruction or modification.'*

Global/State Ranks: G3/S2

**Rarity:** High

**Sensitivity :** High

**Quality:** High

Threats to this community include trampling that can destroy vegetation. Trash/pollution in vernal pools from roads and trails can harm the amphibians that breed in the pools. Spread of invasive plants can alter the composition of this rare natural community.

Coastal Plain Acidic Seepage Swamp

This forested wetland is hydrologically driven by groundwater seeps and drains to the tributary along the eastern boundary of the preserve, near Anita Drive. Indicator species include skunk cabbage, ferns and sedges. It has a high diversity of herbaceous plants including Turk's cap lily and orchids. This community has low NNIs, no vandalism or erosion and minor yard dumping. The soils are not compacted.

Global/State Ranks: G3?/S3

**Rarity:** Medium

**Sensitivity :** High

**Quality:** High

Threats to this community include soil compaction and the spread of invasive species as a result of increased human use. Use of this swamp would compact the soil, especially given the high saturation of the soil; spread invasive species where little currently exist; and destroy characteristic vegetation.

#### Tidal Freshwater Marsh

The tidal marsh forbs (i.e. narrow-leaved cattail, spatterdock, sweetflag (*Acorus americanus*) and pickerelweed) are highly susceptible to trampling. Additionally, this community may contain a rare plant, river bulrush, which may be threatened by the spread of invasive species from hikers or from the soil being compacted or disturbed. The existing soil is not compacted until a deep confining layer and is either saturated or inundated at all times. Soil characteristics do not support foot traffic. Increased pedestrian activity will damage marsh plants. Marsh dewflower, a NNI, is present in some of the marsh and there is a rack line along the shoreline that includes some trash. There were no signs of erosion or vandalism.

**Rarity:** Medium

**Sensitivity :** High

**Quality:** High

Threats to this community include soil compaction and the spread of invasive species as a result of increased human use. Oil spills from neighboring marinas pose a threat to this community.

#### Coastal Plain Floodplain Swamp

This community has a thick herbaceous layer of lizard's tail, which is sensitive to trampling. This parcel is at the uppermost extent of the fresh tidal influence, where a riverine stream channel flows out to the marsh. The soils are often saturated or inundated, impeding foot passage and would ultimately cause damage to this community. This community is also on the edge of the park's boundary and a trail through this area may become or already serves as an access point for park neighbors when the soils are frozen or not fully saturated. There was approximately 10% NNI cover within the user capacity plot, some signs of erosion, and no evidence of soil compaction, vandalism or trash.

Global/State Ranks: G3G4/S3?

**Rarity:** Medium

**Sensitivity :** High

**Quality:** Medium

Threats include trampling, soil disturbance and spread of invasive species from human use.

#### Forested Nontidal Wetland

This forested wetland is found in the parcel north of Old Colchester Road, the parcel west of Hyde Street and near the Herbaceous Nontidal Wetland. This vegetation community is somewhat disturbed and has invasive plants that can potentially spread to other vegetation communities in the park. The soils are minimally compacted (200 psi was maximum compaction level) and during the winter and spring are saturated and inundated. There are steep slopes within the community, as well as adjacent to it. The area to the west of Hyde Street has been hydrologically altered

by ditching. The user capacity data plots had 8% and 30% NNI cover and no signs of trash, vandalism or erosion.

**Rarity:** Medium

**Sensitivity :** Medium

**Quality:** Medium

Threats include stream erosion due to excess runoff entering the preserve and spread of invasive species.

#### Early Seral Pine-Hardwood Forest

This community is young, dominated by Virginia pine and is located on a slope. Oaks are present and, most likely, this community will become an oak-hickory forest if allowed to continue to grow with little disturbance. Invasive species are common, though not in the user capacity plot. There are some old dumps in or adjacent to this community.

**Rarity:** Low

**Sensitivity :** Medium

**Quality:** Low

Threats include soil compaction and the spread of invasive species as a result of increased human use.

#### Herbaceous Nonda | Wetland

This area is located within the central portion of the park and is an abandoned sediment pond with an at-grade barrel riser. The dominant plant is the NNI, marsh dewflower. This community is disturbed and has significant amounts of invasive plants that can potentially spread to other vegetation communities in the preserve. The soils are not compacted and, during the winter and spring, are saturated and inundated. Erosion and vandalism are not apparent.

**Rarity:** Medium

**Sensitivity :** Medium

**Quality:** Low

Threats include soil compaction and the spread of invasive species as a result of increased human use.

#### Tidal Freshwater Aquatic Bed

The Tidal Freshwater Aquatic Bed includes wild celery, hydrilla (invasive), common waterweed, coontail and water stargrass. It is well documented in the fresh tidal Potomac River that SAV helps to promote habitat and nursery grounds for fish and other aquatic animals by providing cover, dissolved oxygen and filtering pollutants. The SAV bed reduces shoreline erosion and makes access to the park from the water difficult. It also makes fishing unattractive and difficult, both from the shoreline and from boats near the shoreline.

**Rarity:** Medium

**Sensitivity :** High

**Quality:** Medium

Threats to this community include oil spills from neighboring marinas that can harm the vegetation and ecology. Erosion along banks can cause subsequent sedimentation of SAV.

#### Steep Slopes and Occoquan River Banks

Steep slopes occurring in several vegetation communities in the forest block south of Old Colchester Road and east of Hyde Street are susceptible to soil erosion. The banks of the stream flowing along the south-western boundary of

the park have slopes as steep as 60%. In particular, Soils 71 (Kingstowne-Sassafras-Marumsco complex) and 91 (Sassafras-Marumsco complex) are highly erodible and found on slopes between 7-25% grade. According to the *Description & Interpretive Guide to Soils in Fairfax County*, characteristics of these soil types reflects ‘*erosion potential, applies to soils under construction site conditions. Erodibility is affected by texture (relative proportion of sand, silt and clay), rock content, permeability, structure and slope (natural or man-made).*’ These soils ‘*are highly erodible, even on B slopes—2-7 percent slope. Soil loss in excess of 0.25 inches from sheet erosion and formation of numerous gullies can be expected on unprotected soils in a severe storm*’. This area is within a forest block that is more than 100 acres in size and abuts wetlands or the river.

**Rarity:** Medium

**Sensitivity :** High

**Quality:** Medium

Threats include erosion along steep slopes and the spread of invasive species on exposed soil.

### **VEGETATION COMMUNITY RECOMMENDATIONS**

The *Vegetation Assessment* report developed by ESA presented a number of recommendations related to management of vegetation communities, assessment of NNI infestations and carrying capacity of Old Colchester Park and Preserve. Presented separately in ESA’s report, the recommendations are consolidated below. Those common to all vegetation communities are presented first. Separate recommendations related to management, NNI control and carrying capacity are presented by community. Most, but not all, of the recommendations are incorporated into the recommendations in this NRMP in Sections IV and V. Clarifications and enhancements to specific recommendations are indicated by the use of italic type.

#### Recommendations for all of Old Colchester Park and Preserve

- Implement a white-tailed deer (*Odocoileus virginianus*) reduction program.  
*The number of deer in excess of the park’s carrying capacity may continue to degrade vegetative structure and diversity, leading to an open understory devoid of native groundcover and causing near irreparable long-term damage. A deer reduction program should be implemented to keep deer numbers in balance and to protect the vegetative community structure.*
- Continue treating and monitoring NNIs until tolerance thresholds for each species or stratum is met or exceeded.
- Monitor natural regeneration of native plants after treatment of NNIs. Plant or seed in native plants if needed.
- Restore abandoned archeology study areas and abandoned trails.
- All proposed trails or facilities should be field located to avoid impact to uncommon or rare plants.
- New trails that traverse areas with invasive species should be monitored and treated to control the spread of invasive plants.  
*Trails are a vector for the spread of Japanese stilt grass and if trails are built, they should be monitored for this species and its spread into the surrounding forest.*
- Remove or improve existing trails on the steepest of slopes.
- Develop educational or interpretive program about the park’s natural history.
- Monitor forest for emerald ash borer (*Agrilus planipennis*) and other forest pathogens.
- Clear trash and yard waste.

- Restore the perennial stream along the eastern boundary.
- Consider the condition of the vegetation community and soil vulnerability to compaction when siting trails.

Northern Coastal Plain Mesic Mixed Hardwood Forest Recommendations: Vegetation Community and Carrying Capacity

- This stand shows the effects of deer browse and would be considered ‘understocked’ from six-feet and below (the browse line).
- Locate trails on flat portions of this vegetation community.
- Proposed trails and roads should avoid the beech critical root zone wherever possible because of their sensitivity to disturbance and compaction.
- Canopy cover should be promoted over Hyde Street by allowing tree branches to grow over the road and planting trees on either side of the street within the right-of-way.

*This will allow a connection between the forest block east of Hyde Street and the core forest block and will reduce the edge effect caused by the road. The connection of forest blocks helps with vegetation dispersal and wildlife use, particularly Forest Interior Dwelling Species.*

- Allow the forest to burn to re-establish a natural disturbance regime. If feasible, consider a prescribed burn.  
*Fire suppression may have altered this community. Allowing the forest to burn, or even prescribing fire if feasible, would re-establish a natural disturbance regime for this natural community.*
- Consider girdling a few beech trees to promote light-gaps that could favor other suppressed hardwoods, thereby diversifying the stand, providing snag habitat and bringing the stand into a more balanced, natural character.

*The community may have an inordinate or unnaturally high amount of beech within what would otherwise be a mixed hardwood stand. One forest management technique may be to girdle a few beeches to promote light-gaps that could favor other suppressed hardwoods, thereby diversifying the stand, providing snag habitat and bringing the stand into a more balanced, natural character.*

- Pick up trash and remove old trash and yard waste dumps.
- Remove bird boxes no longer used by native wildlife and birds.
- Develop educational, interpretive panels on American beech.
- Remove diseased and dying trees.

*Dying and stressed trees can be a vector of disease or insect infestation even on non-target species.*

Acidic Oak-Hickory Forest Recommendations: Vegetation Community and Carrying Capacity

- This stand shows the effects of deer browse and would be considered ‘understocked’ from six-feet and below (the browse line).
- Remove diseased or dying trees, thinning of existing stands is not required.

*Dying and stressed trees can be a vector of disease or insect infestation even on non-target species.*

- Prohibit human access to steep slopes and banks to prevent erosion.
- Allow the forest to burn to re-establish a natural disturbance regime. If feasible, consider a prescribed burn.

*Fire suppression may have altered this community. Allowing the forest to burn, or prescribing fire if feasible, would re-establish a natural disturbance regime for this natural community.*



Coastal Plain Floodplain Forest: Vegetation Community and Carrying Capacity Recommendations

- Consult with the Audubon Society of Northern Virginia and the U.S. Fish and Wildlife Service Potomac River Refuge staff for recommendations regarding a buffer around the osprey nest during osprey breeding and before the chicks fledge (approximately mid-March to mid-July).
- Monitor for emerald ash borer because this vegetation community contains both pumpkin ash and green ash. If the ash borer cannot be controlled, consideration should be given to the removal of the ash trees and replanting with native vegetation.
- Continue to treat wineberry, an NNI that is dominant in this vegetation community (treated in 2011).
- Allow the forest to burn to re-establish a natural disturbance regime as fire suppression may have altered this community. If feasible, consider a prescribed burn.
- Prevent unregulated access and damage to the steep Occoquan riverbanks.

*Access to the Occoquan River and its vistas (i.e. dirt trails) should be controlled, preventing unregulated access and damage to the steep banks. The compacted soils in the community can tolerate more human activity than the uncompacted soils throughout much of the site.*

Coastal Plain Depression Swamp Recommendations : Vegetation Community and Carrying Capacity

- Establish a buffer around this community to prohibit human disturbance and the spread of NNIs within the community and buffer. Do not allow trails and unregulated access in this community because of its susceptibility to compaction, invasive species and water pollution.

*The DCR/VANHP recommends instituting a 250-meter (820-foot) buffer around this community to protect it (because of its rare status) from human-induced disturbance and the spread of invasive species. Hyde Street to the west, adjacent houses to the north, and a dirt trail/road to the south are effectively the borders of any buffer for this community. Inside the buffer, the vegetation and soils should be preserved and managed for the health of the natural community. No trails or unregulated access should be allowed through this community because of its susceptibility to compaction, invasive species and water pollution.*

- Direct Hyde Street runoff away from this community.
- Protect the hydrology recharge and discharge for this wetland as small hydrological alterations can affect community species composition.
- Evaluate all adjacent land use changes for hydrological implications to this community.

*Decisions regarding land use changes nearby should consider the impact on this community. Specifically, the adjacent trail and dam for the dry basin may be making this area more wet than if they were not present. If the dam is removed, headcuts in the resultant stream should be stopped. Similarly, expansion of Hyde Street could impact both the hydrology and vegetation in this community.*

- Promote canopy cover over Hyde Street to reduce edge effect and to shade out NNIs.
- Protect the existing vernal pools in this community.  
*Some vernal pools are currently located along existing roads and trails; therefore, some protection should be offered for them. If viewing opportunities are provided, access should be regulated and paired with interpretive opportunities.*
- Restore the buffer on the north side of this vegetation community near the residential homes—promoting growth of native tree and shrub species and removing NNIs.
- Develop educational, interpretive panels to explain what a natural community is and why this community is rare.

Coastal Plain Acidic Seepage Swamp Recommendations: Vegetation Community and Carrying Capacity

- Restore the severely incised perennial stream along the eastern boundary of the park to ensure that the groundwater seeps driving the Acidic Seepage Swamp will remain functional.

*If incision increases or the channel moves laterally, the movement could potentially wick water away from this adjacent wetland or intercept the water table associated with the seepage swamp and/or eventually meander into and cut away swamp hydrology. Restoring the channel's geomorphology will help ensure that the groundwater seeps driving the Acidic Seepage Swamp will remain functional.*

- Protect recharge and discharge of groundwater.

*The hydrology recharge and discharge for this wetland should be protected as small hydrological alterations can affect this community's species composition.*

- No trails should be located in this community.
- Avoid building trails and providing unregulated access in this community because of its susceptibility to compaction, invasive species and water pollution.

*Because this community currently has very limited invasive species and is highly sensitive to soil compaction caused by trampling; no trails should be located within it. A trail currently exists that offers a vista of this wetland.*

- Positively identify the orchids community to species.

*The orchids in this community have not been positively identified because they did not bloom in 2011. They may be rare and, therefore, this area should be avoided to preserve the orchids, at least until it is determined whether or not they are a common species.*

- Monitor for emerald ash borer.
- Develop educational, interpretive panels to explain the influence hydrology has on vegetation and the uniqueness of orchids and lilies.
- Clear yard waste and trash.
- Install Park Authority signs near the eastern boundary.

Tidal Freshwater Marsh Recommendations: Vegetation Community and Carrying Capacity

- Preserve the tidal marsh that is habitat for state rare river bulrush.
- Remove invasive, NNI marsh dewflower, if possible, given the special challenges of removing it from this community.

*Removal of marsh dewflower from the tidal freshwater marshes will help restore the native plant composition. River bulrush may also be threatened by marsh dewflower. Treatment of the marsh dewflower in the tidal marsh presents special challenges because it is a prostrate plant that grows under desirable native vegetation, the saturated and inundated soils in the marsh are difficult to navigate and are prone to compaction, tidal waters may wash off herbicide within hours of treatment.*

- Restore the perennial stream along the eastern boundary of the park to decrease sedimentation.
- Monitor natural regeneration of native plants after treatment of NNIs. Plant or seed in native plants if needed.
- Provide views of the Tidal Freshwater Marsh while preventing unregulated access. All access should preserve the soil, vegetation and adjacent slopes.

*Views of the marsh and interpretation points should be provided because visitors will seek these out anyway, possibly damaging the marsh in the process. Water views can be easily provided from the adjacent forest.*

- Any proposed boardwalks or facilities should be carefully planned and field located to avoid impact to river bulrush.

*If access to the marsh is desired, a boardwalk with viewing platforms would need to be carefully planned so as to avoid impacting sensitive resources. The boardwalk would need to be located away from the Occoquan River and known locations of river bulrush. All access should preserve the soil, vegetation and adjacent slopes. Examples of activities in the marsh that can adversely impact this community include boating, fishing, bird watching and hiking.*

- Manage river bulrush using on-the-ground monitoring to track expansion or shrinkage of the population.
- Prohibit marine recreation access to the marsh from park property.
- Develop educational, interpretive panels to explain the ecology of tidal marshes and the uniqueness of river bulrush.
- Pick up trash along the shoreline after large storm events and/or annually.

#### Coastal Plain Floodplain Swamp Recommendations : Vegetation Community and Carrying Capacity

- Prevent access or trail construction within this vegetation community because of this community's susceptibility to compaction, invasive species and water pollution.

*Since it is susceptible to trampling and soil disturbance and can be seen from nearby elevated areas, no access should be provided through this community type.*

- Restore the perennial stream along the eastern boundary of the park. As part of the effort, ensure that any changes to the stream and its sedimentation load will not adversely affect this vegetation community.

*Geomorphological restoration of the perennial stream along the park's eastern boundary may impact sediment supplies to this natural community downstream. Therefore, existing and proposed sediment loads should be estimated and their impact on this downstream community evaluated during the stream restoration design.*

- Monitor for emerald ash borer.

*Monitoring for emerald ash borer is particularly important to this community because of the presence of both pumpkin and green ash. Removal of these trees and replanting with other native vegetation may be required if the ash borer cannot be controlled.*

- Develop educational, interpretive panels to explain the effect of trampling.

#### Forested Nontidal Wetland Recommendations: Vegetation Community and Carrying Capacity

- Restore the hydrology to the wetland located west of Hyde Street by installing check dams within the existing ditches. Similarly, the largest ditch is incised and is wicking water away from the wetlands in this area. Restoring a more natural geomorphology to this channel will promote wetland regeneration.

*Restore the hydrology to the wetland west of Hyde Street by installing check dams within the existing ditches to intentionally back seasonal ground and surface water. In doing so, this portion of woodlot may eventually better emulate the adjacent Coastal Plain Depression Swamp to the east of the site, and which may have been connected prior to the construction of Hyde Street, which bifurcated the stand.*

- Control human access.

*Access to this community should be controlled to limit soil compaction, trampling vegetation and the spread of invasive species.*

- The wetland north of Old Colchester Road is impacted by run-off from Furnace Road. This run-off should be treated for both volume and water quality prior to entering the park.
- Positively identify the orchids on site.

*Until the orchid plants in the area north of Old Colchester Road can be positively identified, avoid the area near the railroad. It is currently thought that this orchid is pink lady slipper, which is not a state rare species, though it did not bloom in 2011 to allow for positive identification. All proposed trails or facilities should be field located to avoid impact to the orchid and other uncommon plants.*

- Promote canopy cover over Hyde Street to reduce edge effect.
- Monitor for emerald ash borer.
- Develop educational, interpretive panels to explain the influence hydrology has on vegetation.

#### Early Seral Pine-Hardwood Forest Recommendations: Vegetation Community and Carrying Capacity

##### Recommendations for Early Seral Pine-Hardwood Forest

- Allow the forest to burn to re-establish a natural disturbance regime. If feasible, consider a prescribed burn.  
*Fire suppression has altered this community. Allowing the forest to burn, or prescribing fire if feasible, would re-establish a natural disturbance regime for this natural community.*
- Develop an educational, interpretive panel to help explain natural succession.
- Remove diseased or dying trees to help reduce or eliminate the potential for attracting stressors to the forest.  
*Dying and stressed trees, such as the older Virginia pine, have been known to become vectors of disease and/or insect infestations, even on non-target species. Removal of diseased or dying trees will help to reduce or eliminate the potential for attracting stressors to the forest.*
- Carefully plan trails to limit erosion of steep slopes within this community.
- Pick up trash and old dump piles.

#### Herbaceous Nontidal Wetland Recommendations: Vegetation Community and Carrying Capacity

- Restore the dry basin into a more persistent pond to encourage frogs and salamander populations and to flood out marsh dewflower.
- Control NNI species that threaten the adjacent forest and the development of a native pond and nontidal wetland natural community. Native wet meadow forbs should be planted or seeded for aesthetic purposes.
- Control access to this community.

*Access to this community should be controlled to limit soil compaction, trampling vegetation and the spread of invasive species. Although not a vegetation community issue or recommendation, it may be prudent for the NRMP to recommend that the at-grade barrel riser be repaired or removed, as it currently is a safety hazard.*

- Protect the existing vernal pools and provide regulated access for viewing them.
- Develop educational, interpretive panels regarding the vernal pools.

Tidal Freshwater Aquatic Bed Recommendations : Vegetation Community and Carrying Capacity

- Prohibit marine recreation because of the potential threats from such activities to the SAV.
- Retain the SAV bed.

*The SAV bed should be retained, even if the dominant species becomes hydrilla, because of the erosion-control and fish habitat benefits this community provides. Despite primarily being an invasive species, the hydrilla forming the SAV bed should be retained to assist in achieving the objective of controlling fishing access and bank erosion. Additionally, eliminating hydrilla is often difficult and is not a high priority within the constraints of NNI treatment throughout the park.*

- Prohibit access to the riverbank because of potential sedimentation of the SAV.

*The steep banks along the Occoquan River should also be protected and restricted from human use because of the potential for erosion and subsequent sedimentation of the SAV beds.*

- Develop educational, interpretive panels to explain the importance of SAV.

Steep Slopes and Occoquan River Banks Recommendations: Vegetation Community and Carrying Capacity

- Provide controlled access to the Occoquan River and its vistas.
- Prohibit human access and unregulated use along the steep slopes and banks to prevent erosion.
- Remove or improve existing trails on the steepest of slopes and on the bank down to the Occoquan River.
- Do not direct run-off to slopes (i.e. trail water bars).
- Prohibit marine recreation from the shoreline.

**Deer Population**

The Fairfax County Park Authority staff conducted a white-tailed deer infrared camera population density survey for Old Colchester Park and Preserve in late winter and spring of 2011. The methodology and results of this survey are presented in the report *Old Colchester Park Deer Population Survey, 2011*. A copy is provided in Appendix C. This survey generated management recommendations for maintaining a healthy deer population density in the park and assesses the impact of deer inhabitation on natural resources in the park. The results of the evaluation can be comprehensively compared with those from other regional parks.

The Jacobson methodology (1997), a ratio driven model, was applied to two categories of the deer population, bucks and does (females and fawns), as they were captured in photographs from four cameras dispersed through the park. The results suggest a total population of 60 deer within the park, or at a density of 278 deer per square mile.

The report indicates that the number of doe occurrences is skewed in the 2011 survey, reflecting an extremely high doe-to-buck ratio recorded at one of the four cameras (Lawler, 2011). Regardless of the camera issues, the current density range of deer per square mile exceeds the measure of fifteen deer per square mile, the established ratio for a sustainable eastern forest deer population.

Deer have impacted the vegetation composition of the upland forest. The direct relationship between excessive deer densities and the prevalence of NNIs cannot be overstated. Beyond the destruction of the native understory by forage, the deer browse is leading to the introduction of NNIs through seed transport and to NNI retention as NNIs are not preferred deer food. The wetlands at the park have been somewhat spared from deer impacts. Deer feel vulnerable when walking in muddy, unstable soils and tend to avoid these areas. Because of this, native vegetation is more robust in the saturated and inundated wetlands.



Persistence of the deer population in excess of the park's carrying capacity may further degrade vegetative structure and diversity, leading to an open understory devoid of native groundcover and causing near irreparable, long-term damage. The eventual loss of native recruitment species will lead to an inability to backfill natural mortality. Forest structure will change in a manner where successful species are those not palatable to deer. It is highly probable that the absence of spring wildflowers and other seasonal forbs and the lack of diversity in the shrub layer and spread of NNIs are directly associated with deer in excess of carrying capacity.

Figure 28: Image captured for the deer population survey, date on photo is incorrect and should indicate 2011

From the summer of 2010 through winter 2011, Park Authority staff and a volunteer implemented a deer browse impact and pellet count survey as part of a countywide effort to establish browse impact levels and to test a population survey protocol using pellet counts. Separate from the 2011 camera survey, Park Authority staff conducted a deer browse impact study at Old Colchester Park and Preserve as part of a countywide study. Initially, ten survey plots were placed on site in the summer of 2010. This number was expanded to 40 plots in the winter of 2010-2011. On a scale of 1-5, where 1 is unbrowsed and 5 is severely browsed, Old Colchester Park and Preserve rated a browse level of 4.05, averaged across all 40 plots. This rating indicates heavy browse, and such browse intensity supports the elevated deer population as described in the 2011 camera survey report.

### Small Mammal and Insect Populations

The Park Authority conducted additional baseline research in 2010 and 2011 using existing staff, volunteers and by partnering with other organizations. In 2010, an intern conducted small mammal trapping surveys along the marsh edges that confirmed the presence of two species: marsh rice rat (*Oryzomys palustris*) and raccoon. Park Authority staff conducted dragonfly and damselfly surveys to establish a baseline for *Odonata* insects at the park. Similarly, members of the Audubon Society of Northern Virginia conducted a bird and butterfly survey. In June 2011, volunteers from the Virginia Herpetological Society conducted a survey that documented over a dozen reptile and amphibian species at the park, adding several species to those already documented by staff from Versar, ESA and the Park Authority.

## Data Gaps

### Data and Research Needs

- Continue surveys: vegetation, mammals, invertebrates, herps, birds
- Complete a survey of the vernal pools, using the Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife Vernal Pool Field Observation Form or similar
- Walk the shoreline and look for signs of erosion and unauthorized access from the shore, trash after storm events, spread of river bulrush and marsh dewflower
- Better understand the biology of the river bulrush - What insect is eating river bulrush? Will exclusion of this insect improve bulrush vigor and possibly allow it to flower and fruit? What are the specific habitat preferences of river bulrush within the tidal marsh at the park?
- Monitor the impact of major perturbations, including weather events - What impact did Tropical Storm Lee and the archeology studies that exposed mineral soil throughout the forest have long term? Will NNIs spread?
- Identify species —What orchids exist on-site? Was river bulrush properly identified?

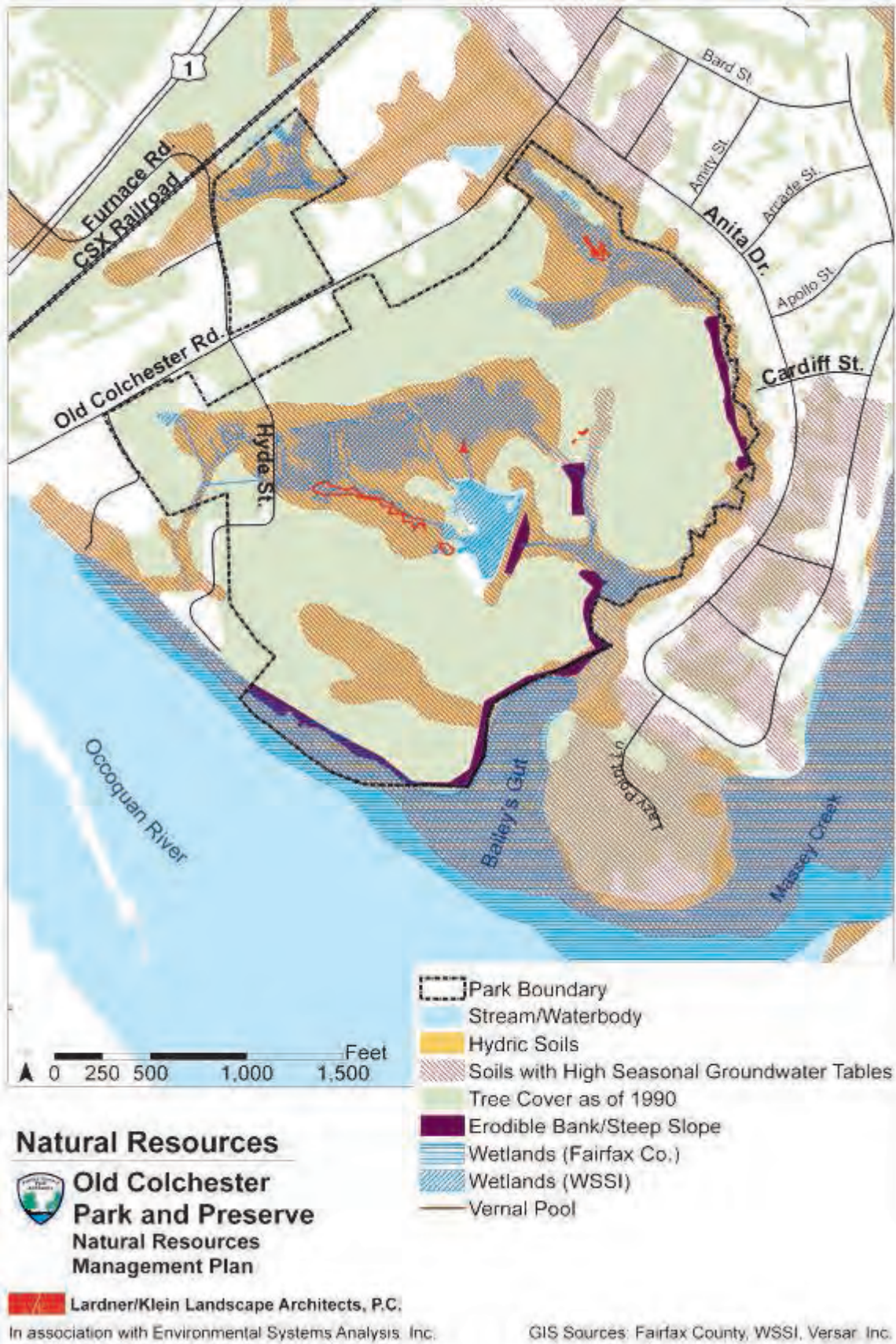


Figure 29: Natural Resources map



# SECTION III: MANAGEMENT ISSUES



*Figure 30: Natural Resource Management Plan project team field walk at Old Colchester Park and Preserve*

## Issues

Old Colchester Park and Preserve has significant natural resources that may be adversely affected by unauthorized human activity, a deer population that exceeds the park's capacity, and untreated non-native invasives (NNIs). The park's rich collection of cultural and natural resources, its location on the Occoquan River and proximity to future trail networks present issues that must be addressed in the development of the Natural Resources Management Plan (NRMP). Six broad issues are articulated in this section, with specific sub-items that relate to each of the six spelled out in more detail. Responses to the broad issues and the sub-items shape the management recommendations incorporated in Section IV.

## **Sensitive Natural Resources**

### **Issue 1. Identification and protection, through good management practices, of the sensitive natural resources found within Old Colchester Park and Preserve**

#### **1A. WETLANDS, TIDAL MARSH, POTENTIAL BOG COMMUNITY AND UNNAMED STREAM**

Old Colchester Park and Preserve contains tidal, nontidal wetlands and an array of forest cover types. Several of the vegetation communities are water related and may be threatened by land grading, drainage pattern shifts, soil compaction or trampling—particularly when the soils are saturated. A plant that is suspected to be the river bulrush (*Schoenoplectus fluviatilis*) was identified in the tidal marsh. If confirmed, it is a rare plant and may be threatened by NNIs brought to the site by hikers or from the soil being compacted or disturbed. Environmental Systems Analysis, Inc.’s (ESA) research established that new trail soils were denser than adjacent soils due to compaction. Compacted soils retard herbaceous vegetation from growing.

There is an opportunity to modify the dry basin using one or a combination of the recommended actions contained in the Versar, Inc. (Versar) report, enhancing a severely NNI infested vegetation community and providing additional habitat.

#### **1B. VERNAL POOLS**

Vernal pools are of additional concern. Six were mapped on site in spring 2011 (Versar). Two man-made vernal pools occur in the Northern Coastal Plain Mesic Mixed Hardwood Forest vegetation community. These pools have developed as topographic depressions within the old roadbed in the park and were made wider and deeper as vehicles traversed the road in wet weather. The ground is now over-compacted from the weight of automobiles and the expanded ruts occur along points in the roadbed that have a modest drainage area. Seasonal direct precipitation and sheet flow combine to allow enough water for the pools to be viable for the purpose of amphibian breeding. During ESA’s April 2011 vegetation assessment field work, fresh, newly-laid egg masses of spotted salamander (*Ambystoma maculatum*) were observed within both of the roadbed pools. The pools occur somewhat nearby both Forested and Herbaceous Nontidal Wetland communities. As herpetofauna species seasonally migrate to pools for the purpose of breeding, it is suspected that some herpetofauna may have opportunistically utilized the roadbed pools. Fortunately, these pools have been wet enough to allow for the viable maturation process. Being successful, the herpetofauna have now imprinted to these sites and the pools will continue to be used until some form of perturbation denies their use. If the roadbed is developed into a public trail, the herpetofaunas’ pools will be at risk and relocation of the roadbed pools should be considered. All the vernal pools should have some form of protection to ensure their drainage areas are not interrupted and that the herpetofaunas’ migration is not imperiled by site disturbances.

#### **1C. SHORELINE PROTECTION**

About 1,500 linear feet of the park is directly located on the Occoquan River, with additional frontage along Bailey’s Gut. The eastern edge of the park is bounded by an unnamed stream, wrapping from its mouth at the Occoquan to the intersection of Old Colchester Road and Anita Drive. The park’s shoreline is vulnerable to erosion from a variety of sources, including water traffic on the Occoquan River. Estimates indicate that this erosive vulnerability will be exacerbated by any rise in sea level. Additionally, as the park becomes more accessible to the general public, people naturally gravitate to the water, creating disturbance that could further damage the fragile banks and shoreline. Care will be needed to protect the shoreline and its fragile banks from further erosion.

The park has many attractants for visitors. Some of the most fragile sites are also the ones most attractive to visitors. It is important to plan wisely for how to accommodate interim users, prior to the development and implementation of the park master plan. Issues that must be addressed include how best to direct park users along the shoreline, how to keep users on the trails, how to site trails to avoid further compaction of the vulnerable soils, how to prevent the

disruption of sensitive cultural and natural resources and how to reduce the spread of NNIs.

Although the parkland was acquired for its natural and cultural resources, its location on the Occoquan River waterfront makes it vulnerable to the pressure and need for additional public waterfront access. If legal access is not provided, it is possible that uncontrolled access will be created, as it has been in the past. Fairfax County is growing in population, as is the surrounding metropolitan area. As time goes on, pressure may increase for water access, a resource that is rare and highly valued by the general public.

The stretch of the Occoquan River adjacent to the park is not known as a good fishing site. However, less experienced fishers may equate water with fishing and attempt to fish from the shore or marshlands. The banks are fragile, the massive hydrilla (*Hydrilla*) mat prevents easy access and the marshland itself is vulnerable to trampling and compaction. Any activity presents the potential for NNI infestation. The site cannot support fishing access from the bank or from a pier given the width and depth of the mudflat. Fishing can be done by boat, which may present additional pressure for boat and waterfront access at the park.

Bailey's Gut and the lower portion of the unnamed stream along the park's eastern edge is not easy to navigate by boat due to its narrow channel (a kayak or canoe would need to 'back out' as the channel is too narrow to turn a boat around) at all but very high tide. However, it appears to be navigable from shore and to be an attractive place to paddle.



Figure 31: Occoquan River

#### 1D. TERRESTRIAL VEGETATION COMMUNITIES

Vegetation communities found on steep slopes within the park are vulnerable to erosion and trampling. Other areas within the park are flat and not prone to erosion but are vulnerable to soil compaction that may periodically impound water. On the areas that are not steeply sloped, the natural community appears to tolerate some human use.

#### 1E. MANAGEMENT AND DEVELOPMENT OF ADJACENT PUBLIC PROPERTIES, COLLABORATION WITH OTHER PUBLIC AND NONPROFIT AGENCIES AND COORDINATION WITH OTHER RESEARCHERS

The Mason Neck peninsula is home to acres of publicly owned and managed lands. Although challenging, much value can come from coordinating management activities with other agencies and nonprofits. Similarly, coordinating research efforts, recreation access and water access can do much to enhance Old Colchester Park and Preserve and protect the sensitive resources of the park. Several properties adjacent to the park provide private, members only, access for boating on the Occoquan River.

## Human Activity

### **Issue 2. Elimination of unauthorized illegal and site-damaging activities**

#### **2A. UNAUTHORIZED SITE USE**

Until 2007, the property was held in private ownership. Site investigations reflect the continuation of activities that have been unauthorized since the Fairfax County Park Authority (Park Authority) took ownership of the property. Deer stands indicate ongoing poaching activities. Encroachments on property boundaries emanate from the backyards of the properties along Anita Drive where several footbridges cross the stream. A private driveway located on park property provides access to an occupied, private house located southeast of the park. Litter, dumping, graffiti on trees and old bird boxes located in park trees indicate other types of ongoing, unauthorized uses.

Unauthorized ATV vehicle use is a challenge for property managers. ATVs make use of the old road network and also go off-road across the park. ATV use damages the site, destroying trails, harming vegetation, compacting soils and creating erosion. Damage is greatest in the more remote areas of the park, with an active path connecting the northwest corner of the park to the waterfront.

#### **2B. UNSANCTIONED ACCESS POINTS**

Official access to the park is unclear and informal. The lack of formal, identified public access points has resulted in many unsanctioned and unauthorized access points. They include continued use of the former logging roads as foot and ATV paths and a myriad of trails, including neighbor constructed footbridges over the unnamed stream near the established residential subdivision to the north and east of the park. The existing trail network may conflict with cultural resource sites and sensitive natural resources. It will be a challenge to re-establish the native vegetation if

the ground is not de-compacted to mitigate the soil compaction attributable to foot and ATV traffic following removal of existing trails and access points.

The park also displays evidence of illegal and unsanctioned digs for artifacts, a concern given the recent archeological work being done on-site and the press attention given to their work and findings.



Elisabeth Lardner

*Figure 32: Unsanctioned access point from adjacent residential neighborhood*

## Deer

### **Issue 3.      *Reduction of the local deer population due to significant vegetative damage caused by deer browse.***

#### **3A.      EXCESSIVE DEER POPULATIONS IMPEDE FOREST REGENERATION, DESTROY UNDERSTORY AND CONTRIBUTE TO NNI SPREAD**

White-tailed deer (*Odocoileus virginianus*) population exceeds the capacity of the park to support it. One study indicated a deer density of 187 deer per square mile with a population of 40-45 deer in the park. (Lawlor, 2011). This number is significantly higher than the 15 deer per square mile that is considered to be sustainable for eastern forests.

Evidence of deer is apparent throughout the park. Vegetation shows significant signs of deer browse and large areas of the park have no discernible understory. Droppings are common as is deer-browsed greenbrier (*Smilax rotundifolia*) and a sparse shrub layer. People and deer appear to share the trails, as coppicing is very common along them. The carrying capacity of the park for deer has been exceeded, as it appears that hardwood seedlings are uncommon and deer may have changed the composition of the forest.

## Non-Native Invasive Plant Materials

### **Issue 4.      *Reduction and management of terrestrial and aquatic non-native invasives (NNIs) found within the park***

#### **4A.      THREAT TO PARK POSED BY NON-NATIVE INVASIVE PLANT SPECIES**

The spread of NNI species threatens the composition of native vegetation communities at Old Colchester Park and Preserve. NNIs are found within the park, both in terrestrial and aquatic environments. Unless site visitors as well as site workers are educated in best practices to minimize inadvertent introduction of any NNIs, inadvertent introduction and spread of NNIs may continue to plague the park.

Existing trails have created corridors that enhance the spread of NNIs. People and animals moving along the trail network can carry seeds and spores that introduce non-native species to the area as well as extending the range of existing NNIs. NNIs may also spread through deer browse beyond the trail network. In addition to the existing trail network, activities such as fishing, water access, cultural resource work and general access will likely increase the introduction and spread of NNIs at the site. Site researchers have already noted the spread of garlic mustard (*Allaria petiolata*) on new trails and near archaeological field sites. Japanese stiltgrass (*Microstegium vimineum*) has been observed along the dirt road network, volunteer foot trails and deer trails. Marsh dewflower (*Murdannia keisak*) has infested the dry basin.

Conversely, some NNIs may provide helpful services. One example is hydrilla. A known NNI, hydrilla greatly reduces water circulation, causes increased water temperatures and decreased oxygen levels that can harm or limit wildlife, and out-competes native submerged aquatic vegetation. It is also difficult, if not impossible, to eradicate. However, due to its growth habit which creates dense mats along the shoreline, hydrilla serves to buffer the park's shoreline from erosive wave action, protecting the fragile banks. Its presence also discourages the casual visitor who might cause damage to natural or cultural resources on the site. The complexity of the interrelationship of natural communities clearly indicates that the approach to addressing NNIs, therefore, must be based on a balanced, informed process.

#### **4B.      MONITORING NEEDED**

The reduction and eradication of NNIs is an ongoing task. Establishment of consistent monitoring methods, in conjunction with additional NNI surveys, will help to ensure the efficacy of the control efforts.

## Appropriate Integration of Passive Recreation and Interpretation with Natural Resource Site Conditions

### **Issue 5. Protection of the site's sensitive natural resources while addressing the demand for public access, passive recreational and interpretive use due to the park's attractive location and proximity to a large population center**

#### **5A. SENSITIVITY OF SITE TO HUMAN ACCESS**

Old Colchester Park and Preserve is located on the Occoquan River waterfront on the Mason Neck Peninsula. Rich in archeological resources, future trail networks and interpretive opportunities are likely to connect the site with others on Mason Neck and in the region. It is highly plausible that visitors will be drawn to the site in the future, for its waterfront and for its natural and cultural resources. The challenge is to manage the sensitive natural resources appropriately so that the increase in traffic does not harm them. ESA did an initial evaluation of the site for current human impact, as measured in 22 one-meter square plots. The criteria evaluated examined vegetative communities in terms of resource rarity, resource sensitivity and resource quality. It is likely that as visitation increases, ongoing monitoring will be needed to ensure that an increase in visitor count does not damage or harm the sensitive resources of the site.

Natural resources that should be protected from human impacts include a rare plant suspected to be on the site - river bulrush, and a rare natural community, Coastal Plain Depression Swamp and possibly other rare communities, to be determined by the Virginia Department of Conservation and Recreation/Natural Heritage Program (VANHP). Consideration should be given to limiting human uses to passive recreation, such as interpretive walks and bird watching, with limitations on group size to protect these natural resources.

One of the primary drivers of the park's unusual natural resources is the site's drainage pattern or hydrology. Land disturbance could have significant impacts on wetlands, including vernal pools, by causing erosion and siltation. Changes in hydrology may alter or destroy the function of these water resources. Removal of forestland may critically alter water flow to the wetlands, which provide an essential habitat for adult organisms that breed in vernal pools.



Elisabeth Lardner

Figure 33: Old Colchester Road, as it terminates in the Occoquan River

#### **5B. CULTURAL RESOURCE INVESTIGATIONS AND PROTECTION OF SENSITIVE NATURAL RESOURCE SITES**

Current cultural resource investigations have been concentrated within 100 feet of Old Colchester Road and along the ridgeline above the waterfront. In deference to sensitive natural resources, some areas that are likely to contain cultural resources have not been fully investigated, particularly the fragile banks along the Occoquan River. It is anticipated that there may be desire in the future for additional archaeological research or interpretation of cultural resources. Such activities can have

adverse effects on natural resources—disturbance of natural vegetation, introduction of NNIs, disruption of root zones—which generally conflict with the goal of the NRMP.

Disturbance of native vegetation can result in removing all ground and understory vegetation and impacting the root systems of mature trees. Soil disturbance will promote NNIs that can overtake the site, not only impacting natural resources, but making it difficult to see the ground and impeding future cultural resource investigation, management and interpretation. The process of reviewing potential land disturbance should include assessing what is there; devising a plan to avoid critical resources and minimize the impacts of the activity; and to restore the area once the activity is complete to include restoring topography and native vegetation and controlling NNIs.

#### 5C. SITE INTERPRETATION

The site is rich in potential storylines for natural resource interpretation and for joint story telling regarding the influence of the natural resources on the resulting culture – how the geography shaped the use of the land in the past. How those stories are told and presented in an integrated manner, sensitive to the site resources is critical. It is important to integrate the interpretive efforts with those of the Fairfax County Cultural Resources staff. There is an opportunity to take advantage of the cultural and the ecological story of the site. Stories can focus on the village along Old Colchester Road—why it was located where it was, why it no longer exists, etc.; the interplay of landscape, ecology and culture; the link to underlying geomorphic features, soils, geology and land use; the influence of high grade logging on-site (the removal of oak/hickory forest and its impact on-site from the remaining beech forest’s allelopathic characteristics, and shade tolerance), past logging decisions and the effect on the site from fire suppression; deer browse, etc.

#### 5D. NEIGHBORHOOD EDUCATION AND OUTREACH

Many of the users of the park are its immediate neighbors. Some are unaware that the property has become part of the Park Authority system and what a natural resource-based park means in terms of access and uses. There is a need to better educate neighbors as to the value of the park and as to the permitted activities allowed within the park. Much of the resource value of the park stems from its water-based habitat communities. Given that the park shares a stream valley along its border with an adjacent single-family neighborhood, education on the impact of ineffective fertilizer application, stream armoring and stormwater runoff is also needed. The goal of outreach to neighbors should include improving the understanding of park resources and gaining support for their management. Such support is critical to ensure that resources are protected while compatible park amenities meet the needs of the community.



Figure 34: View towards Belmont Bay, an old, abandoned barge in Occoquan River

## **Revise Approach Based Upon Monitoring and Site Experiences—Adaptive Management Practices**

### **Issue 6. Respond to changing site conditions and needs with adaptive management practices, as informed by additional data collection and ongoing site monitoring**

Adaptive management recognizes that management strategies that might have made sense, for one reason or another, did not work or conversely, worked exceedingly well. Any practices employed to manage Old Colchester Park and Preserve should be continually revisited and updated based upon site monitoring, new data collection and research findings.

## **Resource Protection Zones**

Zones establishing the level of natural resource sensitivity have been established for Old Colchester Park and Preserve from a compilation of the inventory and analysis work done on the site. Developed for this park specifically, this system of prioritization of the sensitivity of natural resources to human access and use may serve as a model for future analyses of other Park Authority sites.

### **Concept**

All areas within the park and its natural resources are not equally fragile or sensitive. The Resource Protection Zones (RPZ) provide park managers and planners a method to logically and defensibly identify and prioritize the site's natural resources and the appropriate level of public access and use related to those resources. Using the natural resource analysis and GIS mapping, all areas of the park are categorized by zones that reflect the inherent sensitivity of the natural resources. At the most basic level, land is classified as being within an Opportunity Area—typically including land area that is currently developed—or as a Resource Protection Zone—typically including all undeveloped land within the park. To further define the levels of natural resource sensitivity, the Resource Protection Zone contains three sub-sets—Level 1, Level 2, and Level 3 Resource Protection Zones. The three RPZ levels identify the need for protection and prioritize the degree of access and use each level can support. Level 1 is the most sensitive and vulnerable and Level 3 the most potentially able to support limited development. The Resource Protection Zones for Old Colchester Park and Preserve will be approved by the Fairfax County Park Authority Board when they are formalized in the master plan. The starting point for the identification of the RPZs for Old Colchester Park and Preserve is the natural resource mapping compilation as seen in Figure 29.

### **Resource Protection Zones**

*All undeveloped areas within the park boundary are considered to be within a Resource Protection Zone. Developed areas, such as houses, parking lots, athletic fields and driveways are excluded from the Resource Protection Zones.*

There are three levels of Resource Protection Zones. They collectively cover all of Old Colchester Park and Preserve, with the exception of the Opportunity Area—two single-family house sites, a driveway and a paved roadway known as Hyde Street. The street connects the marina outside of the park boundaries with Old Colchester Road, crossing through the park itself.



## Level 1 Resource Protection Zone (RPZ)

### NATURAL RESOURCES

*The Level 1 Resource Protection Zone incorporates areas with Rare, Threatened and Endangered (RTE) species or natural communities (State and Federal designations), as well as Regionally-rare species or natural communities (see definitions, page III:12), vernal pool depressions and 100-foot vernal pool envelopes and high quality streams and wetlands (see definitions, page III:13).*

Level 1 RPZ at Old Colchester Park and Preserve includes State designated rare natural communities (Coastal Plain Depression Swamp, Coastal Plain Acidic Seepage Swamp, Coastal Plain Floodplain Swamp, Tidal Freshwater Marsh), vernal pools and 100 foot buffers around vernal pools and wetlands, as shown in Figure 37.

### PUBLIC USE AND ACCESS LEVEL

No infrastructure development (including trails and boardwalks) is allowed within areas designated as a Level 1 RPZ. Human activity should be limited to only certain activities that may be authorized by the Fairfax County Natural Resource Management and Protection Branch, such as periodic interpretive walks, research and resource management.

In some locations, there are existing roads, trails or other man-made features within 100 feet of a vernal pool. In these situations, Natural Resource Management and Protection Branch staff, working with other County staff, potential outside experts and other critical stakeholders will evaluate the impacts of these features on the vernal pools and make appropriate management decisions and recommendations to mitigate any impacts.

## Level 2 Resource Protection Zone (RPZ)

### NATURAL RESOURCES

*The Level 2 Resource Protection Zone includes areas that contain sensitive species or natural communities and/or provide critical habitat or buffers and/or protect contributing hydrology. Of particular importance are landscape features and natural communities that contribute to the Level 1 RPZ. The vernal pool buffer, 100' - 750' from the pool envelope (see Vernal Pool Guidelines for more information, page II:14); steep slopes (as defined by the Fairfax County Public Facilities Manual); highly erodible soils (as identified by Fairfax County Soils data); and unique soil types such as hydric or diabase soils which may be predictors of existing or potential unique or highly sensitive resources. The Level 2 RPZ also includes natural communities of high quality that are more common, and rare natural communities that are of lesser quality. Most large forested blocks, typically 50 acres or more, should be considered highly sensitive. Adjacency to other protected forested blocks is to be factored into the assessment for placement in Level 2.*

Level 2 RPZ at Old Colchester Park and Preserve includes natural communities that are not state designated rare but are of high quality and together form a large, contiguous, forested block (Northern Coastal Plain Mesic Mixed Hardwood Forest, Acidic Oak-Hickory Forest, Coastal Plain Floodplain Forest, Forested Nontidal Wetland, Herbaceous Nontidal Wetland). Although many of these natural communities fall within the 750 ft. Critical Terrestrial Habitat area of the vernal pools buffer, a portion of the buffer area was reclassified as Level 3 due to degradation of the resources that comprised it. Steep slopes are included. The steep banks along the river contain highly erodible soils that cannot support trails. The Herbaceous Nontidal Wetland has been downgraded to this category due to the abundance of NNI species and long history of disturbance. The section of Forested Nontidal Wetland north of Old Colchester Road is included, though not connected to the rest of the preserve, as it retains high-quality status as a natural community and supports unusual plant species. (see Figure 37)

### PUBLIC USE AND ACCESS LEVEL

Public access should generally be limited within Level 2 RPZ. Any proposed development for park uses or facilities within a Level 2 RPZ must be approved by the Park Authority Board and, with such approval, be carefully designed

to minimize impacts to the site's natural resources. Trails and viewing stations may be appropriate, but a Level 2 RPZ may also be trail-less depending on site conditions. It is generally recommended that buffers of 100 feet around high quality streams and wetlands should be trail-less. Trails must be sited and built in accordance with Trail Location and Development Guidelines for Resource Protection Zones (see page III:14). Trail surface type and maintenance requirements should be evaluated with respect to the short- and long-term impact on the natural resources at the site. Trails may be closed and/or relocated if impacts to natural resources become apparent. No off-trail uses should be permitted other than those authorized by the Natural Resource Management and Protection Branch. Such uses include research, educational and stewardship activities and are generally of limited duration.

### **Level 3 Resource Protection Zone (RPZ)**

#### **NATURAL RESOURCES**

*The Level 3 Resource Protection Zone includes areas containing natural forest or meadow vegetation or water resources that provide a supportive ecosystem function (i.e. serve as buffers and corridors). These areas are generally covered with natural tree/forest or meadow vegetation that contain no known rare, threatened, endangered or sensitive species or natural communities and may have been negatively impacted by past or current land use. These areas are often restorable and contain valuable natural capital, protect water quality and air quality and provide habitat and corridors for wildlife. They buffer higher quality natural areas from human impacts and provide opportunities for interpretation without compromising higher quality areas.*

Level 3 RPZ at Old Colchester Park and Preserve includes the southern half of the parcel, located northwest of Old Colchester Road (south of the wetlands and stream including the Early Seral Pine-Hardwood Forest), the town site, and an area south of Old Colchester Road and east of Hyde Street (approximately 2.7 acres). All of these sites have low quality natural communities and/or high levels of disturbance.

#### **PUBLIC USE AND ACCESS LEVEL**

Level 3 RPZ could potentially support limited development, should development be deemed appropriate based on further site analysis, needs assessment and Park Authority Board decision. Such development could potentially include active and passive uses as well as parking areas, trailheads, trails and other facilities to support park usage. Trails must be sited and built carefully in accordance with Trail Location and Development Guidelines for Resource Protection Zones (see page III:14).

### **Opportunity Areas**

*Areas that are currently developed and do not contain unique or sensitive resources are defined as Opportunity Areas. Examples include developed areas, transition areas or landscaped areas. Uses in these areas are unrestricted by natural resources. Any proposed development within an Opportunity Area must be designed so as to not generate adverse impacts to adjacent Resource Protection Zones.*

Two single-family residential house parcels, a private driveway and the roadway corridor for Hyde Street are considered to be Opportunity Areas at Old Colchester Park and Preserve.

### **Creating the Map—Process for Mapping Opportunity Areas and Natural Resource Protection Zones (RPZ)**

**Step 1:** Identify developed lands within the property as Opportunity Areas. All remaining area is considered to be a part of a Resource Protection Zone.

**Step 2:** Identify areas within the designated Resource Protection Zone that fit the definition of Level 1, Level 2 and Level 3 and map each data layer as assigned by each Level's definition.

**Step 3:** Based on expert opinion, adjust the mapping to reflect the condition of the resource on site. Modify the Levels assigned to that resource by definition to reflect the actual condition of the natural resource.

**Step 4:** Write a brief justification for each change as determined by expert opinion.

*Example: There may be a portion of a rare natural community that is highly disturbed, warranting reclassification from Level 1 to Level 2.*

**Step 5:** Once investigations have been completed to determine if and where development for support uses could occur, and if the use is approved, the Resource Protection Zone map for the park will be amended to redraw the Level 3 zone to exclude the developed areas.

## **Mapping Levels for Old Colchester Park and Preserve's Opportunity Area and Resource Protection Zone**

**Step 1:** After excluding the developed areas within the park—the Opportunity Area, all lands currently undeveloped within the park boundaries were assigned to the Resource Protection Zone category. (see Figure 35) GIS data layers were applied to the RPZ area for the resources listed below.

- *Wetlands (Fairfax County and Wetland Studies and Solutions, Inc. (WSSI))*
- *Vegetation/Natural Communities*
- *Vernal Pools (Versar)*
- *Vernal Pools 100 foot buffer*
- *Erodible Banks/Steep Slopes*

**Step 2:** Areas that fit the definitions for Level 1 and Level 2 were identified and each data layer was mapped. (see Figure 36)

- *All GIS resource layers included in Step 1, as categorized by Level of Resource Sensitivity*
  - *Level 1 RPZ to include in initial GIS layers*
    - *Wetlands (Fairfax County and WSSI)*
    - *Vernal Pools (including 100' buffer)*
    - *Coastal Plain Depression Swamp Vegetation/Natural Community*
    - *Coastal Plain Acidic Seepage Swamp Vegetation/Natural Community*
    - *Tidal Freshwater Marsh Vegetation/Natural Community*
    - *Coastal Plain Floodplain Swamp Vegetation/Natural Community*
    - *Herbaceous Nontidal Wetland Vegetation/Natural Community*
  - *Level 2 RPZ, to include in initial GIS layers*
    - *Vernal Pool buffer of 100-750 feet*
    - *Northern Coastal Plain Mesic Mixed Hardwood Forest Vegetation/Natural Community*
    - *Acidic Oak-Hickory Forest Vegetation/Natural Community*
    - *Coastal Plain Floodplain Forest Vegetation/Natural Community*

- *Forested Nontidal Wetland Vegetation/Natural Community*
- *Early Seral Pine-Hardwood Forest Vegetation/Natural Community*
- *Erodible Bank/Steep Slopes*
- *Hydric Soils*
- ***Level 3 RPZ, to include in initial GIS layers***
  - *No layers*

**Step 3:** Based on expert opinion, mapping was adjusted to reflect the condition of the resource; and the assigned Levels were modified to reflect the on-site conditions. (see Figure 37)

- ***Expert and on-site assessment of quality of resources moved some to a different Level of Resource Sensitivity***
  - ***Wetlands mapped by WSSI in Forested Nontidal Wetland and Herbaceous Nontidal Wetland reclassified as Level 2***
  - ***Park property northwest of Old Colchester Road, south of the intermittent stream and wetlands (Early Seral Pine Hardwood Forest) reclassified as Level 3***
  - ***Park property south of Old Colchester Road and east of Hyde Street (approx. 2.7 acres) reclassified as Level 3***
  - ***Park property at the site of archeological investigation of the Colchester town site reclassified as Level 3***

## **Definitions as Related to Resource Protection Zones**

### **RARE, THREATENED AND ENDANGERED SPECIES OR NATURAL COMMUNITIES**

This category includes those species afforded legal protection under State and Federal statutes, as well as rare species and rare natural communities listed and tracked by the Virginia Natural Heritage Program.

- 1) Federal listing is designated by the U.S. Fish and Wildlife Service. Federally listed Endangered and Threatened species are protected under the provisions of the Endangered Species Act of 1973, as amended through the 100<sup>th</sup> Congress.

Endangered- A taxon “which is in danger of extinction throughout all or a significant portion of its range” (Endangered Species Act, Sect. 3).

Threatened- A taxon “which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (Endangered Species Act, Sect. 3).

- 2) State listing is determined by the Virginia Department of Game and Inland Fisheries (for all animals except insects; **Section 29.1-563 – 570, Code of Virginia**) and the Virginia Department of Agriculture and Consumer Services (for plants and insects; Virginia Endangered Plant and Insect Act Section 3.1-1020 through 1030, **Code of Virginia**, as amended). An informal list of “Special Concern” species has also been developed by the Virginia Department of Game and Inland Fisheries.

Endangered is a species that is in danger of extinction throughout all or a significant portion of its range.

Threatened is defined as a species that is likely to become endangered within the foreseeable future.

Special Concern are animals that merit special concern according to the Virginia Department of Game and Inland Fisheries. This category has no legal protection.

- 3) The Virginia Department of Conservation and Recreation's Division of Natural Heritage (DCR-DNH) identifies Natural Heritage Resources in Virginia that are in need of conservation attention. Natural Heritage Resources are defined in the Virginia Natural Area Preserves Act of 1989 (Section 10.1-209 through 217, Code of Virginia), as the habitat of rare, threatened, and endangered plant and animal species; exemplary natural communities, habitats, and ecosystems; and other natural features of the Commonwealth. To achieve this protection, DCR-DNH maintains lists of the most significant elements of our natural diversity.

The Virginia Rare Animal List contains information on the legal and biological status of Virginia's rarest known native animals, including vertebrates, insects, and selected other invertebrate groups. This list includes those species that are believed to be sufficiently rare or threatened to merit an inventory of their status and locations. All animals which are officially protected by federal or state endangered species acts are included in these lists. Animals identified as vulnerable (G3 or S3), imperiled (G2 or S2) or critically imperiled (G1 or S1) will be in a Level 1 RPZ.

The Virginia Rare Plant Lists contains information on the legal and biological status of Virginia's rarest known native plants, including vascular and non-vascular plants. The Rare Vascular Plant List contains information on the legal and biological status of Virginia's rarest known native vascular plant taxa, 609 in all. This list includes all plants believed to be sufficiently rare or threatened to merit an inventory of their status and locations. The Rare Non-Vascular Plant List contains information on the legal and biological status of 46 taxa thought to be rare in the state of Virginia. All plants which are officially protected by federal or state endangered species acts are included in these lists. Plants identified as vulnerable (G3 or S3), imperiled (G2 or S2) or critically imperiled (G1 or S1) will be in a Level 1 RPZ.

Natural Communities of Virginia are not grouped onto a rare list, but their rarity can be evaluated based on the Global and State rarity ranks (G-ranks and S-ranks) assigned to them through the Virginia Natural Heritage Program and their affiliated partner organizations, including Natureserve and the U.S. Fish and Wildlife Service.

Natural Communities identified as vulnerable (G3 or S3), imperiled (G2 or S2) or critically imperiled (G1 or S1) will be in a Level 1 RPZ.

#### **REGIONALLY RARE SPECIES OR NATURAL COMMUNITIES**

Naturally occurring species, communities or associations of organisms that although not state, federally or globally rare, are uncommon or rare within our region and/or Fairfax County. Such occurrences are often indicative of good ecosystem health, unique soils and other factors that are important to protect genetic variation and long-term viability of species across their range, support dependent species and biological diversity, and often provide the foundation for restoration of the resource or surrounding similar systems with suitable characteristics.

#### **HIGH QUALITY FOREST**

A diverse, stable native plant community with intact soils, high species diversity, good age class diversity and/or recruitment and intact ecosystem functions. In addition, the highest value for these systems should be placed on those that are large (50+ acres), intact, contiguous with other undeveloped parcels, have low NNI occurrence, low deer browse levels, that support rare or sensitive species or communities and/or contain a diversity of landforms (e.g. a landscape mosaic with upland, adjacent side slopes and floodplain).

#### **HIGH QUALITY STREAMS**

High-Quality streams are defined as stream reaches ranked as Excellent under the Fairfax County Stream Physical Assessment. In the event that Park Authority staff encounter a stream reach not already ranked as Excellent but that staff feels merits ranking and preservation under RPZ Level 1 as a high-quality stream, they will work with staff from Fairfax County Department of Public Works and Environmental Services (DPWES) Stormwater to evaluate the

reach and reassess its condition. Evaluation of stream condition will be done in cooperation with Stormwater staff and in accordance with the Fairfax County stream assessment program which measures biological, chemical and physical stream properties as described in the US EPA publication *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish—Second Edition*.

#### **HIGH QUALITY NATURAL COMMUNITIES**

A diverse, stable native plant community with intact soils, high species diversity, good age class diversity and/or recruitment and intact ecosystem functions. In addition, the highest value for these systems should be placed on those that are large (50+ acres), intact, contiguous with other undeveloped protected parcels, have low NNI occurrence, low deer browse levels, that support rare or sensitive species or communities and/or contain a diversity of landforms (e.g. a landscape mosaic with upland, adjacent side slopes and floodplain).

#### **VERNAL POOLS**

Vernal pools are seasonal bodies of water that attain maximum depths in spring or fall, and lack permanent surface water connections with other wetlands or water bodies. Pools fill with snowmelt or runoff in the spring, although some may be fed primarily by groundwater sources. The duration of surface flooding, known as the hydroperiod, varies depending upon the pool and the year; vernal pool hydroperiods range along a continuum from less than 30 days to more than one year (Semlitsch, 2000). Pools are generally small in size (< 2 acres), with the extent of vegetation varying widely. They lack established fish populations, usually as a result of periodic drying, and support communities dominated by animals adapted to living in temporary, fishless pools. In the region, they provide essential breeding habitat for one or more wildlife species including ambystomatid salamanders (*Ambystoma spp.*, called “mole salamanders” because they live in burrows), wood frogs (*Rana sylvatica*), and fairy shrimp (*Eubranchipus spp.*). (Calhoun and Klemens, 2002)

#### **TRAIL LOCATION AND DEVELOPMENT GUIDELINES FOR RESOURCE PROTECTION ZONES**

- In order to preserve interior forest functions, prevent the introduction of NNI species, minimize soil compaction and erosion and damage to natural vegetation, trails should generally be located to the exterior of forest blocks, along existing disturbed edges and rights-of-way, allowing for sinuosity to build and maintain sustainable trails that meet the intended user service levels.
- Trail project evaluation and development must adhere to the Park Authority trail project evaluation criteria set forth in the Trail Development Strategy Plan. In particular, projects must be evaluated for a) technical challenges such as steep slopes, flooding potential, etc., b) environmental impacts, c) sustainability, and d) maintenance unit cost. The latter two criteria are greatly impacted by surface type, location and site conditions. Trails are scored on a total of eight criteria in order to prioritize proposed projects. Trails that would have high resource impacts, present technical challenges, and would be difficult and expensive to maintain would general receive low scores and be ranked with a lower priority.
- Trail alignments need to be walked with Park Authority Natural Resource Management and Protection staff and Park Authority Cultural Resource Management and Protection staff to avoid impacts to sensitive resources.
- Trails must avoid interrupting natural hydrology (both surface and subsurface) especially that which contributes to wetlands and vernal pools. In general, no trails will be located within 100 feet of a vernal pool (the Vernal Pool Envelope) or the same sized—100 feet– buffer depth for high quality streams and wetlands.
- Trail surfaces should be compatible with the site conditions and resource needs. Although paved trails may be more sustainable over time, they may also cause much greater impact to install and are more likely to impact hydrology due to soil compaction, undercutting and trail base construction. They are also generally wider than natural surface trails. However, paved trails may be very appropriate in some conditions. In general, trail surfaces should be appropriate to meet the intended user needs, but their locations,

characteristics, construction and maintenance requirements should not negatively impact sensitive resources or hydrology.

- If a trail is proposed within the Critical Terrestrial Habitat area of a vernal pool (100-750 ft. from the edge of the pool) additional criteria apply. See Vernal Pool Guidelines (page II:14).
- The trail construction footprint and maintenance requirements must be considered when evaluating impacts of a proposed new, relocated or renovated trail. For instance, the construction clearing limits, bridge lay-down areas and stockpile and staging areas must be accounted for in proposed project limits and restoration. Trails should be designed and maintained to be sustainable in the accordance with best practices. Access for trail maintenance and hazard tree removal along public trails is also critical. Questions that should be addressed prior to making a decision include: is there a need for vehicular access for some maintenance chores? What types/sizes of vehicles are necessary? In addition, there should be no application of chemicals to trail surfaces for deicing and other needs that could cause harm to wetlands, surface waters, soils, vegetation or animals.



Vegetation Communities Key

- 1 Northern Coastal Plain Mesic Mixed Hardwood Forest
- 2 Acidic Oak-Hickory Forest
- 3 Coastal Plain Floodplain Forest
- 4 Coastal Plain Depression Swamp
- 5 Coastal Plain Acidic Seepage Swamp
- 6 Tidal Freshwater Marsh
- 7 Coastal Plain Floodplain Swamp
- 8 Forested Nontidal Wetland
- 9 Early Seral Pine-Hardwood Forest
- 10 Herbaceous Nontidal Wetland

- ▭ Park Boundary
- ▭ Resource Protection Zone
- ▭ Stream/Waterbody
- ▭ Wetlands (Fairfax Co.)
- ▭ Wetlands (WSSI)
- ▭ Vernal Pool
- ▭ Vernal Pool 100' buffer
- ▭ Erodible Bank/Steep Slope
- ▭ Critical Terrestrial Habitat

Resource Protection Zones: Step 1

**Old Colchester Park and Preserve**  
 Natural Resources Management Plan  
 Lardner/Klein Landscape Architects, P.C.  
 In association with Environmental Systems Analysis, Inc.



GIS Sources: Fairfax County, WSSI, Versar, Inc

Figure 35: Resource Protection Zone: Step 1



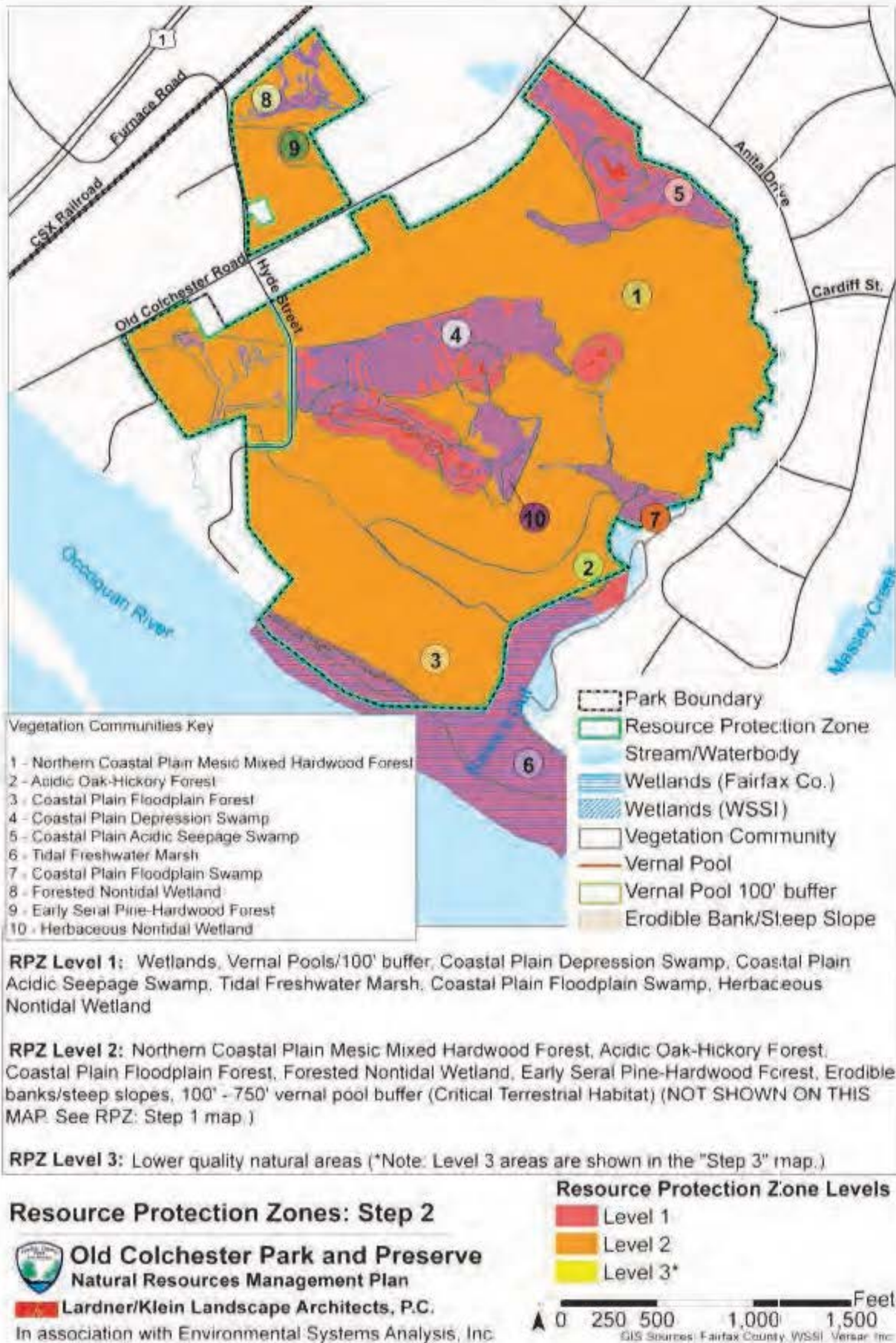
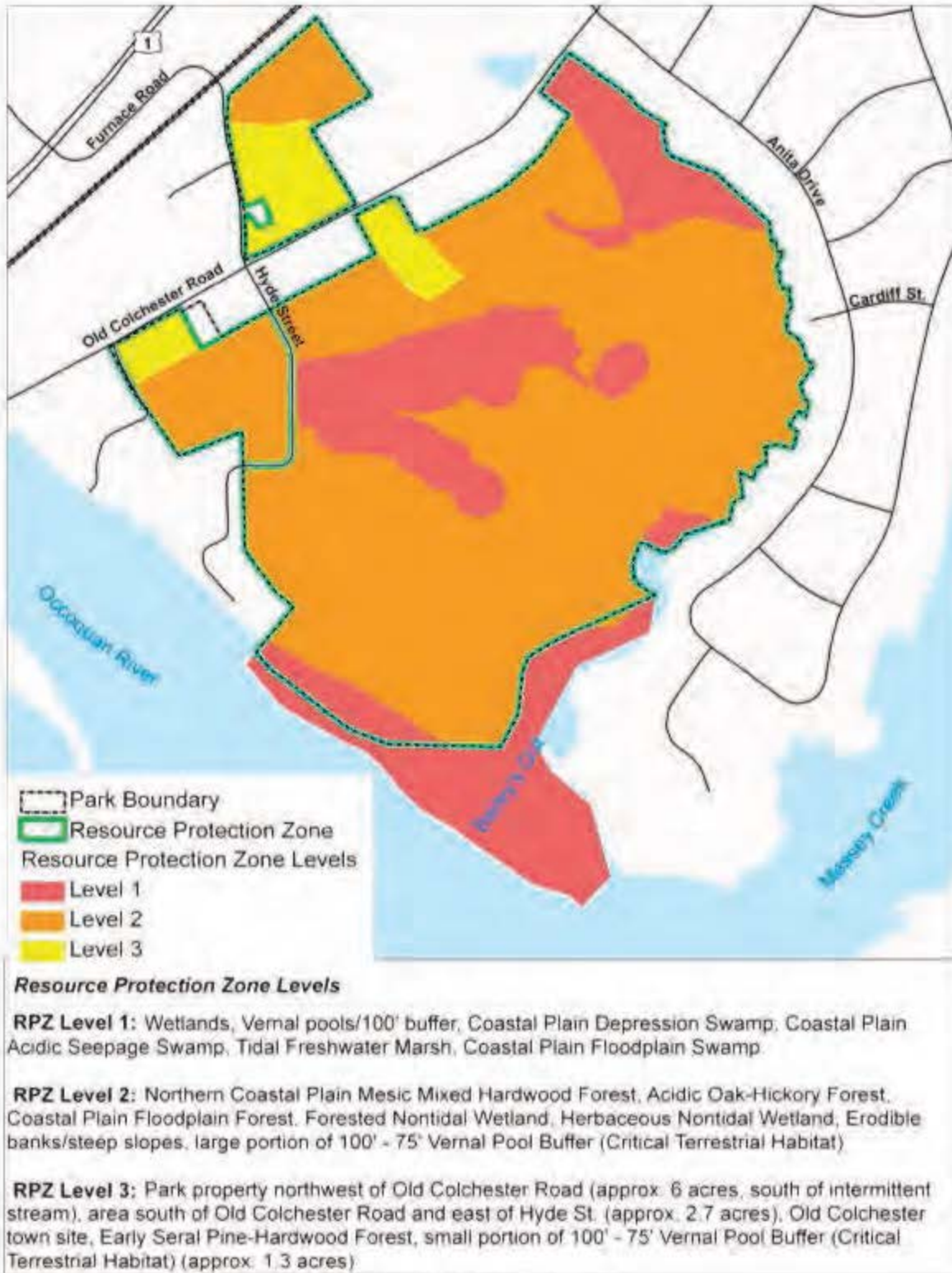


Figure 36: Resource Protection Zone: Step 2

Lardner/Klein Landscape Architects, P.C  
 in association with ESA, Inc.



**Resource Protection Zones: Step 3 Adjustments**



**Old Colchester Park and Preserve**  
**Natural Resources Management Plan**

**Lardner/Klein Landscape Architects, P.C.**  
 In association with Environmental Systems Analysis, Inc.



GIS Sources: Fairfax County, WSS: Versar, Inc.

Figure 37: Resource Protection Zones

# SECTION IV: MANAGEMENT GOAL AND OBJECTIVES



Elisabeth Lardner

Figure 38: Tidal Freshwater Marsh

Through the investigation of site conditions, identification of site issues and the formulation of a methodology to identify the most sensitive natural resource lands at the park, a set of six objectives were developed in support of the overall goal to *Preserve and Protect the Natural Resources of Old Colchester Park and Preserve*. These six objectives are supported by a series of strategies and actions, breaking recommendations for the stewardship of the park into manageable and achievable pieces. Section IV identifies these, and provides additional detailed

information in support Preserve's Natural Resource Management Plan (NRMP). A more succinct listing of strategies and actions is included in Section V. A full listing, in an interactive format, is included as Appendix H.

## Goal

### *Preserve and Protect the Natural Resources at Old Colchester Park and Preserve*

## Objectives, Strategies and Actions

### Objective 1

#### *Protect and Manage Sensitive Natural Resources in the Park*

##### Strategy 1A. Protect and Enhance Wetlands, Tidal Marsh, Potential Bog Community and Unnamed Stream

- Action 1a.1:** Monitor sensitive water resources (wetlands to include vernal pools and seeps) on a 2-5 year cycle and manage wetland communities for hydrology, vegetative community health and associated faunal associations as appropriate.
- Action 1a.2:** Confirm suspected species such as the river bulrush (*Schoenoplectus fluviatilis*) in the Tidal Freshwater Marsh.
- Action 1a.3:** Manage the Tidal Freshwater Marsh for dependent species such as river bulrush by using aerial imagery and on-the-ground monitoring to track expansion or shrinkage of dependent species community size, with periodic monitoring for quality and abundance of rare plant populations.
- Action 1a.4:** Retain the submerged aquatic vegetation (SAV) bed, even if the dominant species becomes hydrilla (*Hydrilla verticillata*), because of the erosion-control and fish habitat benefits the Tidal Freshwater Aquatic Bed provides. Eliminating hydrilla is often difficult and is not a high priority within the constraints of non-native invasives (NNIs) treatment throughout the park.
- Action 1a.5:** Work with Fairfax County's Department of Public Works and Environmental Services (DPWES) and Virginia Department of Game and Inland Fisheries (VDGIF) to periodically conduct biological monitoring of the stream and tidal areas, especially looking at fish and macroinvertebrate populations as measures of health as was done in the 2011 water resources assessment completed by Versar, Inc. (Versar).
- Action 1a.6:** Complete further field studies on the potential bog community located at the toe of the slope below the Old Colchester town site; based upon the results consider its restoration and in cooperation with the Virginia Department of Conservation and Recreation's (DCR) Natural Heritage Program and others.
- Action 1a.7:** Restore the hydrology in the wetland west of Hyde Street by installing check dams within the existing ditches to intentionally back up seasonal ground and surface water.
- Action 1a.8:** In conjunction with DPWES, treat run-off from Furnace Road for volume and water quality prior to its entering the park. The Forested Nontidal Wetland community northwest of Old Colchester Road is impacted by this run-off.

- Action 1a.9:** Work with DPWES Stormwater Division to improve the condition or to restore the unnamed stream located on the park's eastern boundary. Follow recommendations presented in the Fairfax County Lower Occoquan Watershed Plan and the Fairfax County Stream Protection Strategy to restore the upper stream reach, the incised portion of the stream, to reduce the bed and bank erosion and to restore the connection between the stream and its floodplain. Enhancement and restoration efforts would likely be led by DPWES and may encompass a wide range of projects over time to possibly include the following: plant native species to improve the stability of stream banks, water quality and wildlife habitat; stabilize lower reach to reduce sedimentation in Coastal Floodplain Swamp and Tidal Freshwater Marsh; explore restoration of incised stream portions as recommended in county stream assessments. (Note: Stream bank revegetation may occur naturally if human activities are controlled and white-tailed deer population levels are lowered to the ecological carrying capacity.)
- Action 1a.10:** Restore the dry basin (former stormwater basin pond) to its historical extent, with slight modifications, by making use of a water control structure with boards that can be easily and simply manipulated to adjust water levels as recommended in the 2011 water resources assessment completed by Versar, Inc. Until restoration of the dry basin takes place, inspect the dam, outfall and emergency spillway and correct the safety hazard of the at-grade barrel riser. Rebuild the trash rack and lip opening.
- Action 1a.11:** Encourage DPWES to incorporate low impact development (LID) retrofits throughout the drainage area to slow down the flow and reduce the volume entering the stream.

**Strategy 1B. Protect and Manage Vernal Pools and Dependent Species**

- Action 1b.1:** Consult with vernal pool experts to evaluate the existing pools (condition, breeding populations, number, size and location of pools, etc.) and make management recommendations. In particular, specific recommendations are needed for the management of the pools along old road beds to include whether and how any should be expanded or relocated, new pools created, how to manage trails, interpretive recommendations, etc.
- Action 1b.2:** Document vernal pools and monitor them in accordance with guidelines developed by the Massachusetts Natural Heritage and Endangered Species Program and Virginia's Vernal Pools in consultation with VDGIF and DCR's Natural Heritage Program. Include monitoring and managing contributing terrestrial habitat, contributing drainage areas and ensuring access to pools for breeding for dependent species of breeding adults and juveniles such as the spotted turtle (*Clemmys guttata*), spotted and marbled salamanders (*Ambystoma maculatum* and *A. opacum* respectively), frogs and toads.
- Action 1b.3:** Conduct a survey in 2012 (and subsequent years) to further define and monitor breeding species and populations over time. Surveys may be conducted by Fairfax County Park Authority (Park Authority) staff, contractors or volunteers through the Virginia Herpetological Society. Although full surveys may not be conducted every year, as a minimum in non-survey years pools should be checked for the presence/absence of breeding organisms, presence of suitable water depths, etc.

**Strategy 1C. Protect the Shoreline**

- Action 1c.1:** Walk the shoreline at least twice a year to monitor and check conditions related to sea level rise/ climate change impacts, erosion, illegal access, NNIs, etc.
- Action 1c.2:** Prohibit marine recreation access from the park's shoreline.
- Action 1c.3:** Prohibit on shore fishing and erect no fishing (other than by boat) signs at park entry.

**Action 1c.4:** Prohibit boat access from current property shoreline.

**Strategy 1D. Protect and Enhance Terrestrial Vegetation Communities**

- Action 1d.1:** Use prescribed burns, allow natural occurring fires when feasible, employ sustainable forestry practices and other appropriate methods to manage forest lands to protect and enhance sensitive or unique species/communities and to promote biological diversity and the health of vegetative communities while re-establishing a natural disturbance pattern.
- Action 1d.2:** Document, monitor and periodically provide updates on rare species/communities to the Virginia Department of Conservation/Virginia Natural Heritage Program (DCR/VNHP).
- Action 1d.3:** Restore the buffer on the northern side of the Coastal Plain Depression Swamp, a state rare natural community, by promoting the growth of native tree and shrub species and removing invasive, non-native species.
- Action 1d.4:** Monitor the park, and in particular the Coastal Plain Floodplain Forest, Coastal Plain Acidic Seepage Swamp, Forested Nontidal Wetland and the Coastal Plain Floodplain Swamp natural communities for the emerald ash borer (*Agrilus planipennis*). The Coastal Plain Floodplain Forest and the Coastal Plain Floodplain Swamp has a population of both pumpkin ash (*Fraxinus profunda*) and green ash (*Fraxinus pennsylvanica*). If the ash borer cannot be controlled, remove the ash trees and replant with other native vegetation.
- Action 1d.5:** Develop a monitoring plan to monitor changes in species or natural communities over time.
- Action 1d.6:** Identify the orchid species within the Coastal Plain Acidic Seepage Swamp natural community, as they may be rare.
- Action 1d.7:** Positively identify the orchids in the Forested Nontidal Wetland community northwest of Old Colchester Road. Tentative identification is that the orchid is a pink lady slipper (*Cypripedium acaule*) which is not a state rare species.
- Action 1d.8:** Restore the forest between the private parcels along Old Colchester Road and the Coastal Plain Depression Swamp in order to improve the buffer of that community, prevent non-native plant invasions and protect the hydrology.
- Action 1d.9:** Monitor the Coastal Plain Floodplain Forest for the presence of osprey (*Pandion haliaetus*), consult with the Audubon Society of Northern Virginia and the U.S. Fish & Wildlife Service for recommendations regarding necessary buffers around the osprey nest during breeding season and before the chicks fledge (approximately mid-March to mid-July).
- Action 1d.10:** Evaluate habitat benefits of enhancing canopy cover over Hyde Street to improve conditions for Forest Interior Dwelling Species (FIDS) in particular and to help to shade out NNIs that could negatively impact globally rare Coastal Plain Depression Swamp and other surrounding forest community types.
- Action 1d.11:** Consider girdling a few select beech trees in the Northern Coastal Plain Mesic Mixed Hardwood Forest to promote light-gaps that could favor other suppressed hardwoods, thereby diversifying the stand, providing snag habitat and bringing the stand into a more balanced, natural character.
- Action 1d.12:** Monitor natural communities for disease. Remove dying or stressed trees, such as the older Virginia pine (*Pinus virginiana*) from the Early Seral Pine - Hardwood Forest as they have been known to become vectors of disease or insect infestations, even on non-target species. Removal of

diseased or dying trees will help to reduce or eliminate the potential for attracting stressors to the forest.

**Strategy 1E. Work with Adjacent Properties, Collaborate with other Public and Nonprofit Agencies and Coordinate with other Researchers**

- Action 1e.1:** Participate in larger monitoring efforts across Mason Neck, County, region, etc. to support broader conservation efforts and goals.
- Action 1e.2:** Become familiar with goals and membership of the Mason Neck Land Managers Group, '*a partnership among all public land management agencies on the Mason Neck Peninsula designed to achieve habitat and public use management objectives that benefit public lands*'.
- Action 1e.3:** Share the Colchester NRMP with local land managers.
- Action 1e.4:** Work with researchers, educators and volunteers to collect resource information and to monitor site to include continued collaboration for bird, butterfly, odonate and herpetofauna surveys.
- Action 1e.5:** Continue to coordinate with state agencies (particularly VDGIF) for the management of tidal marsh where Bailey's Gut meets the Occoquan River.
- Action 1e.6:** Continue to coordinate with state agencies (particularly DCR/VNHP) for the identification and management of biological resources.

## Objective 2

*Reduce and Eliminate Human Activities that Adversely Affect Sensitive Resources in the Park*

**Strategy 2A. Eliminate Unauthorized Site Use**

- Action 2a.1:** Monitor the park to establish staff presence and reduce litter, dumping, relic hunting and other illegal activities; perimeter and entrance points can be observed every two weeks when trash or mowing cycle is performed in vicinity.
- Action 2a.2:** Place signs at all entries restating that unauthorized ATV use is illegal and patrol to enforce ban.
- Action 2a.3:** Address ongoing deer poaching in conjunction with appropriate County, State and Federal agencies to ensure park visitor's safety.

**Strategy 2B. Designate Clear Access Points and Eliminate Unsanctioned Access Points**

- Action 2b.1:** Monitor and enforce rules regarding boundary infringement, including illegal dumping and damage to resources (e.g. chopping trees, algae blooms due to possible septic failure, tree graffiti, etc.), enlist other County and Federal agencies as needed.
- Action 2b.2:** Ensure that formal entry points are established in the Master Planning process.
- Action 2b.3:** Remove encroachment entries (illegal footbridges) into park and consolidate into single, sanctioned and signed/marked entrance at Cardiff Street to be shared by neighbors.
- Action 2b.4:** Once undesired entry points and trails are removed, restore ground by decompacting soil and adding organic material to former entry points.

### **Objective 3**

#### ***Reduce the Deer Population in the Park***

##### **Strategy 3A. Reduce the Deer Population to Less Than 15 per Square Mile**

- Action 3a.1:** Participate in the County's deer management program.
- Action 3a.2:** Consider contracting out population reductions and/or leasing the property for hunts.
- Action 3a.3:** Monitor population levels and impacts as needed including assessing deer browse through the use of camera surveys and other population survey methods and continued use of the browse impact assessment protocol implemented on site in 2010-2011.
- Action 3a.4:** Use vegetative monitoring results and health (e.g. browse levels and regeneration) to drive and measure success of deer management efforts.
- Action 3a.5:** Consider developing a deer management plan for the Mason Neck Peninsula in conjunction with adjacent land owners and property managers, under the umbrella of Fairfax County's deer management program.

### **Objective 4**

#### ***Reduce Non-Native Invasives (NNIs) Plant Species in the Park***

##### **Strategy 4A. Continue to Control Non-native Invasive Plants Throughout the Park**

- Action 4a.1:** Manage non-native invasive plants through contracted removal throughout the entire park, if funds are limited, use the Fairfax County Non-Native Invasive Plant Site Prioritization Protocol (NNIAP) scores to prioritize treatment areas.
- Action 4a.2:** Train cultural resource workers in best practices to minimize NNIs spread, recognizing that cultural resource practices expose site, clear vegetation, disturbs soil and creates trails linking sites that also can serve as corridors for NNIs expansion.
- Action 4a.3:** Control aquatic NNI plant species to include marsh dewflower (*Murdannia keisak*) in the Freshwater Tidal Marsh and former storm pond.

##### **Strategy 4B. Monitor Management Actions Related to Non-native Invasive Plants Throughout the Park**

- Action 4b.1:** Monitor site annually to guide and adjust the NNI treatment plan.
- Action 4b.2:** Continue site monitoring by conducting a NNI survey every three years (in conjunction with NNIAP) to determine existing coverage, change over time, effectiveness of control efforts and to help guide future control efforts.
- Action 4b.3:** Monitor natural regeneration of native plants following NNI treatment. If needed, plant or seed native plants.



## **Objective 5**

### *Integrate Passive Recreation Development and Interpretive Activities while Preserving and Protecting the Sensitive Natural Resources in the Park*

#### **Strategy 5A. Enforce and Conform with NRMP Recommendations Related to Resource Protection Zones and Opportunity Areas**

- Action 5a.1:** Locate use activities within appropriate Resource Protection Zone (RPZ) Level.
- Action 5a.2:** Periodically update site mapping and RPZ categorization (location of vernal pools, streams, etc.) as further investigations and information suggest.

#### **Strategy 5B. Minimize Impacts from Development and Archeology Activities**

- Action 5b.1:** Monitor compliance with principles that guide site development and restoration (see Appendix G).
- Action 5b.2:** Ensure that any activities on site include additional funds and an expanded timeline to effectively address additional resource assessment and mitigation.
- Action 5b.3:** Ensure that any projects on site include additional funds and an expanded timeline to effectively address non-native invasive plant species control pre- and post-construction.

#### **Strategy 5C. Develop an Interpretation Plan for the Site that Combines Interpretation of Natural and Cultural Resources**

- Action 5c.1:** Develop an interpretive story that combines the cultural and ecological story of the site, its past land uses and their influences on the natural communities found on the site.
- Action 5c.2:** Create natural resource based interpretive signs to interpret the resources on the site.

#### **Strategy 5D. Educate the Public and Adjacent Neighbors as to Site's Natural Resource Value**

- Action 5d.1:** Educate adjacent private landowners, neighbors and general public as to ownership and role of the park as a natural resource based site.
- Action 5d.2:** Minimize the spread of NNIs from site visitors by adding signs and boot washing stations as necessary.
- Action 5d.3:** Educate neighbors on the negative effects of stormwater runoff on sensitive resources; the need to minimize nutrient excess sources through proper septic management; the reduction in use or more appropriate timing of fertilizer application; and the natural dynamic of streams and the negative impact of armoring stream bank at residential property.

## **Objective 6**

### *Practice Adaptive Management Approach and Process*

#### **Strategy 6a. Continually Reassess and Revise Management Approach, based upon Site Findings and Monitoring Results**

- Action 6a.1:** Revise approach to management practices based upon site monitoring and evaluation and changes in science and best practices.

**Action 6a.2:** Adjust site management over time to respond to episodic events such as large storms and floods, and long-term change such as sea level rise.

# SECTION V: IMPLEMENTATION



Elisabeth Lardner

Figure 39: Salamander eggs found in a vernal pool at Old Colchester Park and Preserve

## Operational Plan

This section houses the implementation plan for achieving the Old Colchester Park and Preserve Natural Resource Management Plan (NRMP). Funding needs are outlined in four broad categories, identifying:

- *Actions can be accomplished if the annual funding remains the same*
- *Actions that can be accomplished if some additional annual funding is provided*
- *Actions that can be accomplished if full funding is provided annually; and*
- *Actions that will require capital or bond revenue to be accomplished*

Priorities are identified, with a ranking of 1 (most critical) to 3. A summary matrix of objectives, strategies and actions is included and provides an accessible snapshot of the NRMP's recommendations. A more thorough discussion of the recommended actions is included in Section IV.

## Funding

The actions identified on the matrix in this Section vary in the funds required for their accomplishment. Recognizing this, actions are assigned to one of four categories and noted in the matrix on page V:6 and in Appendix H.

- Existing Resources (E)
- Partial Funding (P) (*identifies initiatives that can be accomplished with some additional funding*)
- Full Funding (F) (*identifies all resources needed to implement the NRMP*)
- Other/Capital Funding (C)

Examples of actions within each funding level are given in the list below. A full listing, action by action, with specific actions/funding needs is included as a matrix in Appendix H.

All costs are estimated in current year—2011 dollars and **on an annual basis**. It is anticipated that due to the ongoing treatment of non-native invasives (NNIs) on the site, those costs will decrease over the years. Although the serious issue related to the overpopulation of deer is beginning to be addressed, the outcome is not certain enough to predict its impact on costs.

### **EXISTING RESOURCES—PARK AUTHORITY STAFFING AT CURRENT ANNUAL FUNDING LEVEL; NO ADDITIONAL FUNDS**

- Periodic walks of site to do qualitative assessments and monitor for inappropriate/illegal activities
- Collaboration with partners and adjacent landowners
- Surveys by volunteers and partners
- Deer management as part of county program

Staffing: Minimal NRMP Branch staff time, minimal POD staff time

### **PARTIAL FUNDING—ADDITIONAL ANNUAL FUNDS AVAILABLE \$100,000**

- Periodic walks of site to do qualitative assessments and monitor for inappropriate/illegal activities
- Collaboration with partners and adjacent landowners
- Staff and volunteer periodic presence/monitoring of site
- NNI management as well as outreach (signage and boot washing stations as appropriate)
- Deer management as part of county program
- Surveys by volunteers and partners as well as staff and contractors
- Signage

Staffing: Part-time staff for specific projects and interns

### **FULL FUNDING—ANNUAL FUNDING IS FULLY AVAILABLE \$300,000**

- Periodic walks of site to do qualitative assessments and monitor for inappropriate/illegal activities
- Collaboration with partners and adjacent landowners
- Regular presence/monitoring of site
- NNI management as well as outreach (signage and boot washing stations as appropriate)
- Deer management as part of county program as well as contracted or lease hunts
- Surveys by volunteers and partners as well as staff and contractors

- Signage
- Active resource management (vernal pool manipulation/creation, forest management, meadow management, prescribed burns, etc.)

Staffing: One full time resource manager, part-time staff for specific projects and interns

#### OTHER/CAPITAL FUNDING

- Resource assessment and mitigation as part of capital projects. (Project specific)
- Interpretative plan development and implementation— \$100,000+ (partial for some natural resource interpretive signs = \$25,000)
- Stormwater projects - TBD by Fairfax County Department of Public Works and Environmental Services (DPWES)
- Pond renovation—\$10,000

### Monitoring Plan

#### WHY MONITOR

No plan is static. A successful outcome for the Old Colchester Park and Preserve natural resources will require ongoing monitoring. Monitoring of the various habitats and natural communities over time and monitoring of the success or failure of the management methods used at the park should be pursued. Annual or periodic monitoring is important, for resource management, for demonstration and evaluation of effective methods and to ensure that resources are being expended most efficiently and effectively. Monitoring should be performed to determine whether the method(s) meet the management goals and objectives established for Old Colchester Park and Preserve.

The chart on the following page identifies monitoring needs and timing for Old Colchester Park and Preserve.

#### MONITORING NEEDS

- Annually monitor for NNI plants within highest quality natural communities (e.g.: Coastal Plain Depression Swamp, Coastal Plain Acidic Seepage Swamp and Freshwater Tidal Marsh) or Fairfax County Non-Native Invasive Plant Site Prioritization Protocol (NNIAP) Units F, G, L, F, U and V. Conduct the NNIAP periodically, every three to five years. NNIAP units are noted by letter code on Plate 5 in the Appendix.
- Monitor the deer population and success of deer management programs. Even when culling is successful, deer can potentially reproduce to original densities within five years.
- Monitor native vegetation for disease and pests. Of particular concern is emerald ash borer (*Agrilus planipennis*) that is present in Fairfax County and will eventually kill all ash trees in the park. Ash trees are components of Coastal Plain Floodplain Forests, Forested Nontidal Wetland, Coastal Plain Floodplain Swamp and Coastal Plain Acidic Seepage Swamp communities. Installing emerald ash borer traps will allow the Park Authority to know when the insect is on-site, and removal of ash trees and planting other native species can occur. Other diseases and pests to monitor include ongoing regional issues with gypsy moth (*Lymantria dispar*), Dutch elm disease, dogwood and sycamore anthracnose, sudden oak death, Asian longhorn beetle (*Anoplophora glabripennis*), light brown apple moth (*Epiphyas postvittana*), siren woodwasp (*Sirex noctilio*), pine shoot beetle (*Tomicus piniperda*), European spruce bark beetle (*Ips typographus*), and the marmorated stink bug (*Halyomorpha halys*). It is assumed that snakehead (*Channa argus*), which directly compete with largemouth bass (*Micorpterus salmoides*), occupy and utilize Belmont Bay and the Occoquan, and hence could occur along the Old Colchester waterfront and marshlands. Rock-snot algae (*Didymosphenia geminata*) and various crayfish (e.g. *Orconectes rusticus*) are other invasives growing in numbers along the Potomac and its tributaries.
- Monitor the regeneration of native vegetation in the cultural resources study and NNI treatment areas.

Table 1. Monitoring Plan for Old Colchester Park and Preserve		FREQUENCY of ACTIONS				
Aco n #	Monitoring Acon	Annually	2-3 Years	5 Years	10 Years	As Needed
1a.1	Monitor sensitive water resources		X	X		
1b.2	Monitor vernal pools—drainage area, access, etc.		X			
1b.3	Monitor vernal pools breeding populations	X				
1c.1	Monitor the shoreline	2x/year				
1d.2	Monitor rare species and communities			X		
1d.4	Monitor for emerald ash borer	X				
1d.9	Monitor for presence of osprey		X			
1d.12	Monitor natural communities for disease			X		
1e.4	Monitor, in conjunction with others, for bird, butterfly, odonate and herpetofauna			X		
2a.1	Monitor for trash and litter, etc.	2x/month				
2b.1	Monitor for boundary infringement, etc.	X				
3a.3	Monitor for deer population levels	X				
4b.1	Monitor site to adjust non-native invasives (NNI) treatment	X				
4b.2	Monitor by conducting NNI survey w/NNIAP		3 years			
4b.3	Monitor for natural regeneration of native plants following NNI treatment		X			
5b.1	Monitor for compliance with site restoration (archaeological site closure and restoration)	X				

- Monitor the geomorphological adjustments of perennial stream along Anita Drive and any impacts to the hydrology of the adjacent Coastal Plain Acidic Seepage Swamp and sedimentation of the downstream wetland communities.

## Measuring Success

Adaptive Management is an excellent way to document success and failure allowing for adjustments to obtain the desired outcome. A process of evaluation and assessment of the management strategies applied to the site provides the resource management staff the opportunity to determine which method is working, how a method could be modified to work better, or, what alternate method would prove to be a better approach for site management.

A good NRMP requires constant evaluation and assessment as to what is working on site and what is not as effective.

## Long Term– Next Steps

Much field work has been accomplished in the development of this NRMP. A very solid snapshot in time has been obtained to use as a baseline for measuring success and failure in park activities such as NNI and deer reduction. This information is only useful if it is shared with others who also have interest in the park and in other public lands on the Mason Neck peninsula. Next steps should include collaboration with other Park Authority Divisions— Cultural Resources, Park Operations and Planning and Development - to ensure that the information gained in this process positively influences future activities at the park. Next steps should also include collaborating with other Mason Neck land managers on challenges that are not easily addressed on the park site alone—deer reduction in particular.

Most importantly, ongoing monitoring and research should continue at the park.

# Implementation Actions

## Objectives, Strategies and Actions Matrix

Actions to achieve the objectives and strategies laid out in this plan are contained in the following matrix. Actions are grouped by strategy and are assigned a priority level for accomplishment. These are noted as being Priority 1, 2, or 3, with 1 being of the highest priority.

## Priorities

The top priorities are assigned to the actions that have the largest overall impact on natural resources. This takes into account the scope of the impact and the relative importance/rarity/sensitivity of the resources impacted. In addition, should an item be an integral component of another action that is considered a priority, its priority is elevated. Other items that are considered high priorities are actions related to development principles/best practices such as mitigating impacts from development. Each action's priority is listed in the matrix within this section.

Priority	Table 2. Objective/Strategy/Action	Funding*			
		E	P	F	C
	<b>Objective 1. Protect and Manage Sensitive Natural Resources in the Park</b>				
	<b>Strategy 1A. Protect and Enhance Wetlands, Tidal Marsh, Potential Bog Community and Unnamed Stream</b>				
1	<b>Action 1a.1:</b> Monitor sensitive water resources on a 2-5 year cycle.			X	
1	<b>Action 1a.2:</b> Confirm suspected species such as the river bulrush ( <i>Schoenoplectus</i> <i>uvialis</i> ) in the Tidal Freshwater Marsh.		X		
1	<b>Action 1a.3:</b> Manage Tidal Freshwater Marsh for dependent species, track expansion or shrinkage, periodically monitor for quality and abundance of rare plant populations.		X		
2	<b>Action 1a.4:</b> Retain the submerged aquatic vegetation (SAV) bed.	X			
2	<b>Action 1a.5:</b> Work with Fairfax County's Department of Public Works and Environmental Services (DPWES) and Virginia Department of Game and Inland Fisheries (VDGIF) to periodically conduct biological monitoring of the stream and tidal areas.		X		
2	<b>Action 1a.6:</b> Complete further field studies on the potential bog community located at the toe of the slope below the Old Colchester town site.			X	
3	<b>Action 1a.7:</b> Restore hydrology in wetland west of Hyde Street.				X
3	<b>Action 1a.8:</b> In conjunction with DPWES, treat run-off from Furnace Road for volume and water quality prior to its entering the park.				X
3	<b>Action 1a.9:</b> Work with DPWES Stormwater Division to improve condition or restore unnamed stream located on the park's eastern boundary.				x
3	<b>Action 1a.10:</b> Restore the dry basin (former stormwater basin pond) to its historical extent, with slight modifications.				x
3	<b>Action 1a.11:</b> Encourage DPWES to incorporate low impact development (LID) retrofits throughout the drainage area to slow down the flow and reduce the volume entering the stream.				x

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed



Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 1. Protect and Manage Sensitive Natural Resources in the Park</b>				
	<b>Strategy 1B. Protect and Manage Vernal Pools and Dependent Species</b>				
1	<b>Action 1b.1:</b> Consult and evaluate existing pools (condition, breeding populations, number, size and location of pools, etc.) to make management recommendations.		X		
1	<b>Action 1b.2:</b> Document and monitor vernal pools.		X		
1	<b>Action 1b.3:</b> Conduct a survey in 2012 (and subsequent years) to further define and monitor breeding species and populations over time.		X		
	<b>Strategy 1C. Protect the Shoreline</b>				
1	<b>Action 1c.1:</b> Walk the shoreline at least twice a year to monitor and check conditions related to sea level rise/climate change impacts, erosion, illegal access, non-navigable in-	X			
1	<b>Action 1c.2:</b> Prohibit marine recreation access from the park's shoreline.	X			
1	<b>Action 1c.3:</b> Prohibit on shore fishing and erect no fishing (other than by boat) signs at park entry.	X			
1	<b>Action 1c.4:</b> Prohibit boat access from current property shoreline.	X			
	<b>Strategy 1D. Protect and Enhance Terrestrial Vegetation Communities</b>				
1	<b>Action 1d.1:</b> Manage forest lands to protect and enhance sensitive or unique species/communities and to promote biological diversity and the health of vegetative communities.			X	
1	<b>Action 1d.2:</b> Document, monitor and periodically provide updates on rare species/communities to the Virginia Department of Conservation Virginia Natural Heritage Program. (DCR/VNHP)		X		
1	<b>Action 1d.3:</b> Restore the buffer on the northern side of the Coastal Plain Depression Swamp.			X	
1	<b>Action 1d.4:</b> Monitor the park, and in particular the Coastal Plain Floodplain Forest, Coastal Plain Acidic Seepage Swamp, Forested Non-tidal Wetland and the Coastal Plain Floodplain Swamp natural communities for the emerald ash borer ( <i>Agrilus planipennis</i> ).		X		
1	<b>Action 1d.5:</b> Develop a monitoring plan to monitor changes in species or natural communities over time.			X	
1	<b>Action 1d.6:</b> Identify the orchid species within the Coastal Plain Acidic Seepage Swamp natural community, as they may be rare.		X		

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 1. Protect and Manage Sensitive Resources in the Park</b>				
	<b>Strategy 1D. Protect and Enhance Terrestrial Vegetation Communities</b>				
1	<b>Action 1d.7:</b> Positively identify the orchids in the Forested Non-tidal Wetland community northwest of Old Colchester Road. Tentative identification is that the orchid is a		X		
2	<b>Action 1d.8:</b> Restore forest between private parcels along Old Colchester Road and the Coastal Plain Depression Swamp.			X	
2	<b>Action 1d.9:</b> Monitor the Coastal Plain Floodplain Forest for the presence of osprey ( <i>Pandion haliaetus</i> ).		X		
2	<b>Action 1d.10:</b> Evaluate habitat benefits of improving canopy cover over Hyde Street.		X		
3	<b>Action 1d.11:</b> Consider girdling a few select beech trees in the Northern Coastal Plain Mesic Mixed Hardwood Forest.			X	
3	<b>Action 1d.12:</b> Monitor natural communities for disease.			X	
	<b>Strategy 1E. Work with Adjacent Public Properties, Collaborate with other Public and Nonprofit Agencies and Coordinate with other Researchers</b>				
1	<b>Action 1e.1:</b> Participate in larger monitoring efforts across Mason Neck, county, region, etc. to support broader conservation efforts and goals.			X	
2	<b>Action 1e.2:</b> Become familiar with goals and membership of the Mason Neck Land Managers Group.		X		
2	<b>Action 1e.3:</b> Share the Colchester Natural Resource Management Plan (NRMP) with	X			
2	<b>Action 1e.4:</b> Work with researchers, educators and volunteers to collect resource information and to monitor site.		X		
2	<b>Action 1e.5:</b> Continue to coordinate with state agencies (particularly VDGIF) for the management of tidal marsh where Bailey's Gut meets the Occoquan River.	X			
2	<b>Action 1e.6:</b> Continue to coordinate with state agencies (particularly DCR/VNHP) for the identification and management of biological resources.	X			

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 2. Reduce and Eliminate Human Activities that Adversely Affect Sensitive Resources in the Park</b>				
	<b>Strategy 2A. Eliminate Unauthorized Site Uses</b>				
1	<b>Action 2a.1:</b> Monitor the park to establish staff presence and reduce litter, dumping, relic hunting and other illegal activities.		X		
1	<b>Action 2a.2:</b> Place signs at all entries restricting that unauthorized ATV use is illegal and patrol to enforce ban.		X		
3	<b>Action 2a.3:</b> Address ongoing deer poaching in conjunction with appropriate County, State and Federal agencies to ensure park visitor's safety.		X		
	<b>Strategy 2B. Designate Clear Access Points and Eliminate Unsanctioned Access Points</b>				
1	<b>Action 2b.1:</b> Monitor and enforce rules regarding boundary infringement, including illegal dumping and damage to resources.	X			
1	<b>Action 2b.2:</b> Ensure that formal entry points are established in the Master Planning process.	X			
2	<b>Action 2b.3:</b> Remove encroachment entries (illegal footbridges) into park and consolidate into single, sanctioned and signed/marked entrance at Cardinal Street.			X	
3	<b>Action 2b.4:</b> Once undesired entry points and trails are removed, restore ground by decompacting soil and adding organic material to closed entry points.			X	
	<b>Objective 3. Reduce the Deer Population in the Park</b>				
	<b>Strategy 3A. Reduce the deer population to less than 15 per square mile</b>				
1	<b>Action 3a.1:</b> Participate in the County's deer management program.	X			
1	<b>Action 3a.2:</b> Consider contracting out population reductions and/or leasing the property for hunts.			X	
2	<b>Action 3a.3:</b> Monitor population levels and impacts as needed.		X		
2	<b>Action 3a.4:</b> Use vegetative monitoring results and health to drive and measure success of deer management efforts.	X			
3	<b>Action 3a.5:</b> Consider developing a deer management plan for the Mason Neck Peninsula in conjunction with adjacent land owners and property managers, under the umbrella of Fairfax County's deer management program.			X	

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 4. Reduce Non-Native Invasive (NNIs) Plant Species in the Park</b>				
	<b>Strategy 4A. Continue to control non-native invasive plants throughout the Park</b>				
1	<b>Action 4a.1:</b> Manage non-native invasive plants through contracted removal throughout the entire park, if funds are limited, use NNIAP scores to prioritize treatment areas.		X		
1	<b>Action 4a.2:</b> Train cultural resource workers in best practices to minimize NNIs spread.	X			
1	<b>Action 4a.3:</b> Control aquatic NNI plant species to include marsh dewflower ( <i>Murdannia keisak</i> ) in the Freshwater Tidal Marsh and former storm pond.		X		
	<b>Strategy 4B. Monitor management actions related to non-native invasive plants throughout the Park</b>				
1	<b>Action 4b.1:</b> Monitor site annually to guide and adjust the NNI treatment plan.			X	
1	<b>Action 4b.2:</b> Continue site monitoring by conducting a NNI survey every three years (in conjunction with NNIAP) to determine existing coverage, change over time, effectiveness of control efforts and to help guide future control efforts.			X	
2	<b>Action 4b.3:</b> Monitor natural regeneration of native plants following NNI treatment. If needed, plant or seed native plants.			X	

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 5. Integrate Passive Recreation Development and Interpretive Activities while Preserving and Protecting the Sensitive Natural Resources in the Park</b>				
	<b>Strategy 5A. Enforce and Conform with NRMP Recommendations Related to Resource Protection Zones and Opportunity Areas</b>				
1	<b>Action 5a.1:</b> Locate use activities within appropriate Resource Protection Zone (RPZ) Level.	X			
2	<b>Action 5a.2:</b> Periodically update site mapping and RPZ categorization.		X		
	<b>Strategy 5B. Minimize Impacts from Development and Archaeology Activities</b>				
1	<b>Action 5b.1:</b> Monitor compliance with principles that guide site development and restoration.		X		
1	<b>Action 5b.2:</b> Ensure that any activities on site include additional funds and an expanded timeline to effectively address additional resource assessment and mitigation.				X
1	<b>Action 5b.3:</b> Ensure that any projects on site include additional funds and an expanded timeline to effectively address non-native invasive plant species control pre- and post-construction.				X
	<b>Strategy 5C. Develop an Interpretation Plan for the Site that Combines Interpretation of Natural and Cultural Resources</b>				
3	<b>Action 5c.1:</b> Develop interpretive story that combines the cultural and ecological story of the site, its past land uses and their influences on the natural communities.				X
3	<b>Action 5c.2:</b> Create natural resource based interpretive signs to interpret the resources on the site.				X
	<b>Strategy 5D. Educate the Public and Adjacent Neighbors as to Site's Natural Resource Value</b>				
1	<b>Action 5d.1:</b> Educate adjacent private landowners, neighbors and general public as to ownership and role of the park as a natural resource based site.			X	
1	<b>Action 5d.2:</b> Minimize the spread of NNIs from site visitors by adding signs and boot washing stations as necessary.		X		
3	<b>Action 5d.3:</b> Educate neighbors on the negative effects of stormwater runoff on sensitive resources; the need to minimize nutrient excess sources through proper septic management; and the reduction in use or more appropriate timing of fertilizer application.			X	

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

Priority	Table 2. Objective/Strategy/Action, cont.	Funding*			
		E	P	F	C
	<b>Objective 6. Practice Adaptive Management Approach and Process</b>				
	<b>Strategy 6A. Continually Reassess and Revise Management Approach, based upon Site Findings and Monitoring Results</b>				
<b>1</b>	<b>Action 6a.1:</b> Revise approach to management practices based upon site monitoring and evaluation and changes in science and best practices.	<b>X</b>			
<b>1</b>	<b>Action 6a.2:</b> Adjust site management over time to respond to episodic events such as large storms and floods, and long-term change such as sea level rise.		<b>X</b>		

\* E—Existing Level; P—Partial Additional Funding Needed; F—Full Additional Funding Needed; C—Capital Funding Needed

# SECTION VI: MASTER PLANNING AND DEVELOPMENT CONSIDERATIONS



Elisabeth Lardner

Figure 40: Flagged resource site

## Considerations for Future Planning Efforts

### Master Planning

Several items need to be addressed when any master planning or site development is initiated. Following is a list of items to be addressed during master planning, site development and trail development activities at Old Colchester Park and Preserve. These items are in addition to considerations outlined in the vernal pool and trail criteria mentioned in the Old Colchester Park and Preserve Natural Resource Management Plan (NRMP) Resource Protection Zone (RPZ) discussion in Section III.

## LIST OF ISSUES AND IDEAS TO CARRY FORWARD

### Master Planning

- Adhere to the Resource Protection Zone mapping developed in the NRMP process when Master Planning the park.
- As a part of the master planning effort, identify formal entry points to park – linking to trail system or other means to control traffic and to protect natural resources from trampling.
- Ensure that planning efforts take into account that all cultural resource/archeological sites were not excavated due to fragility of natural resources. High value in these archeological resource sites is unlikely, but any future work on the site needs to be aware of potential.
- Consider revising the Mason Neck West Park Master Plan concurrently with the Old Colchester Park and Preserve Master Plan. Develop the master plans for both parks congruently, recognizing their close geographic proximity and unique natural characteristics while balancing area needs for active recreation and natural resource protection.
- Protect the hydrology recharge and discharge within the Coastal Plain Depression Swamp as small hydrological alterations can affect this community's composition. In particular, direct the runoff from Hyde Street away from the Coastal Plain Depression Swamp - a state rare community (S2).
- Protect the hydrology recharge and discharge within the Coastal Plain Acidic Seepage Swamp and the Forested Nontidal Wetland natural communities.
- Prohibit human access to steep slopes and banks along the shoreline to prevent erosion.
- Provide controlled access (viewing) to the Occoquan River in the Coastal Plain Floodplain Forest to prevent unregulated access and damage to the steep banks. The compacted soils in this natural community can tolerate more human activity than the uncompacted soils found throughout much of the rest of the park.
- If waterfront access is deemed to be necessary on Fairfax County Park Authority (Park Authority) property, acquire adjacent, less natural resource sensitive land for public waterfront access and limit access to nonmotorized boats.

### Site Development

- Locate interim or permanent development and activities within appropriate Resource Protection Zone Levels.
- Ensure that any development process analyzes and limits site grading that will adversely impact the water resources on site.
- Monitor compliance with principles that guide site development and restoration (see Appendix G).
- Preserve the buffer value for vernal pools by restricting development to less than 25% of the total area within the Critical Terrestrial Habitat Area (CTHA), 650 feet beyond the first 100 foot buffer from the pool's edge. Map the CTHA prior to any development.
- Include time and funding for non-native invasives (NNI) management and treatment in any site improvements or development. Ensure that any projects on site include additional funds and an expanded timeline to effectively address NNI plant species control, pre- and post-construction.
- Ensure that any activities proposed for the site that may affect the physical site include additional funds and an expanded timeline to effectively address additional resource assessment and mitigation.
- Provide a protective buffer surrounding the Coastal Plain Depression Swamp, a state rare community (S2), to limit human disturbance within this community. Virginia Natural Heritage Program (VANHP) recommends a 250 meter (820 foot) buffer around this community because of its rare status. (Hyde Street to the west, adjacent houses to the north and a dirt trail/road to the south are effectively the borders of this



natural community.) VANHP recommends that careful consideration be given to potential impacts in this buffer. They recommend prohibiting clearing, facilities construction and horse trails in the buffer area. It should be noted that this would likely be limited to the immediate area surrounding the community, bordered by the roads and existing informal trails.

- Monitor and evaluate all land use changes adjacent to the Coastal Plain Depression Swamp for hydrological implications to this natural community. In particular, decisions made regarding the restoration of the dry basin may impact this community and should be evaluated prior to implementing any changes and any changes to the Hyde Street corridor such as pavement expansion could adversely affect both the hydrology and vegetation in this community.
- Work with Park Authority staff, contractors, and others to assess vernal pools and other wetlands PRIOR to all park development and maintenance activities, avoiding or mitigating any impacts and ensuring the long-term health of the resources.
- Work with Park Authority staff, contractors, and others to ensure that trails located adjacent to vernal pools are designed, built and maintained to protect hydrology and to provide terrestrial vertebrates access to and from the pools, while limiting physical access to the vernal pools by humans. Provide good viewing points and interpretation for trail users and groups to enjoy.
- Pursue a formal agreement allowing for public access at one or both of the existing adjacent private marinas.
- Actively direct the park visitor by creating a trail system that is clear and has well established boundaries (rails, surface treatment, signs, etc.) and destinations (defined overlook) located away from fragile vegetation and culturally significant sites. For example, there is a potential conflict with the ridgeline scallops and in the early archaic sites in the Northern Coastal Plain Mesic Mixed Hardwood Forest.
- Recognize the potential impact of off-site noise in general from the nearby roads and railroads. Mitigate where possible.
- Evaluate vernal pool buffers in conjunction with development proposals to ensure protection of vernal pool communities while, if possible, allowing for some development on site such as trails, etc.
- Minimize introduction of new NNI plant species.
- Don't inadvertently create barriers that inhibit the movement of for wildlife species through infrastructure improvements.
- Be aware of potential damage to site hydrology through grading and infrastructure development. Old Colchester Park and Preserve is a relatively flat landscape with unique drainage patterns. Any disruption to the existing drainage pattern could adversely affect existing species on site.
- Assess and treat NNI areas pre- and post-construction for all development activities (including trails, modifications to the pond and other development).
- Ensure that any development process analyzes and limits site grading that will adversely impact the water resources on site.

#### Trail Considerations

- Prohibit trails on steep slopes and banks in the Northern Coastal Plain Mesic Mixed Hardwood Forest or the Acidic Oak-Hickory Forest due to the erosion potential. If interim trails are necessary, locate on the flat portions of this natural community.
- Avoid the critical root zone for beech when locating trails in the Northern Coastal Plain Mesic Mixed Hardwood Forest natural community due to root sensitivity to disturbance and compaction.
- Field locate any trails, access points or boardwalks to avoid impacting uncommon or rare plants.
- Prevent any trails or unrestricted access within the Coastal Plain Depression Swamp because of the soils' susceptibility to compaction, spread of NNIs and water pollution. If access is provided to view the vernal

pools within this natural community, the access must be highly regulated and restricted, controlling where a visitor can go within the natural community through the use of railings or boardwalks and not located within Level 1 RPZs.

- Limit trails or unrestricted access within the Herbaceous Nontidal Wetland because of the soils' susceptibility to soil compaction, potential spread of NNIs and trampling of vegetation. Access to view the vernal pool(s) should be regulated and restricted, controlled by the use of boardwalks and railings.
- Prevent any trail (with or without boardwalk) or access within the Coastal Plain Acidic Seepage Swamp, Tidal Freshwater Marsh, or the Coastal Plain Floodplain Swamp due to the natural communities' very limited NNI population, soils that are highly sensitive to compaction caused by trampling and in the Coastal Plain Acidic Seepage Swamp a potentially rare orchid population (not yet confirmed). An existing trail, located in the Coastal Plain Floodplain Forest and the Acidic Oak Hickory Forest provides a view of these natural communities.
- Control access to the Forested Nontidal Wetland to limit soil compaction, trampling of vegetation and the spread of NNIs. In particular, until the orchid is positively identified, access should be eliminated in the area near the railroad, northwest of Old Colchester Road.
- Direct run-off away from steep slopes and banks (be careful in insertion of trail water bars, etc.) caused by any development activities to prevent erosion and possible sedimentation of the SAV beds.
- If trail access is needed, direct alignment away from sensitive natural resources; if unable to do so, employ boardwalks and other means to avoid damaging fragile landscapes. Boardwalks or overlooks with railings would minimize unregulated access to vulnerable sites such as the marsh or the fragile banks along the shoreline.

## Working Together

### **Principles for Cultural and Natural Resource Management Staff Collaboraon on Site**

One of the challenges when presented with a site equally treasured for its cultural and natural resources is to how best coordinate their exploration and protection while ensuring that one effort does the least possible amount of damage to the other. Or, as was addressed in this park, when a particular natural resource is particularly fragile and the expectation of what could be learned from excavating a cultural resource site is low or repetitive to nearby sites, developing an agreement AHEAD as to how best to handle such a conflict is well worth the effort. Based on this collaborative working relationship between the Cultural Resource and Natural Resource staff members, a set of principles for 'Working Together' was developed. The full list with specific recommendations is found in the NRMP's Appendix. A summary of the principles themselves follows.

- Identify potential conflicts between the location of sensitive natural sites and culturally rich sites
- Survey the site prior to work commencement
- Clearly define the work area boundaries and access paths to work areas
- Restore any disturbance after work is completed
- Examine alternate ways of achieving goals
- Include cultural resource staff in site training activities
- Provide necessary additional resources
- Plan for the unexpected
- Work collaboratively on site management plans and interpretation

# SECTION VII: BIBLIOGRAPHY

- Bowman Consulting. 2007. *Environmental Assessment Lorton West Parcels and Lorton Correctional Complex*. Prepared for the Fairfax County Park Authority.
- Calhoun, A. J. K. and M.W. Klemens. 2002. *Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*. MCA Technical Paper No. 5.
- Environmental Systems Analysis, Inc. 2011. *Old Colchester Park and Preserve Vegetation Assessment Report*. November 4, 2011.
- Fairfax County Department of Public Works and Environmental Services Land Development Services, and Northern Virginia Soil and Water Conservation District. 2011. *Description & Interpretive Guide to Soils in Fairfax County*. August 2011.
- Fairfax County Park Authority. 2009. Fairfax Land Records Covenant Release. Land Transfer Documents. Exhibit C. September 24, 2009.
- Federal Lands to Parks Program. *Old Colchester Park and Preserve, Analysis of Public Park Potential, Program of Utilization, and Development Schedule*.
- Lawlor, David M. 2011. *Old Colchester Park Deer Population Survey 2011*. Fairfax County Park Authority.
- United States Department of the Interior Bureau of Land Management Lower Potomac Field Station. June 2011. Meadowood Recreation Area Proposed National Trail Segments.
- United States Fish and Wildlife Service. *Report on the Forests of Mason Neck NWR*.
- US Fish and Wildlife Service. 2010. *Draft Comprehensive Conservation Plan and the Environmental Assessment*. Elizabeth Hartwell Mason Neck and Featherstone National Wildlife Refuges.
- Virginia Department of Conservation and Recreation, Division of Natural Heritage. 2011a. Virginia conservation lands GIS data. Downloaded from DCR website: [http://www.dcr.virginia.gov/natural\\_heritage/cldownload.shtml](http://www.dcr.virginia.gov/natural_heritage/cldownload.shtml). April 2011.
- Virginia Department of Conservation and Recreation, Division of Natural Heritage. 2011b. *The Natural Communities of Virginia Classification of Ecological Community Groups Second Approximation (Version 2.4)*. Website [http://www.dcr.virginia.gov/natural\\_heritage/nctoc.shtml](http://www.dcr.virginia.gov/natural_heritage/nctoc.shtml) [Accessed July 14, 2011].
- Versar, Inc. 2011. *Water Resources Assessment Old Colchester Park Fairfax County, Virginia*. Prepared for Fairfax County Park Authority.
- Wetland Studies and Solutions, Inc. (WSSI). 2006. *Waters of the U.S. Delineation and Resource Protection Area Evaluation, McCue-Occoquan (± 144 Acres) Fairfax County, VA*. Prepared for McCue and McCue Limited Partnership. August 22, 2006.

Page intentionally left blank.