City of Charlottesville

Invasive Plant Inventory

Prepared for

Charlottesville Parks and Recreation Department
Parks Division Offices
1300 Pen Park Road
Charlottesville, VA 22901

Prepared by

Land Planning and Design Associates, Inc.
310 E Main St. Suite 200
Charlottesville, VA 22902

February 2007

TABLE OF CONTENTS

LIST OF FIGURES AND MAPS

Figure/Description

Inventory Maps

CHAPTER 1
EXECUTIVE SUMMARY

1.1 Purpose

This inventory was conducted in order to provide a framework for area wide and site specific management of the native landscapes in Charlottesville. It will allow the city to quantify and budget for the extent of the invasive plant problem within the city in order to establish a management plan that will most effectively address the issue of preserving our native vegetation.

1.2 Methodology

Goal

There are fifteen predefined inventory areas, including city parks, school property, road corridors, and natural areas. The main goal was to conduct an inventory with a focus on quantifying the invasive plants that are directly affecting native tree canopy and riparian buffer areas. This includes invasives that have overtaken the canopy, have the potential to overtake the canopy or cause irreversible tree damage, and understory plants that may prevent the regenerative power of the future tree canopy.

Physical Inventory

A physical inventory of each area was conducted via pedestrian survey. All narrative information was recorded on an inventory sheet, including but not limited to the amount and type of plants present and the site conditions. By grouping areas with similar invasive concerns and typology, clearly defined focus areas were created within each inventory area. These areas were represented by a polygon on the aerial map. A photo inventory was taken to serve as a visual reference.

Maps

A base map for each area was created by overlaying the city's planimetric information onto the most recent aerials. All of the information recorded during the site visit was combined to create site specific management actions and priority levels that are labeled on the base maps. The maps presented in this inventory visually relay the extent of the problem and the corresponding management suggestions.

Narrative Management Suggestions

The written management plan was largely based on what types of invasive plants were present, the condition of the native canopy, and the topology. The main management goals are listed for each inventory area as well as management actions and priority levels for each focus area.

Management Actions

The complete eradication of the invasive plants is not an economic or realistic option. Therefore, the focus of management is to be on the suppression of existing infestations and the prevention of future infestations through monitoring. Five management options were defined: no action, monitor, suppress, containment line, remove. These are general titles that correspond to specific treatment procedures that in conjunction with the degree of infestation will allow for the budgeting of the maintenance for each area.

Priority Levels

Priority levels were defined in order to phase the maintenance schedule. High, Medium and Low level ratings are based on how invaded a site is and the condition of the existing native population. Consideration was also made for the presence of extremely aggressive vines, such as Kudzu or Porcelain Berry.

Budget Sheets

Budget sheets were created for each area. The sheets outline all of the written inventory information and the information contained on the maps. Each focus area is listed with its corresponding acreage, maintenance action, and priority level. All other items listed on the budget sheet were used to create a cost for each focus area.

There are seven management treatments listed.

Each of these actions has an associated per acre cost. This cost is multiplied by the number of applications per year. All treatment costs are added together and multiplied by the level of invasiveness to account for the intensity of the infestation and corresponding increased work load. This is the total per acre cost which is then multiplied by the acreage of each area to get the actual total cost.

The budget sheet and the maps are designed to be updated as the management progresses and a more accurate account of the work involved and the progress made can be expressed.

1. 3 First Year Management Plan

The first year of management will be distinctive from the rest of the plan. Successive years approach management site by site in order to keep mobilization and monitoring of the projects more efficient; however, the first year will be an intensive program that targets all high priority areas regardless of location.

The goal of this first year intensive is to establish a control line for the most aggressive and visually apparent invasives and to clear the tree canopy of any invasive vines. This management is inclusive of all high priority areas.

Ten Year Management
After the first year, management is conducted area by area on a priority based schedule. The budget is projected for a ten year period that will account for three years of management for each area followed by at least three years of monitoring.

While a ten year schedule is presented, areas should be phased-in respectively, according to progress made and wo/man hours that can be dedicated to the project. This adaptive management strategy will ensure that a reasonable amount of the areas reach their management goals before new areas are undertaken.

A base management cost is shown for each area as calculated on the individual budget sheets. Each year the cost is reduced to account for progress made and the consequent reduction in labor/material costs. There is an assumed three year commitment. This time frame may vary in response to field conditions, but assumes a minimum time in which the management goals can be reached.

Realistically there must be a minimum sustained management cost for each area to maintain the level of improvement achieved. This can be calculated as the third year cost plus the annual monitoring costs.

1.4 Inventory Summary

The inventory looked at the tree canopy, riparian buffers, and regenerative potential of the forest canopy in fifteen areas of the city. Most of the areas inventoried were wooded, however there were a few open canopy or no mow areas. Active recreation areas that were heavily maintained were not inventoried.

The total inventoried acreage of these areas is approximately 571 acres, 244 of these are to be considered management areas where invasive plants are having some impact on the defined program goals for this inventory. This means that 42% of the total inventoried areas have at least some issue with invasive plants.

The most prevalent invasive plants in order of magnitude, English Ivy, Multiflora-Rose, Honeysuckle, Bittersweet, Porcelainberry, Mimosa, Tree-of-Heaven, and Kudzu. All areas inventoried have a moderate to severe infestation. Based on a visual inventory, the inventoried invasive plants comprise at least 30% of the total vegetation.

In most areas, the tree canopy is healthy. The most severe canopy specific infestations are happening in the open areas and edges, which is consistent with the growth habits of the asso-

ciated invasives. This includes Porcelainberry, Kudzu, Honeysuckle vine, and invasive trees; however, all of these invasives appear to be establishing in the interior areas as well. English Ivy, which is thriving on the interior areas, is present in all areas. Much of which has started to climb, is mature, and seeding.

While some areas have this thick edge of infestation, most do not, suggesting that the infestations are mature enough to have naturalized in the interior of the wooded areas. A majority of the forest floors are scattered with mature groupings of Multiflora Rose and young or established invasive vines attaching themselves to the tree trunks and the tree canopy.

Railroad buffers and utility paths, especially those that are not mowed and double as trails, showed heavier infestations than neighboring areas. Areas with fewer disturbances, such as utility paths and larger, continuous tracts of land with older trees populations tend to have less infestation.

1.5 Management Summary

Prevention is the best management strategy. The two most effective ways to prevent the establishment of invasives is to avoid planting any species know to be invasive and to reduce soil disturbance.

Approximately 14 acres of inventoried area are considered high priority. In most cases, this is a Kudzu, Porcelainberry, or English Ivy infestation that has overtaken the tree canopy. Prioritizing these areas will allow the most visual and aggressive invasives to be managed first and at the same time will set the stage for the management of larger spaces so that they can be approached with efficiency and effectiveness. This large scale management plan will also allow for the assessment of any potential safety issues due to canopy damage.
The subsequent years of management are performed park by park on a priority basis and will follow the Bradley Method of invasive plant control. The main idea is to manage the least disturbed areas first, limiting the spreading potential of the plants. The secondary focus is on the more established invasive populations, reducing their size.

A list of the top plants for which to manage is suggested for each site. The Nature Conservancy has provided plant-specific management and control measures that are the standard for this manual.

As stated earlier, eradication is not a viable option and in many cases the goal is to visually reduce the presence of the invasive plants by a given percentage that will allow the native population a chance to regenerate and reduce the reproduction capabilities of the invasive plants.

1.6 The Problem of Invasive Plants in Charlottesville's Natural Areas

- Biological traits allow invasive plant species to out compete native plants with the potential of completely altering the native ecosystem's structure and composition
- Because they are out of their natural habitat, invasive species do not have the normal biological controls to limit their growth. This can lead to the formation of monocultures.
- Even the invasive species that are not aggressive enough to out compete natives can prevent or depress the regeneration of native plants
- The establishment of invasive plants may eliminate food sources, nesting sites, or cover used by wildlife.
- They are visually and aesthetically unattractive, often compromising beautiful

tree canopies or forming a thick weedy undergrowth

Figure 1: First Year Budget and Maps

Charlottesville Invasive Plant Inventory

First Year Management of High Priority Areas**

Land Planning and Design Associates, Inc.
2/17/2007

High Priority Management Area	Acres	Management Action	Priority Level	Hand Pull/Cut Vines and Sprouts	Foliar Spray Shrubs/Vines	Basal Cut/Treat Girdle/Treat	Mow/ Weed Eat etc.	Limb Line/ Brush Mow	Restoration	Degree of Invasiveness	Costs pre Acre	Total	Monitoring
				$1,000	$300	$1,300	$100	$400	$400	1,1.5,2,3,3.4			$75
Azalea Park													
A-3E	0.15	Suppression	High	2	2				1	3.4	$18,200	$1,530	2
A-3R	0.39	Suppression	High	2		2			1	3.4	$17,000	$6,630	2
Conservancy Areas	0.40	Contain	High		2	2	2	2		2.25	$9,450	$3,780	2
Buford Middle School													
B-2E	0.40	Suppression	High		2			2		3.4	$4,760	$1,904	2
Conservancy Areas	0.05	Contain	High	2	2	2	2	2		3.4	$21,080	$1,054	2
Greenbrier Park													
Greenleaf Park													
G-3E	0.85	Suppression	High	2	2		2	2	2	3.4	$14,960	$12,716	2
Conservancy Areas	0.17	Contain	High		2	2	2	2		2.25	$9,450	$1,607	2
Jackson-Via													
J-1I	5.74	Suppression	High		2	2				0.25	$800	$4,592	2
J-2E	0.22	Suppression	High		2	2				2.3	$7,360	$1,619	2
Johnson													
Jordan Park													
McIntire Park													
M-3E	2.13	Suppression	High		2		2			3.4	$3,400	$7,242	2
M-5E	0.27	Remove	High		2		2			3.4	$3,400	$918	2
M-7E	0.18	Suppress	High		1	1				2.25	$3,825	$689	2
Conservancy Areas	0.40	Contain	High		2	2	2	2		2.25	$9,900	$3,960	2
MeadowCreek													
M-1O	0.21	Suppression	High		2		2	2	2	3.4	$8,160	$1,714	2
M-1R	0.15	Suppression	High	2			2			3.4	$7,480	$1,122	2
M-2E	0.32	Suppression	High		2	2				2.3	$7,360	$2,355	2
M-2R	0.18	Suppression	High	2		2				2.3	$10,580	$1,904	2
Conservancy Areas	0.05	Contain	High	2	2	2	2	2		3.4	$21,080	$1,686	2
Northeast Park													
Conservancy Areas	0.04	Contain	High		2	2	2	2		2.25	$18	$1	2
Pen Park: Park													
P-1MP	0.14	Suppression	High	2	2	2				1.5	$7,800	$1,092	2
P-2MP	0.40	Remove	High	2	2	2		2	2	3.4	$23,120	$9,248	2
Conservancy Areas	0.40	Contain	High		2	2	2	2		2.25	$9,450	$3,780	2
Pen Park: Golf													
Quarry Park													
Riverview Park													
Conservancy Areas	0.02	Contain	High		2	2	2	2		2.25	$18	$0	2
Tonsler Park													
T-3E	0.39	Suppression	High	1	2	2			1	2.3	$18	$7	2
Route 250 By-pass													
250-2E	0.44	Suppression	High		1	1				3.4	$5,440	$2,394	2
Conservancy Areas	0.02	Contain	High	2	2	2	2	2		3.4	$21,080	$422	2
Total High Priority Areas	**14.34**											**$73,946**	
											Annual Monitoring Costs	**$2,121**	
											Park Total	**$76,066**	

*all costs of treatments are per acre

**please refer to page five budget summary for a complete budget report

CHAPTER 2 INVENTORY

2.1 Methodology

The first part of the inventory was to become familiar with the inventory areas. Aerial maps were printed of each of the fifteen areas. These maps were used in the field to be able to make notes on and to outline important areas. An initial visit to each of the sites was conducted with Parks and Recreation staff and staff from LPDA, Inc. During these visits, issues were outlined and specific problem areas were identified in the park and recorded on the aerials.

After this, a more detailed visit was made to each site and information was recorded on aerials and inventory sheets. This information was put into the computer and maps were created that can graphically illustrate the extent, size, and location of maintenance issues within the defined study areas.

Each site was visited individually between the months of July and August when invasive and native populations are in full leaf and an accurate assessment of their impact could be accounted for. Information was recorded on the aerial maps and on inventory sheets.

Problem areas were site identified and then defined on the map with a corresponding polygon around the problem area. These sites were given names that corresponded to the inventory sheets where more detailed information could be noted.

The name given to each polygon begins with the first letter of each site's name. This is followed by a progressively increasing number representing a subcategory. The number defines a distinctive or dramatic change in a site's vegetative community. The types of areas were delineated by visual differences in vegetative communities or site conditions. This number is followed by a letter that further defines the type of physical space the plants were found in: open, edge areas, riparian buffer, utility right of way, or interior areas. They are in represented by an O, E, R, U, or I respectively. For example, a solid stand of pine on the river edge at Meadow Creek Natural Area would be called M-1R. Or, Meadow Creek, site one in a riparian buffer area.

The information that was recorded on the aerials and on the information sheets was then transferred into AutoCAD so the recorded site information could be presented in a format that can be more easily quantified. The polygons and their associated data were then exported into Arc View and combined with the city's planemetrics information. This includes sewer lines, water boundary lines, topography, property lines, park boundary lines, and road information.

In this final format the information can be modified as progress is made in the field, boundary lines can be modified, priority information can be updated and acreage information can be generated.

2.2 Inventory Sheet

The inventory sheet was developed using suggestions and examples from comparable invasive plant surveys done by the California Department of Food and Agriculture and many others. The goal of the invasive inventory sheet is to provide the most complete picture of not only the invading plants but the existing native landscape that is being affected. Inventory sheets were used to record invasive and native plant species present, any erosion or other site concerns, general characteristics of the native canopy, a site description, degree of invasive infestation, and any other notable information about the site. These sheets will also be helpful as a tool for the future monitoring of management sites.
see figure 2

Field Inventory of Invasive and Natvie Species			
	Park Name:		
	Site Number:		
	Inventory Date:		
	Data Collector:		
	Site Description		
	Site Location Marker		
	Native Plant Species:		
	Invasive Plant Species:		
	Distribution Potential:	semi-contained not contained other:	
	Distribution Pattern:	clumpy scattered patchy scattered even linear	
	Community Character:	Open Edge Interior Riparian Buffer Utility	
	Invasive Cover Class:	1=1-5% 2=5-25% 3=25-50% 4=50-95% 5=95-100%	
	Erosion Issues:	yes no notes:	
	Invasive Promoter:	road railroad construction open canopy erosion other:	
	Recommendations:	no action monitor supress control line remove restoration	
		notes:	

Invasive Plants		Comments and Photo Log	
Symbol	**Common Name**		
AA	Tree-of-Heaven		
AB	Porcelainberry		
AJ	Mimosa		
AP	Garlic Mustard		
CO	Bittersweet		
EU	Autumn Olive		
EF	Winter Creeper		
HH	English Ivy		
L	Honeysuckle, bush or vine		
LJ	Chinese Privet		
MV	Japanese Stilt Grass		
P	Bamboo		
PC	Japaneses Knotweed		
PM	Kudzu		
PT	Princesstree		
RM	Multiflora Rose		

Figure 2: Plant Inventory/Monitoring Field Sheet

2.3 Target Species

A list of target invasive plants was established by the Parks and Recreation as presented in the original scope for this project. This list was then expanded based on the Department of Natural Resources' list of exotic invasive plants.

Species chosen were those that directly affect the existing and potential tree canopy such as vines. Plants that create competition for establishing native woody plants, such as saplings and shrubs were also included in the inventory. A few perennials were also included that are considered generally obnoxious. They are not intended to be managed, but they are good indicators of how vulnerable a site is to invasive plant material.

This study will outline the plants to be considered invasive for the purpose of this inventory; however, for a detailed description and identification of these plants, refer to either Nonnative Invasives Plants of Southern Forests: A Field Guide for Identification and Control published by the United States Forest Service or Plant Invaders of Mid-Atlantic Natural Areas published by the National Park Service.
see figure 3

2.4 Terms and Vocabulary

Invasive Species

This definition can vary quite a bit. For the purpose of this inventory, "Invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem. " These terms have been provided by the USDA.

Site Types

Open
These are areas with no tree canopy. They consist of mainly shrubby growth, grasses, and perennials.

Edge
A linear perimeter area approximately 20' in width defined by a higher level of invasive plants than its corresponding interior. An edge is only defined when there is a significant difference in the number of invasive plants as compared to the interior areas.. These are usually found along the perimeter of a trail or the edge of a wooded area.

Interior
An area with significant canopy cover that is greater than 20' in depth and is sometimes defined by an edge area or a riparian buffer.

Riparian Buffer
Strips of grass, trees or shrubs established along streams, ditches, wetlands or other water bodies. They trap sediment, filter nutrients, and provide habitat and corridors for wildlife. A minimum width of 30' is recommended.

Utility
This is a corridor, usually with no canopy, that is maintained jointly with a utility company such as sewer or electric.

Canopy Terms

Sapling
A tree aged approximately 0-10 years

Young
A tree aged approximately 10-40 years

Mature
A tree aged approximately 40+ years

Invasives Species List		
Symbol	Common Name	Scientific Name
AA	Tree-of-Heaven	Ailanthus altissima
AB	Porcelainberry	Amepelopsis brevipedunculata
AJ	Mimosa	Albizia julibrissin
AP	Garlic Mustard	Alliaria petiolata
CO	Bittersweet	Celastrus orbiculatus
EU	Autumn Olive	Elaeagnus umbellata
EF	Winter Creeper	Euonymus fortunei
HH	English Ivy	Hedera helix
L	Honeysuckles	Lonicera sp.
LJ	Chinese Privet	Ligustrum japonicum
P	Bamboo	Phyllostachys sp.
PC	Japaneses Knotweed	Polygonum cuspidatum
PM	Kudzu	Pueraria montana
PT	Princesstree	Paulownia Tomentosa
RM	Multiflora Rose	Rosa multiflora

Figure 3: List of Invasive Plants

Figure 3: List of Invasive Plants

CHAPTER 3 MANAGEMENT

3.1 Current Management Strategies

Current invasive management practices involve suppression of Kudzu, plant removal with volunteer effort, the restoration of Riparian areas with native saplings, and the establishment of no mow areas.

This study will outline the scope of the problem as a whole and for individual sites so that appropriate overall and site specific management plans can be established. This guide will help to model park policy for the management of invasive plants as there is currently no comprehensive invasive plant management plan.

3.2 Adaptive Management Strategy

Because of the adaptive nature of invasive plants and the range of environments in which they occur, this outline follows an adaptive management strategy.

An adaptive strategy uses the results from work that has been implemented and subsequently monitored to inform future efforts. The plan may need to be modified each year to gain optimum results and monitoring is key. The excel sheets for the budget and the Arc View maps are all set up to be modified as needed. This strategy follows the guidelines below:

- **Establish Goals:** The goals are to maintain and create an existing healthy weed-free canopy and riparian buffer area first and to protect future tree canopies second through the management of invasive plants. The second goal is to prevent the establishment of new infestations through continued monitoring.
- **Park Inventory:** Weed areas interfering with these goals are continuously identified and updated through consistent monitoring and assigned priorities based on the severity of their impact
- **Define Management Strategies:** Determine effective control options and management strategies for each inventory site and each target species based on the recommendations of this plan.
- **Implement Management Plan:** Most sites will require a minimum of a three year commitment.
- **Monitor Results:** Monitor and assess the impacts of the management actions based on the goals. Remember to assess the effects on both target and non-target species.
- **Evaluate, Modify and Repeat:** Evaluate the effectiveness of the methods as measured against the site goals, refine management procedures and return to step one.

3.3 Management Goals and Strategies

Some invasives may disrupt ecological processes and alter biological diversity while others are more limited in their affects. Managing for all the non-native species inventoried can be overwhelming and ultimately unsuccessful. A management strategy was developed to ensure the most efficient use of resources by targeting only those plants that interfere with the project goals.

The strategy is built on two principles. First, instead of managing against invasives, the goal is to manage for the desired ecological community. This means that consideration must be given to the effect that the management procedures will have on the native communities as well as the invasives.
In most cases, the strategy is not to eliminate the invasives altogether, but to ensure that a

healthy native community is allowed to thrive.

The second goal is to prevent an increase in future invasive plant control through continued monitoring, attacking new infestations first and controlling established invasives second.

General management strategies are listed in order of importance:

1. **Protect what is healthy:**

   Monitor the sites with the healthiest invasive-free native ecosystems that need to be kept free of infestation. The two highest priorities are Jackson-Via Elementary School and the trail areas at McIntire Park. All areas that receive management treatment need to be monitored for at least 2-3 years after completion of the management strategy to ensure they stay at a level of acceptable invasiveness. Continuously scout for new healthy areas that can benefit from monitoring.

2. **Suppress the biggest threats:**

   The top management priority is to eradicate English Ivy, Kudzu, Bittersweet, Porcelain Berry and Grape from all sites where this is practical. This mainly includes areas surrounding an intense Kudzu infestation that are just becoming infected. This is top priority due to its high visibility and aggressive nature.

   Begin by removing the vine from the tree and cutting it back to the core infestation or property line in order to evaluate the full extent of the problem. Problems include hazardous trees, terrain issues, and potential erosion issues. Begin the maintenance procedures once the problem is fully evaluated.

   For all areas that can not reasonably be eradicated, containment lines must be established to prevent further spread. After management has reduced the size of the infestation as much as possible establish containment lines based on salvageable tree canopy and accessible terrain. Establish a regular mowing schedule for any areas that are not immediately manageable. Planting grass may be a successful management strategy in some areas.

   After the largest most visible vine infestations are under control, begin to manage for other vines within the interior areas. This is a problem that is fairly consistent throughout the inventory area.

   Cut all Bittersweet, Porcelain Berry English Ivy, and Honeysuckle from the canopy and treat the larger vines. Ivy will begin to seed when it is mature and climbing, so this is the first step in eliminating the spread of seeds. Treat all large vines immediately after cutting and hand pull vines less than 6" tall.

3. **Manage the moderate:**

   Manage infestations of invasives on the forest floor. Especially in areas where young tree canopy is being prevented from establishing. This includes continued management of vines, Multiflora-rose, and Garlic Mustard.

   A general acceptable target for most areas of high and medium priority is to reduce the visual presence of invasive plants by at least 2/3 in order to limit spreading ability and give the native vegetation access to more resources. Again, the goal is to suppress not eliminate the infestation. So, start with the newly established plants and work your way in towards larger more mature colonies. This will reduce their ability

to spread to surrounding areas.

4. **Manage invasive trees:**

   Many of the more mature invasive trees, Tree-of-Heaven and Mimosa have established in the open edge areas and along riparian buffers and trails. These areas are important to control as they are great locations for seed dispersal.

   These trees will root sprout vigorously after they are cut, creating more potential for seeding and less viable growing area for native plants to establish. These plants should not be managed until a plan is in place that allows for multiple follow-ups.

   Either girdle/treat, cut/treat or basal treat the saplings. This activity can be done in the winter to discourage the reproduction of root suckers. Hand-pull smaller plants that are establishing along trail edges and the forest floor. Girdle/treat or basal treat trees in interior areas to avoid cutting and disposal. The dead tree will also provide wildlife habitat.

5. **Plan for the future:**

   After the most aggressive invasives have been successfully managed, re-vegetate open canopy areas, riparian buffers and areas with erosion concerns with native plants; see appropriate plant lists in appendix. Focus on replanting evergreens and under story plants in addition to the more common native deciduous trees.

   Consider planting a thick edge of native shrubs on highly susceptible edges, trails, utilities, or roadways. Thick edge plantings have been shown to help prevent invasive plant seeds from penetrating into interior forest areas. The plantings along Route 250 seem to be successful at preventing the establishment of invasives, for example.

CHAPTER 4
SITE INVENTORY

The following section contains the information that was recorded for the inventoried park areas: Azalea Park, Buford Middle School, Greenbrier Park, Greenleaf Park, Jackson-via Elementary School, Johnson Elementary School, Jordan Park, McIntire Park, Meadow Creek Natural Area, Northeast Park, Pen Park, Quarry Park, Riverview Park, Tonsler Park, and Route 250 from McIntire Park to the 29N interchange. These areas are indicated on the following context map.

4.1 Inventory Summary

The inventory looked at the tree canopy, riparian buffers, and regenerative potential of the forest canopy in fifteen of Charlottesville's park areas. This includes parks, natural areas, road corridors, and schools. Most of the areas inventoried are wooded, however there are a few open canopy or no mow areas. Active recreation areas that are heavily maintained were not inventoried.

The total inventoried acreage of these areas is approximately 571 acres, 244 of these acres are to be considered management areas where invasive plants are having some impact on the program goals. This means that 42% of the inventoried sites have at least some issue with invasive plants. 12.6 acres are considered high priority and will require more immediate attention in order to avoid a potentially greater problem.

The sites with the highest overall priority are McIntire, Jackson-Via, Greenleaf, and Meadow Creek. These sites are characterized as having either extremely healthy native areas at risk of being invaded, or a large percentage of highly visible highly aggressive invasives that have begun to compromise the tree canopy.

Sites that are described as being a lower priority are Riverview, Pen: Golf, and Johnson. These sites are characterized by not having many areas that are readily accessible to the public or areas that do not pose a threat of spreading invasive plant material to surrounding healthy sites.

A majority of the areas fall into a mid level maintenance priority. These areas show a consistent level of established invasives especially on the forest floor. The types of plants and degree of infestation are fairly consistent. The wooded sections are mostly young and deciduous and do not cover large contiguous tracts of land. Many are located near other infested areas or highly urbanized settings. Almost all areas have some water component.

The native canopy for the most part is young with scattered mature trees. The native canopy consists mainly of Tulip Poplar, Sycamore, Pine, Oak and to a lesser degree Maple, Hickory, Locust, and Beech. The mature trees are likely to be Tulip Poplar, Pine, and/or Sycamore. A typical native understory consists of Holly, Dogwood, Sassafras, Sumac, and Cherry. The understory in all areas is moderately to heavily and consistently invaded with invasive shrubs and vines.

The most consistent invasive plants in order of prevalence are English Ivy, Multiflora-Rose, Grape, Honeysuckle, Bittersweet, Mimosa, Tree-of-Heaven, and Kudzu. Most forest floors are scattered with mature groupings of Rose and young or established invasive vines attaching themselves to the tree trunks.

All areas have some English Ivy infestation with moderate to severe colonies scattered throughout. Much of the Ivy has started to climb, is mature, and seeding. Grape, Honeysuckle, shrub and vine, and saplings are establishing mainly on the perimeter of the inventoried sites. Honeysuckle shrubs and 6" tall seedlings are consistently established in most forest interiors.

Most areas do not have an edge of more intense infestation as most infestations have already naturalized on the interior of the wooded areas.

However, the most severe canopy infestations are happening in the open areas and edges, which is consistent with Kudzu's growth habits. Most of the rail road buffers and utility paths, especially those that are not mowed and double as trails, showed heavier infestations than neighboring areas. Areas with fewer disturbances, larger, continious tracts of land with older tree populations, have less infestation.

4.2 Management Summary

The first year of management will be dedicated to those areas with the most severe infestations or high priority areas. This management will span many inventory areas. In most cases, this is a Kudzu or English Ivy infestation that has overtaken the tree canopy. Prioritizing these areas will allow the most visablel and aggressive invasives to be managed first and will also set the stage for the management of larger spaces so that they can be approached with more efficiency and effectiveness.

The successive years approach maintenance site by site in order to keep mobilization and monitoring of the projects more efficient. The sites addressed first are those that have the most problematic invasive species in combination with the most accessible park land, both physically and visually.

The parks that are approached last, are those with land that is not readily accessible to the public or has natural boundaries, such as a road, railroad, or athletic fields that will prevent the mobility of the existing invasive invasives from being of the highest concern.
The management plan spans ten years. This allows for priority phasing of the sites in addition to the annual monitoring and it also accounts for three successive years of maintenance for each site once management has begun. It is important to accomplish the goals defined for a site before moving onto a new site. Therefore, the phasing of the sites plan may need to be modified as budget and time constraints present themselves.

Charlottesville Parks and Recreation Inventory Sites

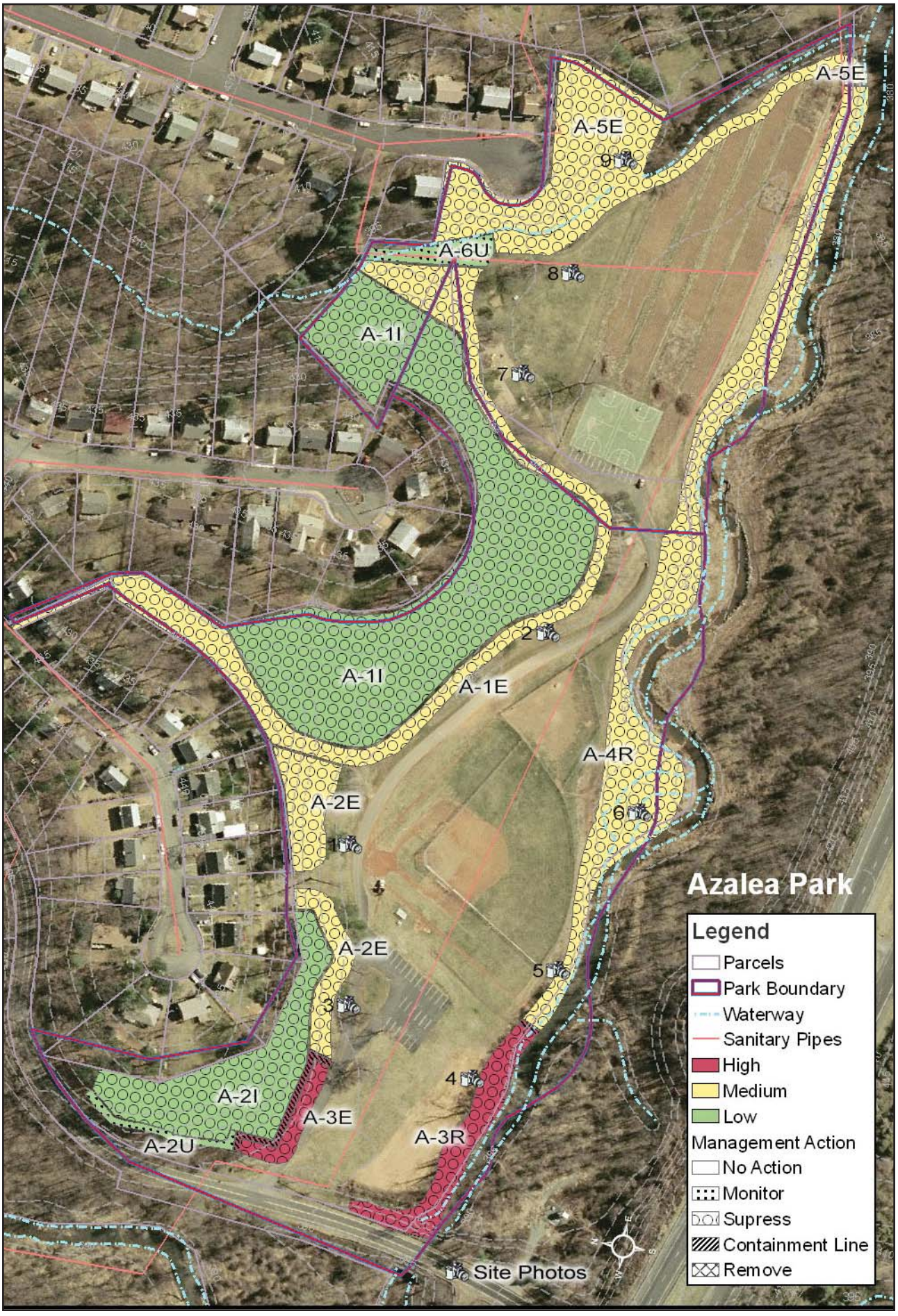
Map of Inventoried Areas

4.3 Azalea Park Inventory

Inventory Summary

This is a 23 acre park with approximately 9 acres of invasive management areas. This neighborhood park has basketball courts, play area, picnic tables, garden plots, dog area, ball field, swings, and open fields. Its main use is the dog area, the ball field and general passive recreation. It is bordered by residential property and I-64. The park is also bordered on the south by Moore's Creek with pedestrian access. There are sewer and electric utility paths that run within the site as well as a connection to the Rivanna Trail.

The native forest community consists of Hickory and Poplar. Other existing native species are: Beech, Pine, Sassafras, Cherry, White Oak, Hickory, Dogwood, Alder, Hazelnut, Cedar, Holly, Poplar, Ash, Blueberry, Jewelweed, and Virginia creeper. Overall, the tree canopy is young with scatterings of mature trees throughout the park, mostly Tulip Poplar. The canopy is mainly deciduous. The open areas are fairly flat. The terrain of the areas to the north is moderately to steeply sloping up towards the housing. The area around the stream is relatively flat, sandy and with almost no low lying wet areas.


A-5E
A-5E
9
A-6U
8
A-1I
7
A-1I
A-1E
2
A-4R
A-2E
6
1
Azalea Park
A-2E
5
3
4
A-2I
A-3E
A-3R
A-2U
Site Photos
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove

Azalea Park Photo Inventory

1 Mature Elaeagnus shrubs

2 Edge condition along entrance drive

3 Grape vines in the tree canopy

4 Grape in the canopy next to the river

5 Mimosas in riparian buffer

6 Elaeagnus shrubs in open area

7 Edge condition

8 Edge condition

9 Vines in the canopy in interior open area

Area Inventories

A-1E

Site Description: Healthy young tree canopy with saplings. Invasives vines are starting to establish on the edge and Elaeagnus is fairly established as larger shrubs. There are a few openings in the canopy along the edge. The terrain is starting to slope upwards.
Site Type: Edge
Acreage: .67 acres
Invasive Species: Elaeagnus, Bittersweet, Honeysuckle, Multiflora Rose
Site Concerns: some erosion

A-1I

Site Description: A young tree canopy with some saplings and understory shrubs. It is mostly a deciduous canopy with a hilly terrain. The canopy is healthy with vines beginning to establish on the floor and invasive shrubs are well established and scattered throughout the woods.
Site Type: Interior
Acreage: 2.94 acres
Invasive Species: Elaeagnus, Bittersweet, Honeysuckle, Multiflora Rose
Site Concerns: erosion concerns

A-2E

Site Description: This is a 30' edge that is similar to the canopy with the exception of more mature trees. The canopy here is young with some scattered mature trees and saplings.
Site Type: Edge
Acreage: .45 acres
Invasive Species: Elaeagnus, Honeysuckle, Grape, Bittersweet, Privet, Multiflora Rose
Site Concerns: none

A-2I

Site Description: A healthy tree canopy of Hickory and Poplar along a steep slope. This area is bordered by residential properties and a power line easement.
Site Type: Interior
Acreage: .84 acres
Invasive Species: Elaeagnus, Honeysuckle, Grape, Bittersweet, Privet, Multiflora Rose
Site Concerns: none

A-2U

Site Description: This is an open regularly mowed area about 30' in width that is maintained by the power company. There is a planting of Elaeagnus along the edge and a few pine trees.
Site Type: Utility
Acreage: .06 acres
Invasive Species: Elaeagnus
Site Concerns: maintenance coordination

A-3E

Site Description: The canopy is Walnut, Locust, Poplar and Sycamore. This area has young trees with vines that are half way up the tree trunks and in some areas fully covering the tree canopy.
Site Type: Edge
Acreage: .15 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Wineberry
Site Concerns: none

A-3R

Site Description: This is a 20' wide riparian buffer area with a young canopy of Walnut, Locust, Tulip Poplar, Willow and Sycamore 50% of which is covered with vines. There are many invasive vines on the opposite side of the creek that are perhaps a result of the highway and will be a factor to consider when managing this area. This area is buffered by Moore's Creek and an open mowed area that is in the no mow program.
Site Type: Riparian Buffer
Acreage: .39 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven, Mimosa
Site Concerns: neighboring invasive vines, creek

A-4R

Site Description: This area is mostly open with large shrubs and tall grasses and a scattering of young trees. This is a 20'-50' wide riparian buffer area with a young canopy of Walnut, Locust, Poplar, Willow and Sycamore. There are sapling invasives and vines, including Kudzu, establishing in some areas. There are many invasive vines on the opposite side of the creek that are perhaps a result of the highway and will be a factor to consider when managing this area. This area is buffered by Moore's Creek and an open mowed area that is in the no mow program. There is pedestrian access in this area and a narrow sandy foot trail.
Site Type: Riparian Buffer
Acreage: 1.64 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven, Mimosa
Site Concerns: neighboring invasive vines, creek

A-5E

Site Description: This area has a young canopy with some nice Willow and some mature trees that are being compromised 100% by Grape vines in the areas heading away from the creek. This is creating open spaces in the canopy. There is a connection across the creek to the RTF located here and a trail that connects to the neighborhood.
Site Type: Edge
Acreage: .96 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven, Mimosa
Site Concerns: open canopy

A-6U

Site Description: A young tree canopy with some saplings and understory shrubs. It is mostly a deciduous canopy with a hilly terrain. The canopy is healthy with vines beginning to establish on the floor and the edge and invasive shrubs are well established and scattered throughout the woods.
Site Type: Interior
Acreage: .13 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven, Mimosa
Site Concerns: open canopy

Azalea Park Management

Management Summary

The Target species at this park are Vines, Elaeagnus, and invasive saplings. There are two high priority areas near the park entrance that should be treated first. These areas, A-3E and A-3R, should be cleared of vines to the best extent possible to expose the stems of the vines. Cut and treat mature vines immediately afterwards. Establish control lines around the two most serious areas at the west end of the park. Evaluate and remove any trees that may be a safety hazard. Follow up and monitor for re-sprouting, treat as necessary.

Next, the interior areas should be scanned for young invasives that can be mechanically removed. Remove any newly established populations of Elaeagnus, Bittersweet, Multiflora-Rose, Privet, or Mimosa by hand. After new infestations have been cleared, focus on reducing the size of larger mature infestations. Reduce their visual presence by at least 1/3. Cut and treat all saplings, especially on the edge areas and along the creek bank. Only treat these species when follow up visits are guaranteed as they will re-sprout and seed voraciously. Lastly, set a regular maintenance schedule for the open canopy areas and areas that are being replanted to avoid the establishment of invasives.

Across Moore's Creek there are extensive populations of invasive vines that will remain a threat to the park. The river bank should be monitored for spreading weeds.

The compost area should be established away from the tree canopy to prevent seed dispersal into the wooded areas. This park should be monitored at a minimum of twice annually.

Management Priorities

1. Suppress and eliminate to the Grape, Porcelainberry and Bittersweet vines that have established in the tree canopy.

2. Eliminate all mature Elaeagnus shrubs from the forest edge and interior.

3. Manage the forest interior for the prevention and further establishment of invasive shrubs and vines

4. Continue to re-vegetate a 30' riparian buffer area

Management Suggestions

(Type, Treatment, Priority)

A-1E Edge, Suppression, Medium
Elaeagnus is the main concern here and should be cut and treated with chemicals. Small shrubs and vines can be hand pulled and any re-sprouting weeds should receive a foliar spray. In areas where there is an open canopy, native trees and shrubs should be planted to prevent further intrusion from wind blow invasive seeds.

A-1I Interior, Suppression, Low
There is no significant canopy damage, so the focus is on prevention and monitoring. There are a fair number of vines and shrubs beginning to establish in the understory that need to be suppressed. Many of the species are small and will respond to hand pulling, however minimize this procedure in areas that are susceptible to erosion. Other procedures will include cut and treatment of larger shrubs and foliar spraying of persistent vines and shrub that respond to cutting by sending out sucker sprouts.

A-2E Edge, Suppression, Medium
Cut and treat the Elaeagnus and saplings in this section. Hand pull weeds less than 6". Foliar

spray any re-sprouting shrubs.

A-2I Interior, Suppression, Medium
This area is not readily accessible and therefore is not a top priority. Maintain by clearing weeds from forest floor, hand pull and cut/treat larger shrubs.

A-2U Utility, Monitor, Low
Cut and treat the Elaeagnus in this area to prevent seeds from spreading. Establish a joint management procedure with the utility company.

A-3E Edge, Suppression, High
This is a high priority area and should be managed promptly. Cut and clear the vines to fully assess the situation. Cut and treat the larger vines. Any damaged trees should be evaluated and felled if they are deemed a safety hazard. Vines should be managed before any disturbance of the soil to avoid excessive seed contamination.
A containment line should be established to limit the spread of these vines. When the vines have been reasonably maintained, focus on re-establishing a native tree and shrub edge.

A-3R Riparian, Suppression, High
This is a high priority area and should be managed promptly. Be careful to not overspray or use chemicals that are harmful to water quality. Establish a maintenance procedure for the understory in this area. This area should be widened to a minimum of 30'. Native riparian buffer should be re-established when vines have reached a level of reasonable control. Also, establish a containment line to prevent the spread of these vines.

A-4R Riparian, Suppression, Medium
If there is not a sufficient riparian buffer of a 30' width, native vegetation should be planted. Make an effort to cut and treat any invasive saplings along the creek. Establish a management program for the no mow areas that have been replanted to make sure that invasives do not establish before the canopy is mature.

A-5E Edge, Suppression. Medium
Cut all vines from the canopy and assess the extent of invasion. Cut and treat all mature vine stems and invasive shrubs. Foliar spray small shrubs. Assess any tree damage and take measures for any trees that present a safety concern. Hand pull any weeds less then 6" tall. Establish a management procedure for grass clippings, which may introduce weed seeds, so they do not end up in the canopy area. Establish containment lines around dense populations of vines that have invaded the canopy.

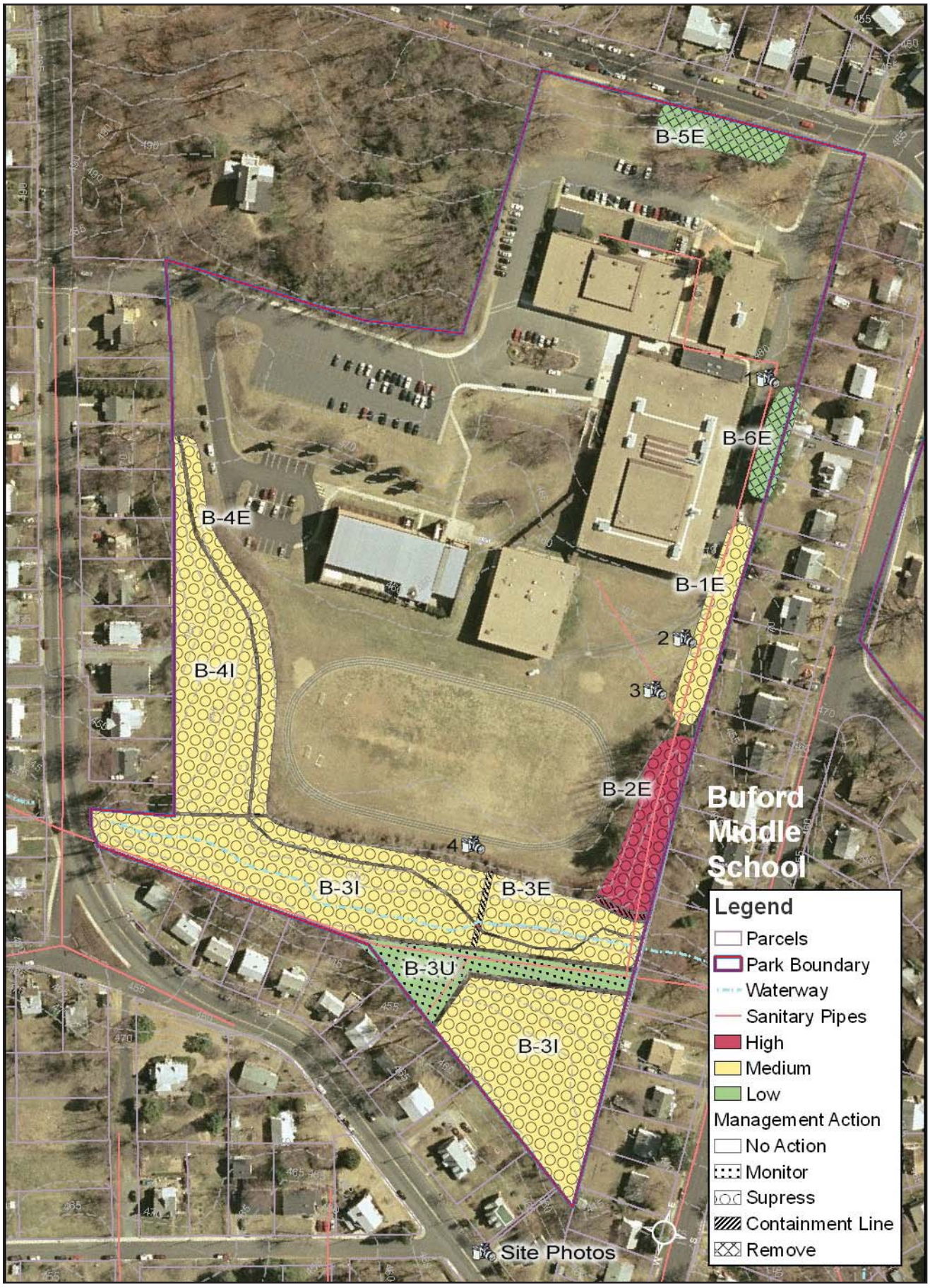
A-6U Utility, Monitor, Low
Foliar spray the areas along the trail as most weeds are low growing and shrubby. Work to estalish a joint maintenance plan with the utility company. Monitor this area for the establishment of parent plants.

4.4 Buford Middle School Inventory

Inventory Summary

This wooded area is around the middle school track and behind the Smith Recreation Center. There is approximately 5.33 acres of management area. There is a young deciduous canopy of Sycamore, Tulip Poplar, Locust, and some Pine. The canopy is patchy in this area with some areas of die back and severe vine coverage.

The interior of the woods is consistently scattered with invasive shrubs and vines. The terrain slopes steeply down from the track area about 4' to a small creek with floodplain. The site is largely unused but there is a primitive nature trail the runs along the creek.


B-5E
B-6E
B-4E
B-1E
B-4I
B-2E
Buford
Middle
School
B-3I
B-3E
B-3U
B-3I
Site Photos
1
2
3
4
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove

Buford Middle School Photo Inventory

1 English Ivy growing under Pines

2 Porcelainberry growing in open area

3 Vines growing into canopy

4 Open area in canopy consumed by vines

Area Inventories

B-1E

Site Description: There is very little canopy in this area and it is being overtaken by Multiflora Rose and some Bittersweet. The terrain is very steep and inaccessible.
Site Type: Edge
Acreage: .24 acres
Invasive Species: English Ivy, Multiflora Rose, Bittersweet, Mimosa,
Site Concerns: steep terrain

B-2E

Site Description: This area is mainly mature Pine and young Locust with some Sycamore and Tulip Poplar. The terrain is very steep here. The canopy is still healthy but there are vines establishing on the trunks and this area borders a highly infested area.
Site Type: Edge
Acreage: .33 acres
Invasive Species: English Ivy, Bittersweet, Multiflora Rose
Site Concerns: steep terrain

B-3I

Site Description: Most of this area has a healthy canopy of Sycamore, Maple, and Tulip Poplar. This is a great space for a more developed nature trail. The understory is consistently thick with invasive shrubs and vines that are fully established and starting to climb the tree trunks. This canopy has die back in some areas due to heavy vines.
Site Type: Interior
Acreage: 2.3 acres
Invasive Species: Multiflora-Rose, English Ivy, Bittersweet, Porcelainberry
Site Concerns: creek

B-3E

Site Description: This area is heavily invaded with invasives and there is open canopy in areas due to extensive vines and die back. The terrain slopes steeply down to the creek where the soil is saturated in places.
Site Type: Edge
Acreage: .49 acres
Invasive Species: Porcelainberry, Bittersweet, Multiflora-Rose, Tree-of-Heaven, Mimosa, Honeysuckle
Site Concerns: steep terrain, creek

B-3U

Site Description: same as B-3I
Site Type: Utility
Acreage: .37 acres
Invasive Species: Grape, Bittersweet, Multiflora-Rose, Tree-of-Heaven, Mimosa, Honeysuckle Site Concerns: none

B-4I

Site Description: The canopy is good in this area but the understory is consistently scattered with invasive vines and shrubs. The vines are establishing on the tree trunks. There are some areas of open canopy where Grape has fully established on the interior of this site. The terrain slopes from the field down about 3' into the woods towards a perennial creek. There are some erosion issues along this creek probably due to excessive run off.
Site Type: Interior
Acreage: .87 acres
Invasive Species: Vinca, English Ivy, Grape, Bittersweet, Multiflora-Rose
Site Concerns: perennial stream, steep terrain

B-4E

Site Description: same as above with invasive saplings beginning to establish on the edge where there is not a consistent mow line established.
Site Type: Edge
Acreage: .25 acres
Invasive Species: English Ivy, Grape, Bittersweet, Multiflora-Rose, Tree-of-Heaven
Site Concerns: steep terrain

B-5E

Site Description: This is a stand of Pine and Dogwood that is in good condition.
Site Type: Edge

Acreage: .17 acres
Invasive Species: Privet, Tree-of-Heaven, Mimosa,
Site Concerns: sloped terrain

B-6E

Site Description: The canopy is mostly Pine. The canopy is free of invasives. It is bordered by residential areas and a parking area.
Site Type: Edge
Acreage: .11 acres
Invasive Species: Bittersweet, Tree-of-Heaven
Site Concerns: none

Buford Middle School Management

Management Summary

The target species at this park are invasive Porcelainberry, Multiflora-Rose, and English Ivy. There is a good opportunity for a nature trail here that could be managed by the school children, otherwise the space is unused. The intention of this space will ultimately define the management strategy.

If the space is to remain unused the focus should be on killing off the vines in the canopy and restoration of open canopy areas. After the vines are cut at the base and begin to die off, trees should be evaluated for damage and safety hazards should be addressed. If the area is going to be used for its trails then more effort should be put into the management of invasives.

A containment line should then be established around the area where vines have intruded into the canopy. While it may not be feasible to eliminate the vines, they should not be allowed to progress past the containment line.

Clear areas of vines to the best extent possible in order to expose their stems. Cut and immediately treat the stems of mature vines with herbicide. Allow the vines to re-sprout and then treat with a foliar spray. This treatment should be repeated as necessary until the vines have been reduced by 2/3 or contained to a manageable area that may still require cutting multiple times a year. After vines have been managed for a season, evaluate the trees for damage and remove safety hazards.

Multiflora-Rose and English Ivy should be the next targets. Eliminate new infestations of Rose and Ivy and secondly try to reduce the overall size of more mature infestations. Remove Ivy from tree trunks and hand pull from surrounding areas. Treat large vines after

cutting.

Lastly, Invasive trees on the perimeter and in open canopy areas should be cut and then treated. Only cut trees when follow-up visits are guaranteed as they will re-sprout with vigor thus increasing their opportunities for seed production.

Management Priorities

1. Treat all high priority areas first, **B-2E** and establish the **containment area**.

2. Cut and treat all invasive vines that are in the tree canopy. The goal is to reduce their visual presence by at least 2/3 and remove them from the canopy completely.

3. Target Multiflora-Rose and English Ivy to eliminate newly established communities and reduce the visual presence of the established communities by 2/3.

4. Cut, girdle or basal treat invasive trees on the border and in open canopy areas
5. Establish a joint maintenance plan with the utility company

6. Re-vegetate in areas of open canopy with native trees and shrubs.

Management Suggestions
(Type, Treatment, Priority)

B-1E Edge, Suppression, Medium
Multiflora Rose is the main concern here and should be cut and treated with chemicals. Weed eat small shrubs and vines and any re-sprouting invasives should receive a foliar spray. In areas where there is an open canopy, native trees and shrubs should be planted to prevent further intrusion from wind blow invasive seeds.

B-2E Edge, Suppression, High
Cut and clear the vines to fully assess the situation. Cut and treat the larger vines. Any damaged trees should be evaluated and felled if they are deemed a safety hazard. Vines should be managed before any disturbance to the soil to avoid excessive seed contamination. Hand pull juvinile vines and shrubs. Cut and treat any large invasive shrubs. When the vines have been reasonably maintained, focus on re-establishing a native tree and shrubs and erosion control.

B-3I Interior, Suppression, Medium
see description for B-2E

B-3E Edge, Suppression, Medium
see description for B-2E
This area will require a containment line to prevent the spread of Porcelainberry. After the vines have been removed from the canopy and the extent of the infestation has been established, establish the containment lines in the most reasonable locations. The utility passage can act as the back edge of the cotnainment line.

B-3U Utility, Monitor, Low
Work to esatblish a joint management plan with the utility company. Monitor this area annually specifically for the establishment of adult parent plants.

B-4I Interior, Suppression, Medium
see description for B-2E

B-4E Edge, Suppression, Medium
see description for B-2E

B-5E Edge, Removal, Low
Hand pull any juvinile invasives. Cut and treat all larger plants.

B-6E Edge, Removal, Low
see description for B-5E
Consider mulching this area in order to cut back on the establishment of invasives.

4.5 Greenbrier Park Inventory

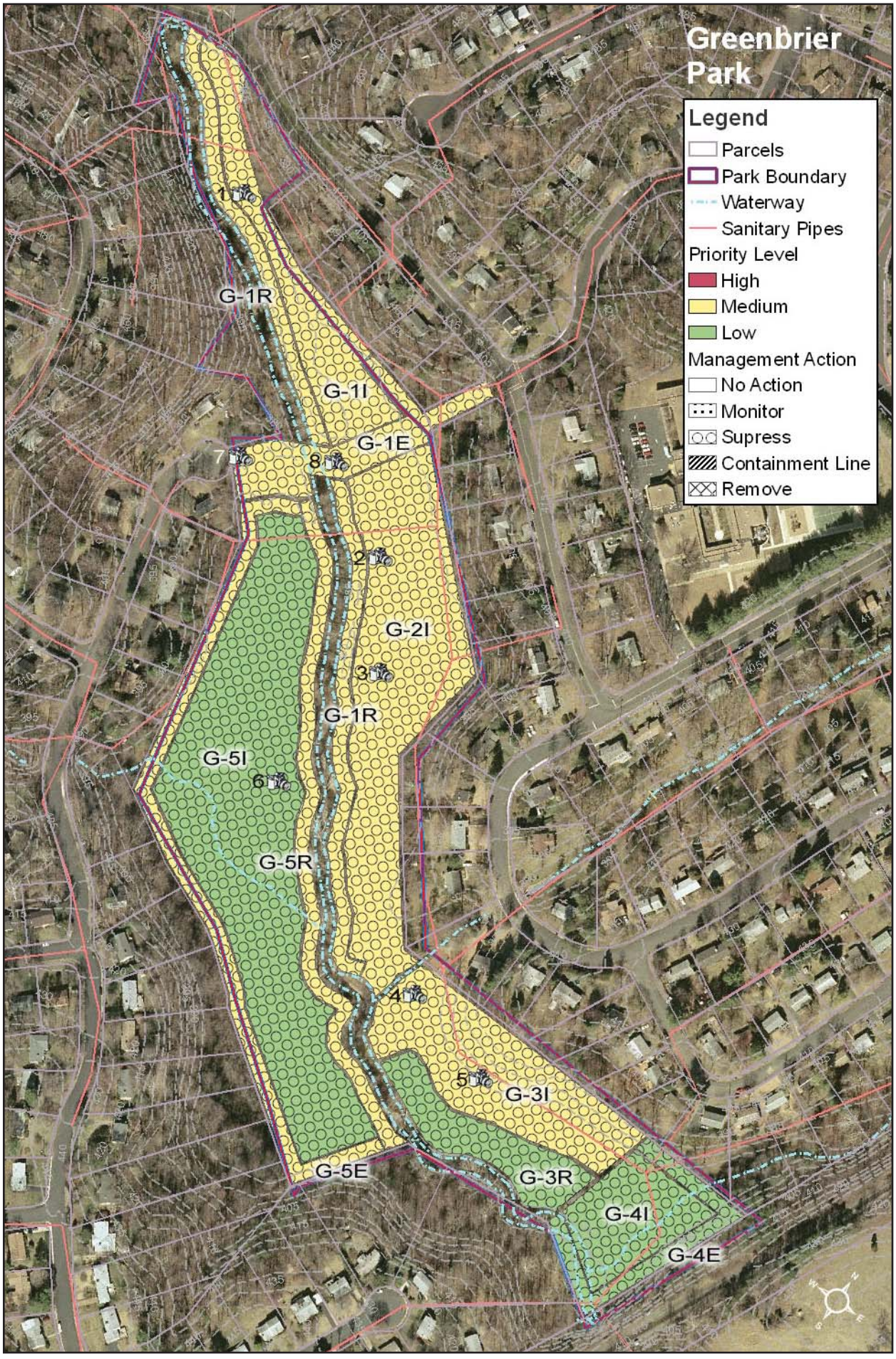
Inventory Summary

This is a 28.3 acre park with 21.23 acres of management area. The RTF passes though this park and it is mainly used as part of the trail system as it is has no developed active-use areas. It does have dirt trails and a footbridge that extends over Meadow Creek.

There is a natural marsh found here that is not readily accessible to pedestrians, but an effort should be made to protect the health of this area as a biological gem.

The canopy is in good condition overall with some open areas due to blow down and tree decay. There is a good mix of young trees with some scattered mature trees that are starting to appear unhealthy.

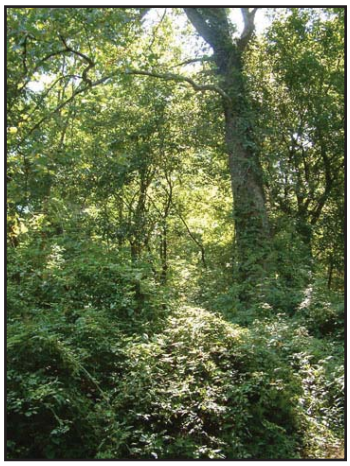
The canopy consists of Box elder, Maples, Sycamore, Walnut, Oak, and Cherry. The understory is weedy in most places with patchy invasive shrubs and perennials especially towards the creek, picnic, and entrance areas.


Greenbrier Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
1
G-1R
G-1I
7
8
G-1E
2
G-2I
3
G-1R
G-5I
6
G-5R
4
5
G-3I
G-5E
G-3R
G-4I
G-4E

Greenbrier Park Photo Inventory

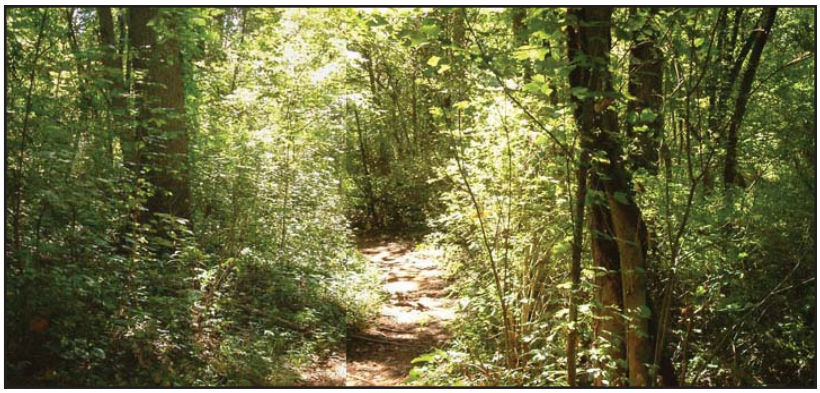
1 Vines along the trail

2 Erosion issues



3 Rose on the forest floor

4 Trail edge along drainage ditch



5 Rose and vines establishing along trail edge

6 Microstegium in open canopy area

7 Vinca and Ivy at park entrance

8 Mimosa along the creek bank

Area inventories

G-1I

Site Description: This is an area with a good mix of young and mature trees. There are areas of open canopy where invasive shrubs have begun to fill in the forest floor. The terrain is moderate and low in some areas retaining water seasonally. Small perennials that are found in creek side and moist environments are present here and are competing with invasive perennials. The invasives are scattered consistently throughout the forest floor on the edge and the interior. In some areas 75% of the floor is covered with invasives, however, the tree canopy is in good condition.
Site Type: Interior
Acreage: 1.7 acres
Invasive Species: Multiflora Rose, Garlic Mustard, Vinca, Bayberry
Site Concerns: low wet areas,

G-1E

Site Description: This area has a paved trail that connects the neighborhood with the school. There is a footbridge and picnic area here. The canopy is healthy, but competing with invasives as saplings as starting to establish especially along the stream bank and evergreen vines are working their way into the canopy and have established themselves on the forest floor. There are areas of heavy erosion along the trail.
Site Type: Edge
Acreage: 1.09 acres
Invasive Species: Multiflora Rose, English Ivy, Garlic Mustard, Mimosa, Tree-of-Heaven
Site Concerns: erosion

G-1R

Site Description: This is an area with a good mix of young and mature trees. There are areas of open canopy where invasive shrubs have begun to fill in the forest floor. The terrain is moderate to flat along the trail. The trail is a 10' open area with a sandy base. The trail is close to the river and becomes the riparian buffer in many areas. The drop to the river is up to 4' in places and some erosion is present.
Site Type: Edge
Acreage: 1.45 acres
Invasive Species: Multiflora Rose, Bittersweet, Tree-of-Heaven, Mimosa, Garlic Mustard, Bayberry, Climbing Yam
Site Concerns: erosion, creek

G-2I

Site Description: see description for G-1I
Site Type: interior
Acreage: 4.2 acres
Invasive Species: Multiflora-Rose, Garlic Mustard, Mimosa, Bittersweet, Climbing Yam
Site Concerns: floodplain areas

G-3I

Site Description: Canopy is in good condition with some grape in open canopy areas. There are fewer large trees with the exception of a few Poplars. There are more young trees and saplings here. There are less vines here than in previous sections. The understory is much denser here with shrubby invasives and the trail narrows from a 20' to a 5' opening so the canopy is not as open along the trail and there are not as many open areas in general. Canopy consists of Sycamore, Tulip Poplar, Willow, Beech, and Maple.
Site Type: Interior
Acreage: 2.47 acres
Invasive Species: Grape, Multiflora Rose, Mimosa, Tree-of-Heaven
Site Concerns: floodplain areas, sewer line

G-3R

Site Description: same as above with the addition of more open canopy areas
Site Type: Riparian Buffer
Acreage: 1.15 acres
Invasive Species: Grape, Multiflora Rose, Privet, Bittersweet, Mimosa
Site Concerns: floodplain area, water

G-4I

Site Description: The canopy is more open

here and the understory is less dense with invasive shrubs. There are some erosion issues near the railroad due to traffic and compaction.
Site Type: Interior
Acreage: 1.2 acres
Invasive Species: Grape, Multiflora Rose, Privet, Bittersweet, Mimosa
Site Concerns: erosion, water

G-4E
Site Description: same as above
Site Type: Edge
Acreage: .58 acres
Invasive Species:
Site Concerns:

G-5I
Site Description: The canopy is healthy and young with species similar to previous sections. It is mainly deciduous. There are many open canopy areas especially in areas that tend to have more saturated soils. There are some areas of blow down. The understory is open with many perennial invasives. There are vines throughout this section however the canopy is still free of invasives.
Site Type: Interior
Acreage: 6.29 acres
Invasive Species:
Site Concerns: floodplain, water

G-5E
Site Description: same as above
Site Type: Edge
Acreage: 1.3 acres
Invasive Species:
Site Concerns:

G-5R
Site Description: same as above
Site Type: Riparian Buffer
Acreage: 1.05 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose
Site Concerns: water

G-VM
Site Description: There is a small area at the cul-de-sac park entrance that is overgrown with Vinca. The canopy is still healthy but the plants are starting to climb the tree trunks.
Site Type: Parent Plant
Acreage: .03 acres
Invasive Species: Vinca
Site Concerns: none

Greenbrier Park management

Management Summary

The target plants at this park are vines, Multiflora-Rose, Garlic Mustard, and Invasive saplings. Most of this site is low lying or marshy, take care to avoid chemicals that will have a negative impact on the wetland biology.

Cut all vines at the base to kill them from the tree canopy. Treat any mature vines. If there is English Ivy or Vinca pull all runners as best possible to limit spread of infestation. Establish a monitor line around all major vine infestations and monitor for spread.

Next, focus on understory invasives such as Rose and Mustard. Start with newly established infestation and work inward towards the larger more mature infestations. The areas of least intense infestations are in the southeast; the areas of more intense infestation are in the northwest and at the main entrance and pedestrian bridge. Eliminate new infestations and any invasives that can be hand pulled. Reduce larger infestations by at least 40% with treatments of foliar spray and cut/treat.

Along the creek and paved trail areas there are some issues with invasive saplings, Mimosa and Tree-of-Heaven, which are maturing to seed. When follow up visits are assured, cut and treat all invasive saplings repeatedly. In areas where there is no riparian buffer, where there has been blow down or invasive plant removal, continue planting with native trees and shrubs.
Treatment is consistent for all park areas except where noted.

Management Priorities

1. Cut vines at base to kill the vines in the tree canopy, treat larger vines with herbicide immediately after cutting, and establish monitor lines around any serious infestations
2. Manage understory invasives by hand pulling and cut/treat to reduce the infestations by at least 2/3

3. Cut/treat, girdle/treat, or basal treat all invasive saplings, especially along the creek and entrance areas.

4. Establish a joint maintenance plan with the utility company

Management Suggestions
(Type, Treatment, Priority)

There are no high priority areas. Management suggestions for all areas should follow the priorities. Additional suggestions are listed below.

G-2I Interior, Suppression, Medium
There are some open canopy areas here where older trees are becoming sickly and dieing off. Vines have started to intrude. Cut/treat mature vines at the base and manage open canopy areas as open space until maintenance is under control and there is an established schedule. Re-vegetate with native trees and shrubs.

G-3I Interior, Suppression, Medium
There is an area near the small pedestrian bridge where there is open canopy and intense understory weeds and vines. Cut this area to assess the full situation. Treat any large invasives and continue maintenance with a foliar spray for any re-sprouting. This area could with be planted with native grasses for easier maintenance or with natives from the riparian planting list.

G-5I Interior, Suppression, Low
This area is not a top priority as it is not readily accessible and there are no clearly defined trails in this area. There are however some important bog areas that need special attention and care that they are not overwhelmed with invasive.

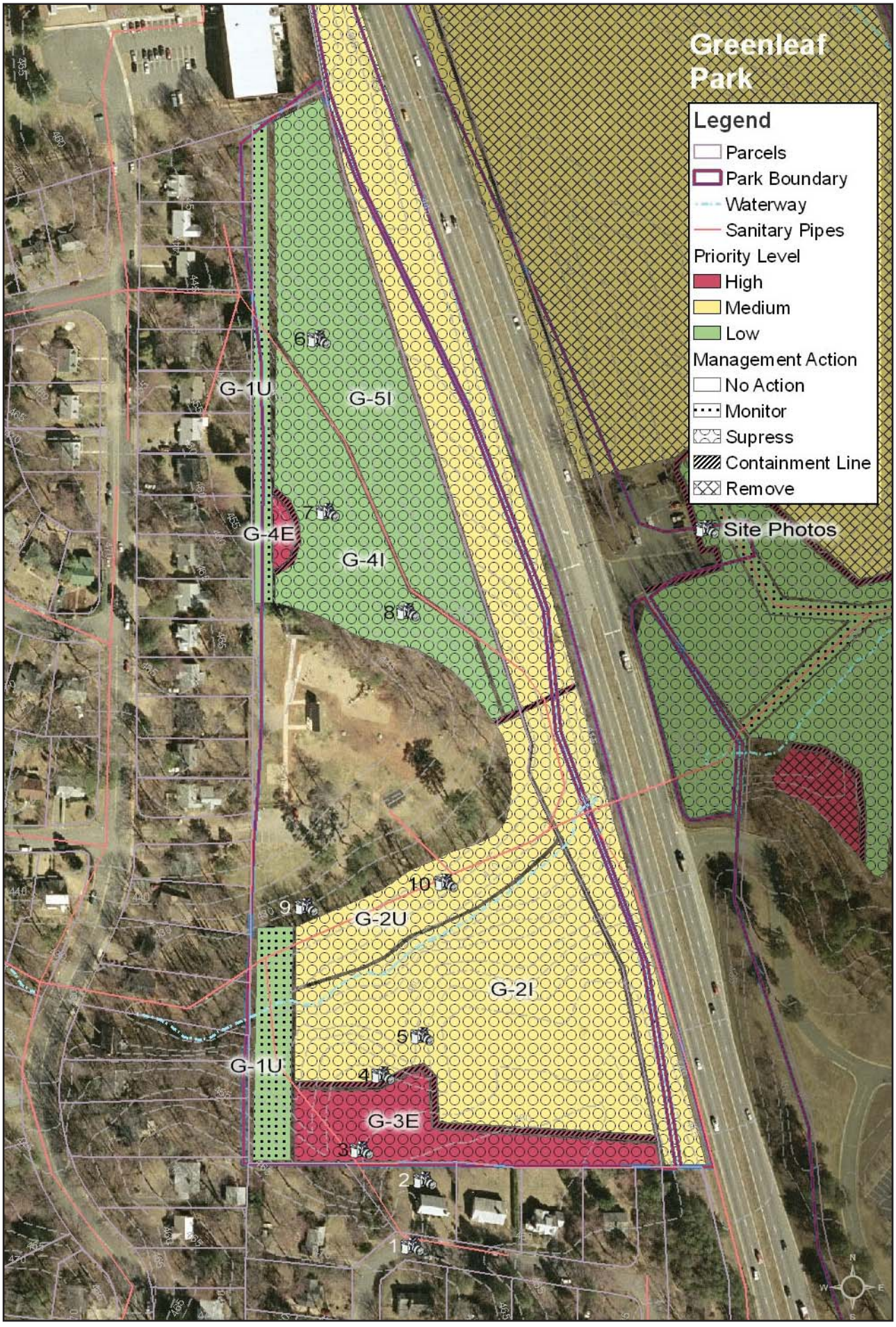
4.6 Greenleaf Park Inventory

Inventory Summary

This is a 14 acre park with 10 acres of management area. There is an open area with play structures, basketball court, and a picnic shelter. There are wooded trails that run the length of the park to Walker School connecting it to the neighborhood.

The canopy consists of a mainly young deciduous Tulip Poplar, Maple, Beech, Hickory, and some Pine. The canopy is in good condition in most areas. Invasive vines are a serious threat at this park. The southern perimeter is completely infested with Kudzu and English Ivy that is climbing the trunks of trees consistently.

There are some large areas of blow down here due to wind and Kudzu damage. The terrain is hilly on the southern section with some erosion issues especially near the creek where there are pedestrian crossings. It is flatter in the northern areas, but there are still some erosion concerns near the creek. There are some areas of blow down from storm damage in the areas along route 250. Invasives have not yet taken advantage of this area.


Greenleaf Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos
G-1U
G-5I
G-4E
G-4I
G-2U
G-2I
G-1U
G-3E
1
2
3
4
5
6
7
8
9
10

Greenleaf Park Photo Inventory

1 Ivy and Kudzu at park entrance

2 Kudzu on park border area

3 Kudzu within park

4 Trail edge

5 English Ivy on tree trunks

6 Tree of Heaven along trail

7 Bamboo infestation

8 Example of forest interior

9 Utility area

10 English Ivy on tree trunks

Area inventories

G-1U
Site Description: This area has little to no canopy and is maintained by the utility company. Saplings and large shrubs are starting to establish here with a very dense undergrowth of weeds.
Site Type: utility
Acreage: .78 acres
Invasive Species: Tree-of-Heaven, English Ivy, Mimosa, Multiflora-Rose, Bamboo
Site Concerns: maintenance coordination, slopes

G-2I
Site Description: English Ivy is major concern in this area throughout. It is consistently climbing the trees and there are mature plants here. The canopy is still healthy but the understory is consistently infested with aggressive vines and very sparsely populated with native groundcover. The edge of this area was managed in 2005 through cutting and pulling to keep the vines out of the canopy. There is a small creek that runs the northern perimeter of this section and some steep topography with drops of 5' in some areas.
Site Type: Interior
Acreage: 3.76 acres
Invasive Species: English Ivy, Multiflora Rose, Bittersweet, Mimosa, Kudzu
Site Concerns: erosion, creek, native trees

G-2U
Site Description: same as above
Site Type: Utility
Acreage: .94 acres
Invasive Species: English Ivy, Multiflora-Rose, Bittersweet, Mimosa, Kudzu
Site Concerns: erosion, creek, extensive native trees

G-3E
Site Description: This edge is almost completely compromised due to invasives. The canopy is 100% consumed and experiencing dieback in most outer edge areas. This runs along a residential area and there may be some concerns with trees fall on private property.
Site Type: Edge
Acreage: .85 acres
Invasive Species: Kudzu, Bittersweet
Site Concerns: highly aggressive invasives

G-4I
Site Description: For the most part this area is very healthy with a clear understory. There are some scattered groupings of invasive shrubs and some English Ivy, invasive saplings and other vines along the edge of the trail. The area to the east of the trail, which follows the sewer line, borders a creek with a sharp 4' drop off. Watch for areas with beginning Kudzu plants.
Site Type: Interior
Acreage: 1.17 acres
Invasive Species: English Ivy, Multiflora-Rose, Mimosa, Tree-of-Heaven, Kudzu, Barberry
Site Concerns: creek, trail edge

G-4E
Site Description: Bamboo has established in this area and is out competing the native plants.
Site Type: Edge
Acreage: .07 acres
Invasive Species: Bamboo
Site Concerns: none

G-5I
Site Description: Invasives compose 5-10% of the vegetation. The canopy is healthy and clear with a few areas of blow down. The terrain is relatively level with some erosion concerns along the path and creek area near the footbridge.
Site Type: Interior
Acreage: 2.20 acres
Invasive Species: English Ivy, Multiflora-Rose, Mimosa, Tree-of-Heaven, Honeysuckle
Site Concerns: none

Greenleaf Park Management

Management Summary

The target plants at this park are English Ivy, Kudzu, Bamboo, and Multiflora-Rose. This park has some high priority areas that need to be addressed. The main goal is to contain and reduce the size of the Kudzu and English Ivy infestations and remove them completely from the tree canopy.

The first priority is to manage the Kudzu infestation in high priority areas. Cut all vines from the canopy in early spring or late fall, treating the large vines, to get a clear picture of the extent of the problem. Allow them to re-sprout and then foliar spray new shoots.

Once vine management is underway, establish a containment line around the infestation to prevent further spread of the vine. Evaluate trees for damage and remove any safety hazards, leave non-hazard trees for wildlife habitats.

Establish a regular mowing/cutting/treatment schedule for this area. Monitor the interior areas for any new Kudzu infestations and treat/pull immediately. Replant native trees in open canopy areas when infestation is under control and reduced the visual presence by at least 2/3. Tree suggestions include trees that are not low branching in habitat to avoid climbing vines.

The prevalence of English Ivy and Rose on the interior is a secondary issue. These invasives should be reduced by at least 40% and the tree trunks should be kept free of vines. Initially cut all invasive vines from the trees and then focus on newly established communities working your way towards larger more mature infestations.

Mechanical methods should be limited near the creek area as there are some erosion issues and soil disturbance should be kept to a minimum. This area may also require some replanting of understory plants as the Ivy has prevented other ground cover to establish. Define a designated creek crossing and provide access over the creek bank to prevent further erosion.

The southern portion of this park is more infested than the northern, an effort should be made to maintain the spread of invasives

Also, establish a control line around the Bamboo infestation and begin to cut and treat this area reducing the infestation as much as possible. Be sure to monitor this area for spread and to evaluate the management procedures effectiveness.

Lastly, establish a joint management plan for the utility corridor. This area needs a consistent mowing schedule to prevent invasives from reaching seeding stage.

Maintenance Priorities

1. Manage the high priority areas first, **G-3E** and the **containment area.** Cut the Kudzu at its base to kill the vine within the tree canopy and expose the stem. Then, evaluate the condition of the tree canopy and determine where the containment line should be placed. Remove any trees that pose a safety hazard.

2. Establish the containment line around the Kudzu and Bamboo areas to prevent expansion.

3. Reduce and maintain the invasive populations on the interior by at least 2/3 following the general management goals and stratigies. Focus on English Ivy first and then Rose, Bittersweet, and Bamboo. Monitor closely for Kudzu spread.

5. Plant canopy in areas where there has been blow down and erosion issues, most of the blow down is Pine.

6. Establish a joint management plan with the

utilities company.

Management Suggestions
(Type, Treatment, Priority)

G-1U Utility, Monitor, Low
Esatblish a joint management plan with the utility company. Monitor for establishing paretn plants.

G-2I Interior, Suppress, Low
Follow the main management goals. Focus on English Ivy. Reduce the presence of Ivy by 2/3 with a focus on keeping it from reaching maturity. There are some erosion issues around the creek crossing. Establish a trail crossing so that the compaction is minimized. After Ivy is controlled in this area, establish native shrubs to help with erosion. After, Ivy is under control, then begin to manage for other invasives.

G-2U Utility Suppress, Medium
Establish a constant mow line and joint management plan for this area. See comments above.

G-3E Edge, Suppress, High
Cut all vines at the base in order to expose the stem and assess the situation. Cut all large vines and apply herbicide. Assess the area for tree damage and treat accordingly. If any areas can be managed as open areas, establish a plan for regular mowing. Establish the best placement for the 8' wide containment line and a regular schedule for mowing. Follow guidelines for Kudzu management and consider working with the neighboring residents to establish a joint management plan.

G-4I Interior, Suppress, Low
Minimize the establishment of Kudzu and Bamboo in this area. Otherwise, cut and treat all large invasives and pull any newly establishing vines and shrubs. There is a patch of Ivy beside the trail that can be elimintated to ensure it does not fully establish in this area.

G-4E Edge, Contain, Low
Follow the guidelines for the treatment of Bamboo.

G-5I Interior, Suppress, Low
Address the invasives along the stream bank as in other areas, attaking smaller plants first and larger plants second. After management has shown some success, revegetate with some natives in the buffer area.

4.7 Jackson-Via Elementary School Inventory

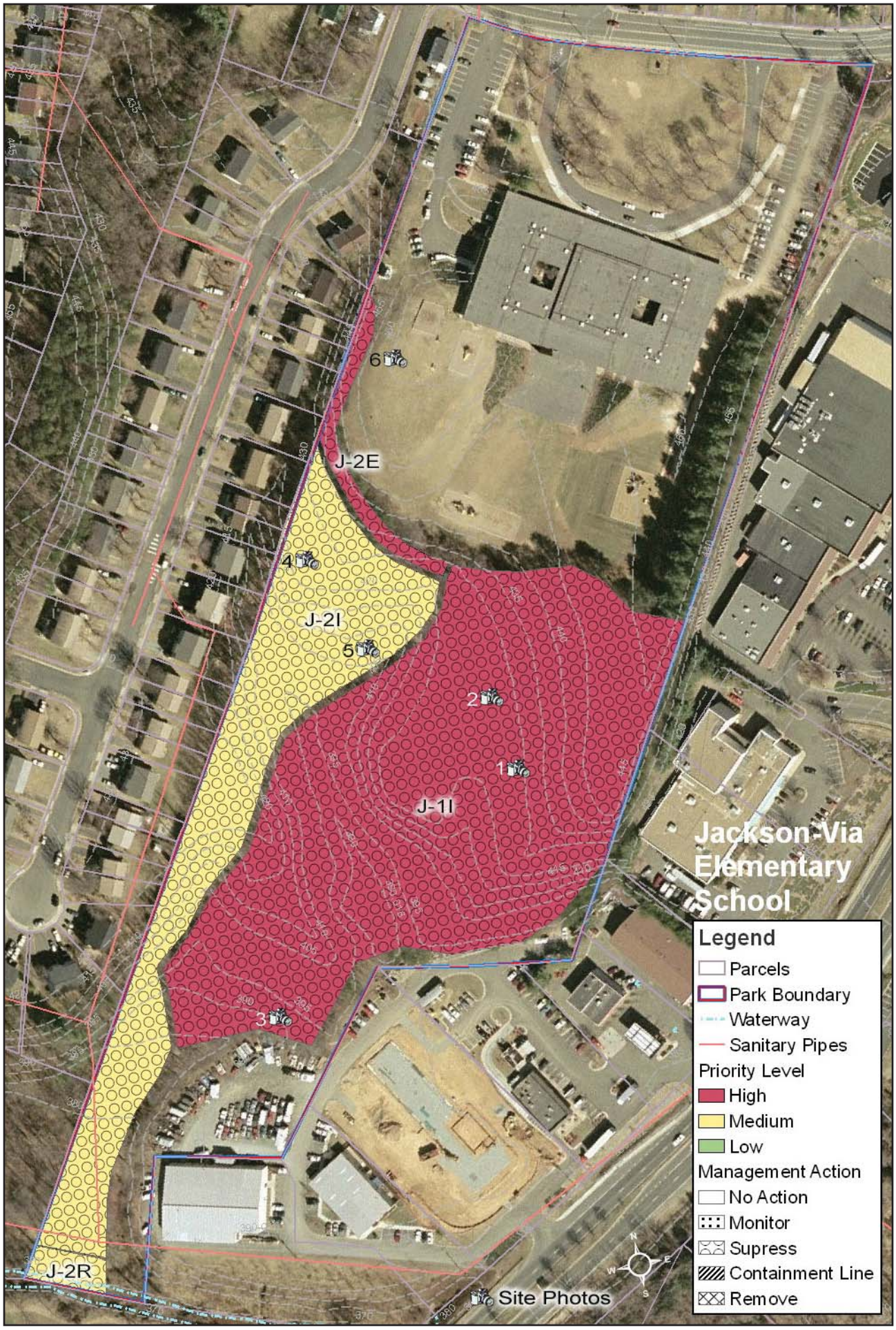
Inventory Summary

This is an elementary school with a wooded area behind the school that is approximately 9 acres, all of which is a management area. There is a nature trail the winds through these woods with and outdoor sitting area.

The canopy is in great shape and is one of the healthiest forest systems surveyed. There is a good mix of deciduous and hardwood with only a few areas of blow down or open canopy.

There are mainly mature pines, young Maples, Holly and Tulip Poplar. The understory is fairly open and clear of invasives, however, there are scattered groupings of invasive shrubs consistently throughout.

The terrain is varied from gently sloping to considerable drop offs in the southern section. There is a stream the runs through the woods which has some severe erosion issues due to clogged drain pipes and improper routing of run off.


6
J-2E
4
J-2I
5
2
1
J-1I
3
J-2R
Site Photos
Jackson-Via Elementary School
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove

Jackson-Via Photo Inventory

1 Typical forest interior

2 Multiflora-Rose along the trail edge

3 Erosion concerns

4 Erosion issues

5 Typical trail edge

6 Edge condition with vines and Tree-of-Heaven

Area Inventories

J-1I

Site Description: The canopy in this area looks good with some open canopy areas. There is a good mix of deciduous and evergreen here that is not found on many sites. Invasive vines and saplings are starting to establish especially along the trail edge. There are scattered groupings of Multiflora-Rose. Native species include Tulip Poplar, Devil's Walking Stick, Sassafras, Maple, Berries, Virginia pine, Salix, White Oak, Dogwood, Cedar, Sycamore, Running Cedar, Holly, Cherry and Hickory.
Site Type: Interior
Acreage: 5.74 acres
Invasive Species: Multiflora Rose, Tree-of Heaven, Bittersweet, Mimosa, Elaeagnus
Site Concerns: erosion, creek, extensive native trees

J-2I

Site Description: same as above
Site Type: Interior
Acreage: 2.38 acres
Invasive Species: Multiflora Rose, Tree-of Heaven, Bittersweet, mimosa, Elaeagnus
Site Concerns: erosion, creek, extensive native trees

J-2R

Site Description: same as above
Site Type: River Buffer
Acreage: .17 acres
Invasive Species: Multiflora Rose, Tree-of Heaven, Bittersweet, mimosa, Elaeagnus
Site Concerns: erosion, creek, extensive native trees

J-2E

Site Description: This is a 20' edge that is highly invaded with weeds. There are many sapling and shrubby species that are spreading into the interior. The edge is mowed with some issues as a consistently established mow line.
Site Type: Edge
Acreage: .22 acres
Invasive Species: Multiflora- Rose, Mimosa, Tree-of-Heaven, Elaeagnus, Bittersweet
Site Concerns: mow line

J-EP

Site Description: This is an area that has been planted with the invasive Elaeagnus.
Site Type: parent plant
Acreage: .05
Invasive Species: Elaeagnus
Site Concerns: none

Jackson-Via Elementary School Management

Management Summary

This is a high priority park as it has a very healthy forest community with comparably low invasive populations. The main goal is to reduce the existing weeds as much as possible to a level below 1/3. The target species are Multiflora-Rose, Bittersweet, and invasive saplings, Mimosa and Tree-of-Heaven.

Treat the newly established infestations first and work inward toward larger more mature infestations. For example, all of the target species have small plants establishing on the canopy floor.

These species should be hand pulled before they establish any further, especially before they start to produce seeds. Next, large infestations of Rose and establishing vines should be managed with a target reduction of 2/3.

Establish a consistent mow line on the exterior edge as well as consider planting understory native species that may prevent intrusion by invasive seeds. Cut and treat all invasive trees and saplings along the edge. This management should only be done when follow-up visits are guaranteed.

There are some severe erosion issues that may eventually contribute to canopy die back. Drainage ways should be cleared to allow water to flow off the site.

This site provides a good opportunity for school children to participate in the monitoring and control of invasives along the trail areas, especially since the initial management will be exclusively mechanical.

Management Priorities

1. Manage **high priority** areas first, **J-1I** and **J-2E**. Remove, through mechanical methods, any juvenile or newly established plants from the interior forest floor

2. Target more mature infestations and reduce the populations by 2/3

3. Manage the edge environment by cutting and treating any invasive shrubs and trees. Also, establish a consistent mow line and consider planting native plants that may help reduce penetration by invasive seeds.

4. Evaluate off site drainage issues that may be contributing to on site erosion issues. Clear the drainage pipes in J-1I to avoid standing water that may lead to canopy die back, severe erosion, or potential environments favorable for invasives.

Management Suggestions

(Type, Treatment, Priority)

J-1I Interior, Suppress, High
This is a high priority area as it has a very healthy native community. Manage this area for juvinile inasives first. hand pulling anything under 6". Next focus on the groups of Multiflora Rose. Cut and treat the larger more mature groupings of plants. There are some erosion issues here and the establishment of native groundcover could help in the areas with steep terrain.

J-2I Interior, Suppress, Medium
See J-I1. There are some off site erosion conerns creating environments for the establishment of invasives. Address that issue of drainage coming from neighboring streets.

J-2R Riparian Buffer, Suppress, Medium
see J-I1

J-2E Edge, Suppress, High

This area is more invaded than the others and should be addressed quickly in order to limit the spread to the interior. Cut and treat all mature invasives. Establish a regular mow line, possibly consider moving the line back 5' so that a majority of the invasives will be in the mow path. Establish low growing native vegetation on the interior edge to help limit the intrusion of invasives.

4.8 Johnson Elementary School Inventory

Inventory Summary

This school has approximately 6.8 acres of wooded land to maintain. None of these areas have any large issues with invasive plants. The wooded areas to each side of the entrance are used for their walking trails that connect to the neighborhood sidewalks. The canopy in these areas is young and healthy consisting of mainly Oaks, Dogwood, and Maples. The understory is fairly open without many invasive shrubs or vines. There are a few invasive plants that are establishing along the perimeter of these areas, mainly Tree-of-Heaven, Mimosa, and Ligustrum.

The areas on the side and rear of the site are used as buffers from neighboring residential properties and are fairly narrow in nature, 20'-40'. The canopy consists mainly of Oak, Maple, Honey Locust, and Sassafras. There are more invasive plants located here. Area J-3E along the southeastern edge has the densest invasives. There is English Ivy, Tree-of-heaven, Honeysuckle, Mimosa, Ligustrum and there are areas where Kudzu is trying to establish. Kudzu was also found along the edge where there is new construction. That edge has since been removed.


Johnson Elementary School
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photo
J-1I
J-1I
J-1E
J-1E
J-2E
J-3E
1
2
3
4
5
6

Johnson Elementary School Photo Inventory

1 Typical forest interior

2 Construction edge

3 English Ivy edge condition next to fields

4 English Ivy next to building

5 Typical forest edge

6 Forest edge with steep topo

Area inventories

J-1I

Site Description: There is a healthy canopy of Oaks, Maple, Dogwood, and Beech. The canopy is young with many scattered saplings. The understory is open and clear of invasive shrubs or vines with few exceptions. The sections to the southwest have some areas of steeper topography around the amphitheater. Earthen trails cut through these wooded areas to connect to the neighborhood sidewalks.
Site Type: Interior
Acreage: 4.27 acres
Invasive Species: Mimosa, Honeysuckle, Ligustrum
Site Concerns: none

J-1E

Site Description: This area is the same as described above only there is a higher concentration of invasive plant material. The edge area is approximately 10' and has a level of invasiveness between 5-25%. The edge is bordered by a regularly maintained lawn area.
Site Type: Edge
Acreage: 1.05 acres
Invasive Species: Mimosa, Tree-of-Heaven, Ligustrum, Honeysuckle
Site Concerns: none

J-2E

Site Description: This area has a young canopy of Oak, and Maple with some scattered Pines. This is an edge area of about 10' width where invasives have begun to establish. It serves as a buffer between a row of residential units and the parking area for the school.
Site Type: Edge
Acreage: .34 acres
Invasive Species: Ligustrum, Tree-of-Heaven, Mimosa, English Ivy, Honeysuckle
Site Concerns: none

J-3E

Site Description: This is a wooded buffer between the athletic fields and residential housing. It is about 20' in width with young Oaks and Maples. There are some serious invasive plants that are establishing here. English Ivy is beginning to climb the trees and Kudzu is trying to establish.
Site Type: Edge
Acreage: 1.17 acres
Invasive Species: Mimosa, Tree-of-Heaven, Honeysuckle, English Ivy, Kudzu
Site Concerns: none

Johnson Elementary School Management

Management Summary

A majority of this canopy area serves as buffers between the school and residential areas. Most areas are not substantial or readily accessible. The J-1 areas have some trails through them and are the most visible areas, and could possible be a good educational opportunity for children to learn about invasive plants.

The J-3E area should be monitored for Kudzu and any plants should be eliminated. Treat this plant chemically until dead, do not dig up the tuber for removal. The area along the construction edge should also be monitored for Kudzu and treated immediately. These areas should be managed mechanically first by removing all newly established invasive plants to prevent further spread. Next, cut/ treat, girdle/ treat, or basal treat all larger invasive trees and shrubs especially in the edge areas. Lastly, manage the larger more mature infestations on the interior.

Management Priorities

1. Monitor for and remove any Kudzu that is found in areas **J-3E** and along the construction edge.

2. In all areas, remove all newly established invasives that can be removed by hand.

3. Cut/treat, girdle/treat, or basal treat all invasive saplings and shrubs in the edge areas

4. Manage interior areas of J-1I for any large mature infestations

Management Suggestions

(Type, Treatment, Priority)

J-1I Interior, Suppression, Low
Remove any juvinile invasvie by hand pulling. Cut and treat mature invasives and vines with a focus on invasive trees.

J-1E Edge, Suppression, medium
see J-1I. Focus on the management of invasive trees.

J-2E Edge, Suppression, Low
Cut and treat all mature invasives and establish a regular mow line or weed eating schedule with invasives in mind.

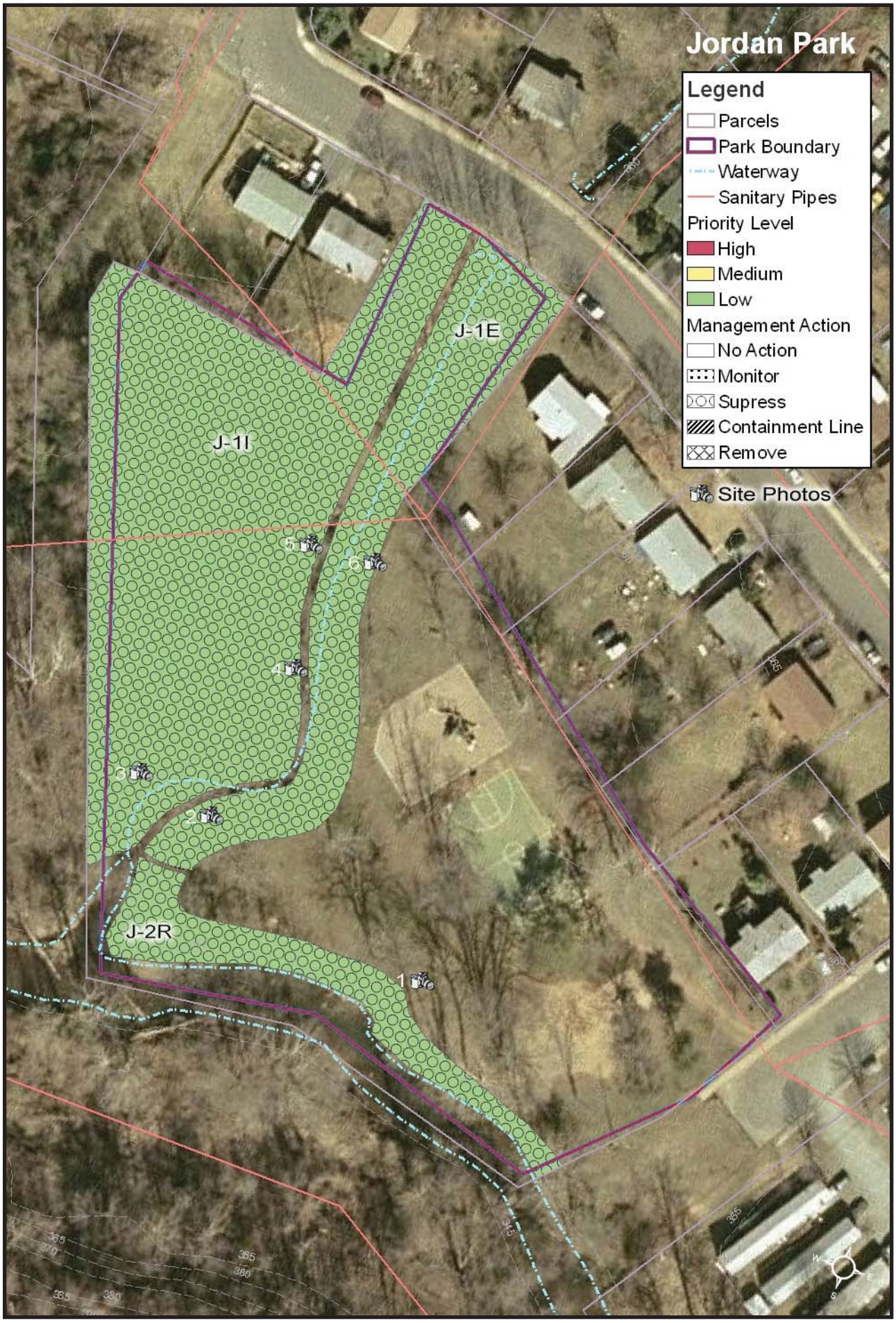
J-3E Edge, Suppression, Low
There is some Kudzu beginning to establish in this area. Cut and treat all vines and invasive trees. Monitor this area regularly for Kudzu as well as the edge border the new development, especially if replanting is considered. There was mention of Kudzu here before it was bulldozed.

4.9 Jordan Park Inventory

Inventory Summary

This is a 3.1 acre park with approximately 1.62 acres of invasive management area. This park is used for its basketball court, play area, and connection to the Rivanna Trail system. There is a moderately healthy young canopy of Box elder, Honey Locust, Hickory, Walnut, and Sycamore. The park is surrounded by many highly invaded areas. The area across the river has a thick cover of invasive vines and the areas bordering the Rivanna Trail are highly invaded with shrubs and vines.

The native understory consists of Pokeweed, Jewel weed, Mulberry, Poison Ivy, Dogwood, and Holly. The understory wooded areas in this park are moderately to severely infested with invasive shrubs and vines. There are some erosion issues that are occurring along the waterway that drains into Moore's Creek. The buffer along this waterway is narrow in some areas as well. The Riparian buffer along Moore's Creek is healthy and there has been an effort made to replant this area to establish a thicker buffer.


Jordan Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos
J-1E
J-1I
J-2R
1
2
3
4
5
6

Jordan Park Photo Inventory

1 No mow area

2 Invasive shrubs on trail edge

3 Vines and Rose on interior area

4 Erosion along creek edge

5 Typical interior area

6 Typical interior areav

Area Inventories

J-1I

Site Description: This area is not readily accessible save for the 3' wide dirt trail that cuts through here. The canopy in this area consists mainly of Sycamore, Hickory, and Box elder. The canopy has not yet been invaded but establishing plants may have some tough competition on the canopy floor. There is a very dense understory of invasive shrubs and weeds that makes this area impassable in the summer.
Site Type: Interior
Acreage: 1.07 acres
Invasive Species: Multiflora-Rose, Honeysuckle, Elaeagnus, grape, Bittersweet, Garlic Mustard
Site Concerns: proximity to water bodies

J-1E

Site Description: This is a 20' edge buffer that has a slightly different composition of invasive plants than the interior area. The canopy in this area is the same as for area J-1I. There are more shrubby invasives and saplings here and Kudzu is trying to establish. The Kudzu area is located in the northern section where the property line makes a right turn. There is a fairly good buffer here for the creek however it does become non existent in areas. There are some areas where erosion is an issue.
Site Type: Edge
Acreage: .38 acres
Invasive Species: **Kudzu**, Elaeagnus, Multiflora-Rose, Mimosa, Tree-of-Heaven
Site Concerns: erosion, proximity to water body

J-2R

Site Description: There is an effort being made to expand the riparian buffer in this area by planting native trees in a no mow area. The bank across Moore Creek is highly invaded and poses a potential threat for new infestation. The bank canopy is healthy with young invasive saplings and vines beginning to establish.
Acreage: .17 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet, Grape
Site Concerns: steep bank, proximity to water

Jordan Park: Management

Management Summary

The target plants for this park are Kudzu, Multiflora-Rose, saplings, and invasive vines. The first goal is to eliminate the Kudzu plant and monitor for its presence. Secondly, cut all invasive vines at the base in order to kill the vine in the canopy. There is an intense infestation across the creek so reinfestation is always a threat.

Establish a regular cutting plan to keep the vines out of the canopy, where the infestation is very limited, in the case of Kudzu, remove the vine altogether. Otherwise, reduce the visual presence of the infestation by 40%. Cut,/treat, girdle/treat, or basal treat all woody infestations with a focus on the forest perimeter and riparian areas.

The interior infestation seems to be at the same level of maturity and has fully established. There are no leading edges to control so the next goal is to focus on reducing larger infestations. Reduce their visual presence by at least 1/2.

Continue to re-plant trees in the riparian buffer area. Mow these areas at least once annually until the canopy is fully established. This will be a difficult area to manage as there is a thick infestation of invasive vines across the creek.

Management Priorities

1. Eliminate the Kudzu plant that is beginning to establish. One of the focuses of continued monitoring should be to scout for Kudzu reinfestation.

2. Cut the invasive vines at the base and treat in order to kill the part that is in the canopy to improve visual character

3. Treat all invasive saplings and larger shrubs

4. Continue to re-plant the buffer area and create a management plan for the area while the trees are becoming established.

5. Establish a joint maintenance plan with the utility company

Management Suggestions

(Type, Treatment, Priority)

J-1I Interior, Suppression, Low
Remove any juvinile invasvie by hand pulling. Cut and treat mature invasives and vines with a focus on Multiflora Rose, Grape, Honeysuckle, and Garlic Mustard. Establish a joint management plant with the utility company for common areas. Reduce the visual presence of the infestation in this area by 1/2.

J-1E Edge, Suppression, Low
Cut and treat all mature invasives witha focus on Elaeagnus, Multiflora Rose and invasive trees. Continue the establishment of a buffer area after invasive management is under control. Also, Estalish a regular mow line here, consider mowing the buffer area for a few seasons to reduce the presence of invasives.

J-2R Riparian, Suppression, Low
Cut and treat all mature invasives and establish a regular mow line. Continue to monitor for the presence of invasives in the replanting areas and take immediate action if they appear.

4.10 McIntire Park Inventory

Inventory Summary

This is a 115 acre park with approximately 40.6 acres of invasive management areas. This community park has three shelters, ball fields, play areas, nature trails, 9 hole golf course, and a wading pool. It is mainly used for athletics and social gatherings.

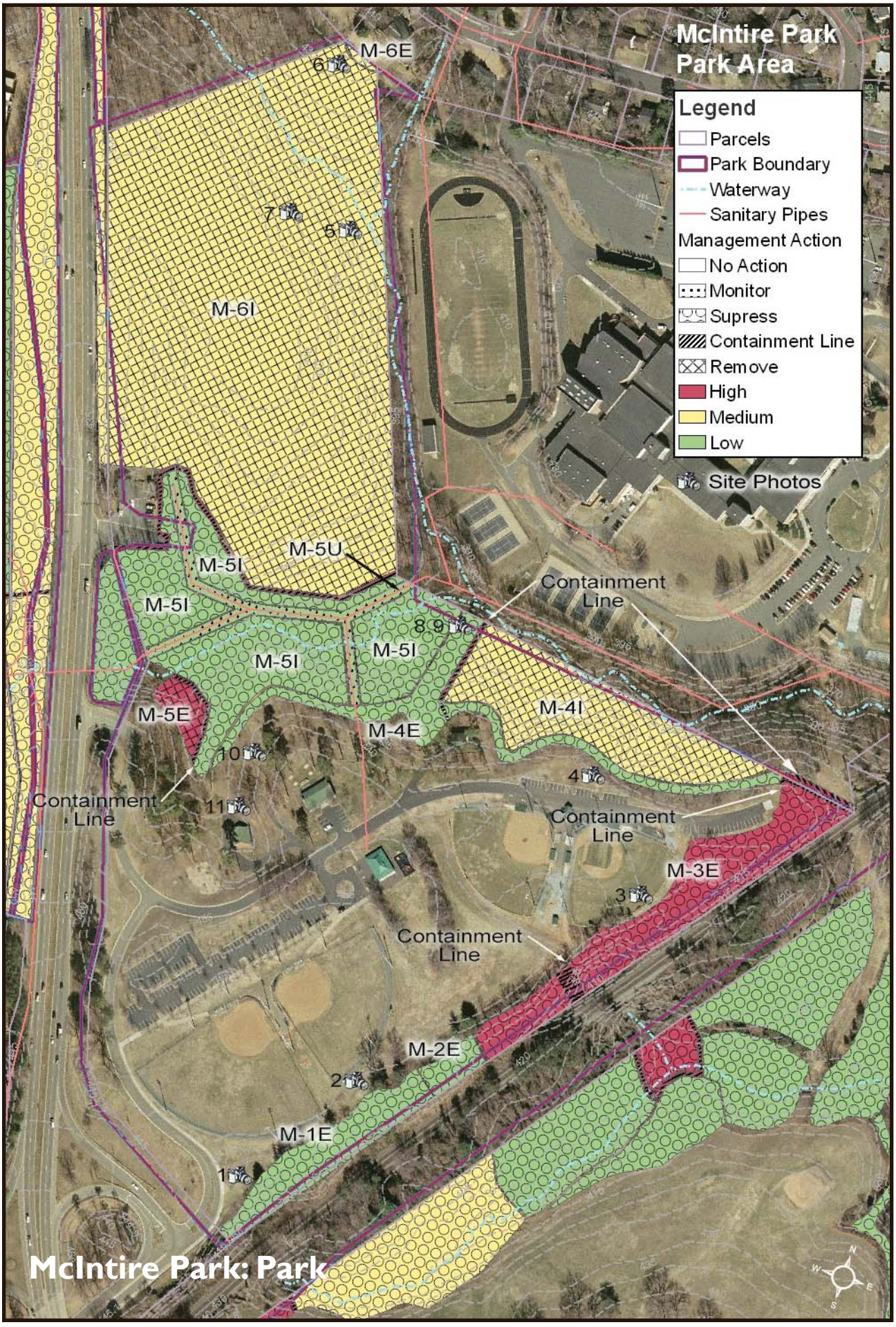
It is bordered by the high school and 250 By-pass and bisected by the railroad. There are sewer lines that run through the western wooded side near the fire station and a bridge connecting the park to the high school.

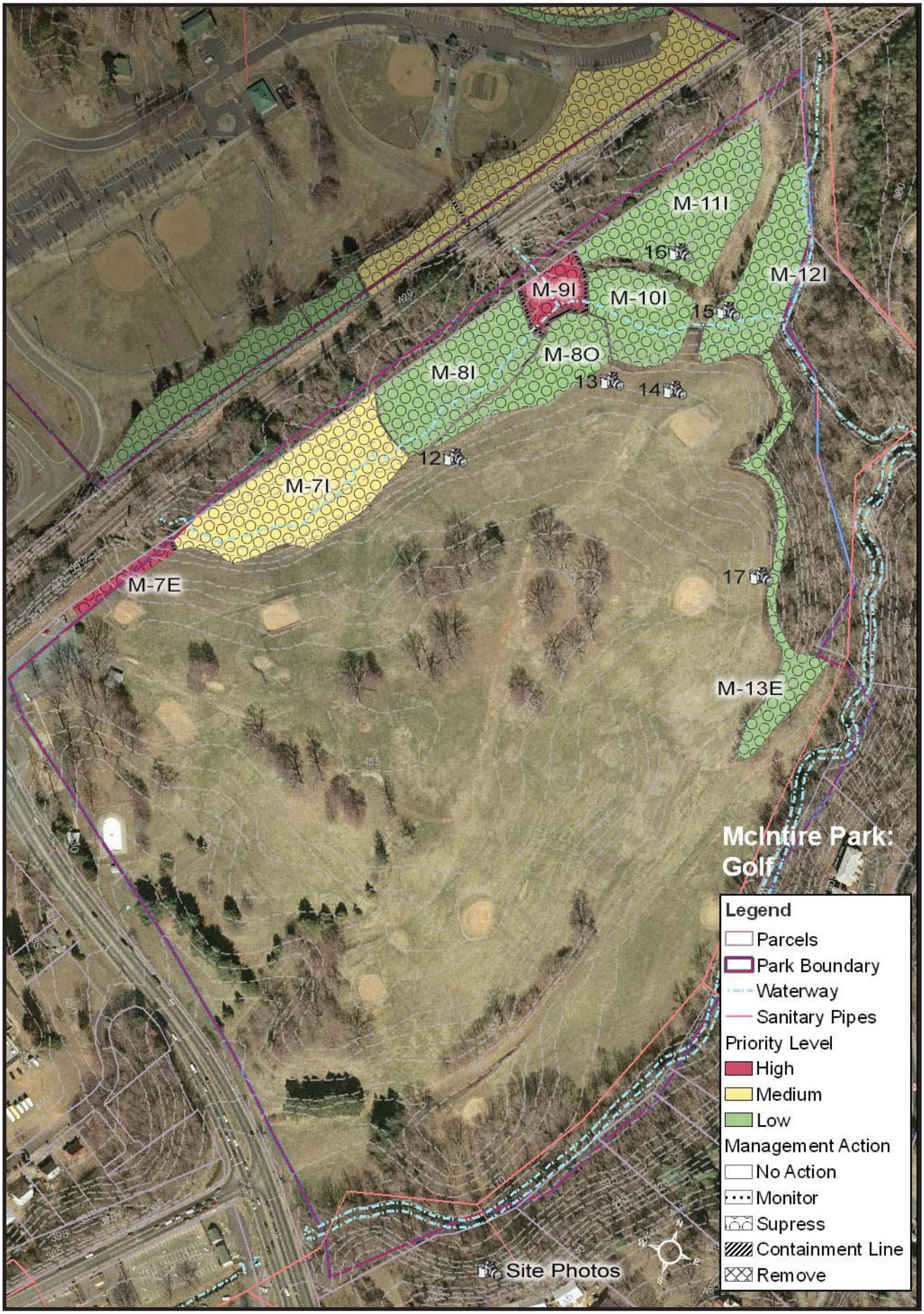
The park is also bordered on the east by a creek which will is where the future location of the Meadow Creek Parkway will be. This area was not inventoried due to forthcoming construction.

The native forest community consists of Sycamore, Maple, Hickory, Oak, Locust, Poplar, and Pine. Other existing native species are: Cherry, Dogwood, Redbud, Sassafras, Cedar, Jewel weed, Pokeweed, Smilax, Berries, Poison Ivy, Golden Rod, Sumac, Birch, Ginger, Solomon's seal, Holly, and ferns.

Overall, the tree canopy is young with scatterings of mature trees throughout the park; however, the land has been undisturbed for awhile. The canopy is mainly deciduous and has already passed through the first successional stage of evergreen trees.

The open areas are fairly flat. There is some steeper terrain along the creeks and railway. The riparian buffers are substantial in most areas. Despite this, there are some serious erosion concerns along the creek probably due to off site drainage.


McIntire Park
Park Area
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Management Action
No Action
Monitor
Supress
Containment Line
Remove
High
Medium
Low
Site Photos
M-6E
6
7
5
M-6I
M-5U
M-5I
M-5I
M-5I
M-5I
8
9
Containment Line
M-5E
M-4E
M-4I
10
4
11
Containment Line
Containment Line
M-3E
3
Containment Line
M-2E
2
M-1E
1
McIntire Park: Park


M-11I
16
M-12I
M-9I
M-10I
15
M-8O
M-8I
13
14
12
M-7I
M-7E
17
M-13E
McIntire Park: Golf
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos

McIntire Park Photo Inventory

1 Edge condition

2 Edge condition

3 Kudzu along RR border

4 Typical interior area

5 Erosion concerns

6 Trail edge condition

7 Perennial invasives

8 Ivy and shrubs at bridge

9 Interior invasive areas

10 Edge condition

11 Edge condition with invasive trees

12 Vines and edge condition

13 Open area

14 Open area

15 Trail edge condition

16 Open canopy utility area

17 Edge condition

Area Inventories

M-1E

Site Description: This is a 60' wide railroad buffer with a healthy young tree canopy with saplings mixed with mature Pines. There is some die back happening here. Invasives vines are starting to establish on the edge and interior forest floor. Invasive trees are establishing along the edges along with small vines.
Site Type: Edge
Acreage: 1.02 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet, English Ivy, Multiflora Rose
Site Concerns: some erosion, railroad

M-2E

Site Description: This is a 60' wide railroad buffer with a healthy young tree canopy with saplings mixed with mature Pines and some Cedar with some canopy die back happening here. Invasives vines are starting to establish on the edge and interior forest floor. Invasive trees are establishing along the edges along with vines. There is an open no mow area here where vines are starting to establish more aggressively.
Site Type: Edge
Acreage: .22 acres
Invasive Species: Elaeagnus, Bittersweet, Honeysuckle, Multiflora Rose, Grape
Site Concerns: open canopy

M-3E

Site Description: This is a 60' wide edge bordering the railroad with a canopy that is 95% compromised by vines and Kudzu. The terrain here is very steep sloping down towards the railroad with some erosion and leveling off towards the Northern end.
Site Type: Edge
Acreage: 2.13 acres
Invasive Species: Kudzu, Bittersweet
Site Concerns: erosion, railroad

M-4I

Site Description: This area is very healthy that is largely Birch, Red Oak, Hickory and Ericaceous shrubs. Trees are young to mature. The terrain is steep sloping towards the creek with some extreme erosion happing due to drainage off of the parking area that is affecting tree roots. The understory is open and healthy with a soft and non-compacted floor of detritus. Invasives are establishing along the trail, edge and as you near the bridge.
Site Type: Interior
Acreage: 2.32 acres
Invasive Species: Bittersweet, English Ivy, Multiflora Rose, Grape, Garlic Mustard
Site Concerns: erosion, creek, very healthy native community

M-4E

Site Description: This is an edge area with young trees. Trees are mostly Birch, Red Oak, and Hickory. The area follows the paved trail along the perimeter of the woods and into the woods along the bridge. This area has naturalized with a thick understory of invasives and is the leading edge for the introduction of invasive plants into the healthy native communities that it borders. There are some open areas that have been planted with native shrubs that are completely consumed with invasive vines. The canopy is still free of vines, but the are establishing on the forest floor.
Site Type: Edge
Acreage: 1.17 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet, honeysuckle, English Ivy, Multiflora Rose, Garlic Mustard
Site Concerns: neighboring Kudzu, erosion, creek

M-5I

Site Description: This area has mainly younger trees that are mostly deciduous. Species are such as mentioned above. There are many open canopy areas do to loss of trees and especially along the trail. The undergrowth is very thick with invasive shrubs and vines. Trails, a creek, and utilities divide this area making it susceptible to invasive due to such a variety of

exposure and activities. The terrain is moderately flat with some slight hills and low lying areas that stay moist. It is bordered by 250, open space, and two very healthy native communities.
Site Type: Interior
Acreage: 3.93 acres
Invasive Species: Multiflora Rose, Bittersweet, Honeysuckle, Garlic Mustard, English Ivy
Site Concerns: creek, open canopy

M-5E
Site Description: this is an edge area with serious invasive pests. The sparse canopy has some die back and open areas due to tree loss. Mature trees look to be unhealthy with few saplings establishing. The understory is extremely weedy with scattered invasives. This area slopes dramatically forming a low lying bowl shaped or ditched area. This area is 75% invaded with vines.
Site Type: Edge
Acreage: .27 acres
Invasive Species: English Ivy, Kudzu, Bittersweet
Site Concerns: terrain

M-5U
Site Description: This is a 30' wide open area used to access the sewer line and as part of the trail system. Some areas are low lying with a large fern population and stay saturated. Invasives have successfully established along the perimeter of this trail. There are areas of open canopy along the trail.
Site Type: Utility
Acreage: .61 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven, Mimosa, Garlic Mustard
Site Concerns: creek, maintenance coordination

M-6I
Site Description: This area has a very healthy young to mature native tree canopy that is largely Birch, White Oak, Hickory and Ericaceous shrubs. Trees are young to mature. The terrain is moderate with some slight slope near the creek. The understory is open and healthy with a soft and non-compacted floor of detritus. Invasives are establishing along the trail edge and as you near the bridge. This area has been largely unused until the recent addition of pedestrian trails.
Site Type: Interior
Acreage: 14.09 acres
Invasive Species: Multiflora Rose, Bittersweet
Site Concerns: neighboring invasive vines, creek

M-6E
Site Description: This is a small area of intentionally planted invasive ground cover. There is also a compost pile here that could be a potential source of invasive material. It is spreading consistently into the forest floor.
Site Type: Edge
Acreage: .04 acres
Invasive Species: Vinca, Japanese Spurge
Site Concerns: compost pile

M-7E
Site Description: This is a largely open area the borders the rail road with a canopy that has been compromised 80% by vines.
Site Type: Edge
Acreage: .18 acres
Invasive Species: Grape, Bittersweet, Kudzu, Honeysuckle
Site Concerns: open canopy

M-7I
Site Description: This area is buffered by an open area and the railroad. There is a young tree canopy with some mature trees scattered throughout, mainly White Oaks and Tulip Poplar. It is mostly a deciduous canopy with a hilly terrain sloping towards the railroad. Vines are beginning to establish on some of the more mature Oaks, in some areas up to 90%. There is a thick undergrowth of invasives shrubs and vines.

Site Type: Interior
Acreage: 2.00 acres
Invasive Species: Grape, Bittersweet, Multiflora Rose, Honeysuckle, Tree-of-Heaven
Site Concerns: railroad, creek

M-8O
Site Description: This area is in the no mow program and is established with tall grasses and invasive shrubs, mainly honeysuckle. The terrain here is moderately sloping towards the rail road.
Site Type: Open
Acreage: .76 acres
Invasive Species: Multiflora Rose, Honeysuckle, Tree-of-Heaven, Elaeagnus
Site Concerns: none

M-8I
Site Description: This area is buffered by an open area and the railroad. There is a young tree canopy with some mature trees scattered throughout, mainly White Oaks and Poplar. It is mostly a deciduous canopy with a hilly terrain sloping towards the railroad. Vines are beginning to establish on some of the more mature oaks. There is a thick undergrowth of invasives shrubs that becomes more apparent in this area.
Site Type: Interior
Acreage: 1.4 acres
Invasive Species: Multiflora Rose, Honeysuckle, Tree-of-Heaven, Elaeagnus, Bittersweet
Site Concerns: creek, railroad

M-9I
Site Description: This railroad buffer area has very little tree canopy left, most of it has fallen or is covered in Kudzu. The topo is hilly here.
Site Type: Interior
Acreage: .31 acres
Invasive Species: Multiflora Rose, Kudzu, Honeysuckle, Tree-of-Heaven, Bittersweet
Site Concerns: creek, railroad

M-10I
Site Description: This area is buffered by an mowed utility area. There is a young tree canopy with some mature trees scattered throughout, mainly White Oaks and Tulip Poplar. It is mostly a deciduous canopy. There is an undergrowth of invasives shrubs.
Site Type: Interior
Acreage: .88 acres
Invasive Species: Multiflora Rose, Honeysuckle, Tree-of-Heaven, Elaeagnus, Bittersweet
Site Concerns: creek

M-11I
Site Description: The area that circles the perimeter of this site is a 30' mowed utility path. The canopy is healthy young and evergreen, mostly Pine. There are invasive vines that are beginning to establish on the floor. The terrain is gently sloping.
Site Type: Interior
Acreage: 1.53 acres
Invasive Species: Multiflora Rose, Honeysuckle, Tree-of-Heaven, Elaeagnus, Bittersweet
Site Concerns:

M-12I
Site Description: This area has a healthy young canopy on a steeply to moderately sloping terrain. It is not readily accessible as there are no paths that run through here and the understory is fairly thick with invasive growth. Invasive vines and shrubs, mainly honeysuckle and Rose have established here.
Site Type: Interior
Acreage: 1.16 acres
Invasive Species: Bittersweet, Honeysuckle, Multiflora-Rose
Site Concerns: railroad

M-13E
Site Description: This is an edge area of approximately 20'. The interior terrain slopes steeply downwards to the water. This edge is dense with Honeysuckle and invasive saplings. Large colonies of Sassafras are establishing

here along with all the aforementioned trees.
Site Type: Edge
Acreage: .74 acres
Invasive Species: Honeysuckle vine, Multiflora-Rose, Bittersweet, Mimosa, Tree-of-Heaven
Site Concerns: none

McIntire Park Management

Management Summary

The target plants at this park are the Kudzu and other invasive vines, Multiflora-Rose, and English Ivy. Cut the kudzu at the base to kill it in the tree canopy in the early spring or late fall and evaluate the situation.

Establish appropriate areas for containment lines based on salvageable trees and topography that will increase ease of maintenance. Allow the Kudzu to re-sprout, then cut all vines to ground level and treat the larger vines. Establish a regular maintenance and monitoring schedule for these areas to keep the canopy vine free.

Replant as necessary but keep areas open as necessary for maintenance. It may be advantageous to establish lawn in some areas that will always require mowing.

Next, manage the healthiest interior areas for newly established invasive populations. Pull by hand any juvenile infestations that may be establishing in healthy areas.

Establish a containment line around the sewer lines, fire station, and pedestrian bridge area to prevent further intrusion from these invasives. Work towards reducing the size and presence of larger mature infestations. Basal treat or cut/treat saplings established on the edge areas, and establish a regular maintenance plan for any open edge areas.

The formally planted areas near the pedestrian bridge should be cleared of invasives and put on a regular maintenance schedule. Also, consider planting native shrubs along the edge of the woods and bridge area to help limit intrusion of invasives.

Management Priorities

1. Manage high **priority areas, M-3E, M-5E, M-7E, and containment areas**. Kill all Kudzu in the tree canopy and establish containment lines around the infestations.

2. Remove any newly established infestations from areas M-6I and M- 4I and establish a containment line around neighboring weed areas to prevent any further intrusion.

3. Reduce and maintain overall invasives by 60% in the park areas and 40% in the golf areas.

4. Cut and treat all invasive saplings on the edge environments.

5. Establish a joint maintenance plan with the utility company.

Management Suggestions
(Type, Treatment, Priority)

M-1E Edge, Suppression, Low
This is not a high priority area as it is by the railroad and will be subject to constant re-infestation. Invasives should be suppressed to a level of 45% of the forest floor and removed completely from the canopy cover. Monitor for any Kudzu infestations and take action if it migrates to this area. First priority is to cut and treat for all large shrubs and saplings. Spot spray for smaller interior infestations.

M-2E Edge, Suppression, Low
Cut all vines form the canopy and treat as you cut. Secondly, cut and treat mature shrubs and saplings. Spot spray interior for vines and small shrubs.

M-3E Edge, Suppression, High
This is a high priority area and should be managed first. It is likely that re-infestation will occur as a result of the railroad and the persistence of tubers, so the goal is not to eliminate but to control the Kudzu and to save what affected tree canopy is still viable. Establish a containment line around the Kudzu infestation to prevent spread. The containment line should exclude any currently effected trees that are still healthy and have a good chance for survival. Remove vines from the canopy cut within 6" of the ground; then assess the situation for erosion and tree damage. Remove any trees that are a safety hazard. Maintain 8' wide control line through mowing.

M-4I Interior, Remove, Medium
This area is not listed as high priority but should be one of first managed as it is a extremely healthy system that needs to be kept free of weeds. Because this area is very healthy, it is important that the edge of this area bordering the Kudzu is monitored to prevent spread into this area. Hand pull any weeds less than 6" where there is no concern for erosion. All invasive vines and shrubs should receive cut/treat and foliar spray procedure.

There are some areas where erosion is a concern and it is affecting tree roots. Drainage issues should be addressed and re-vegetate where necessary.

M-4E Edge, Suppression, Low
This is also an area of high concern. The goal is to prevent weeds from spreading into the interior of this healthy forest system. All saplings, vines, and shrubs should be cut and treated. Hand pull any weeds less than 6" tall. A containment line should be established around the bridge area as the weeds here are starting to migrate into the forest interior. Areas to the west where there are more formal landscape plantings, Azaleas, a maintenance schedule should be created. Being open, these areas are highly susceptible to invasives and the irregular maintenance schedule has led to a thick growth of invasive shrubs to establish. Consider formal native plantings around the bridge area to

decrease erosion and possibly help to control the intrusion of wind blown seeds.

M-5I Interior, Suppression, Low
The main focus of this area is to establish a joint maintenance plan with the utility company and to keep the invasives from spreading into the healthy area M-6I. Multiflora-Rose is the largest problem in this area. New infestations should be eliminated as best possible and reduce the visual presence of more mature infestations in by at least 40%. There are some areas of blow down near the sewer easement where revegetation with wet soil natives could be beneficial in reducing opportunities for the establishment of more invasives.

M-5U Utility, Monitor, Low
Establish a joint maintenance plan with the utility company in this area. There seems to be frequent disturbance here that is leading to fairly severe infestations.

M-5E Edge, Remove, High
The main priority here is to contain the spread of the invasive vines that are taking over the canopy. First, cut all vines form the canopy and reduce the overall infestation as much as possible. Secondly, evaluate the damage and potential location of a containment line. A regular maintenance plan should be established for the management of this containment line.

M-6I Interior, Remove, Medium
This is one of the healthiest areas in the inventory area. Every effort should be made to keep invasive plant out of this area. This is the number one priority. Establish, monitor and maintain a limit line where neighboring invasives are not to grow beyond. Hand pull all establishing invasives in this area and cut/treat any larger invasives.

M-6E Edge, Remove, Medium
This is a compost area that has been started by an over zealous neighbor. Spurge and other groundcovers that thrive on shade have escaped from this area. Pull the established plants and treat the area with herbicide. The compost piles should be removed to discourage further intrusion. Make educational material about the effect of invasives on our natural areas readily available to the neighboring residents.

M-7I Interior, Suppress, Medium
The main issue in this area is that there are vines in mature trees. Cut all vines from the tree canopy and treat the stumps. Establish a 15' clear area around the trunks of the more mature trees. Reduce the overall visual presence of invasives by at least 2/3.

M-7E Edge, Suppress, High
This area has some aggressive vines. This area is not easily manageable due to its proximity to the railroad. Cut vines from the canopy. Establish a containment line to prevent the spread of this area into adjacent areas.

M-8I Interior, Suppression, Low
Treat this area the same as M-7I.

M-8O Open, Suppression, Low
Cut/treat all large woody invasives in this area. Establish a management plan for these areas, whether it is regular mowing or the planting of native grasses and shrubs to discourage invasives, or just continued maintenance of invasives.

M-9I Interior, Suppression, Low
This is a heavily infested area where the canopy has been reduced due to storm damage and invasive vines. It is not a high priority due to its proximity to the railroad. Cut all vines form the canopy and treat where able. Establish a regular cutting schedule to help prevent the aggressive spread of these vines.

M-10I Interior, Suppression, Low
There are scattered invasives here. Treat as area M-7I and reduce the overall visual presence of invasive plant material by at least 2/3.

M-11I Interior, Suppress, Low
There is a healthy canopy of Pines here unfortunately; there is a likelihood that Kudzu will establish in this area. Hand pull all vines and newly established invasives from the forest floor and monitor for Kudzu migration. Reduce the presence of invasives by at least 2/3.

M-12I Interior, Suppression, Low
Treat this area to reduce the overall presence of invasives by at least 1/3.

M-13E Edge, Suppression, Low
Spray this area for Honeysuckle and encourage the growth of thickets of natives such as Sassafras when the vine has been reduced by at least 2/3. Consider incorporating dense areas of Honeysuckle into the golf course mowing plan for easier management.

4.11 Meadow Creek Natural Area Inventory

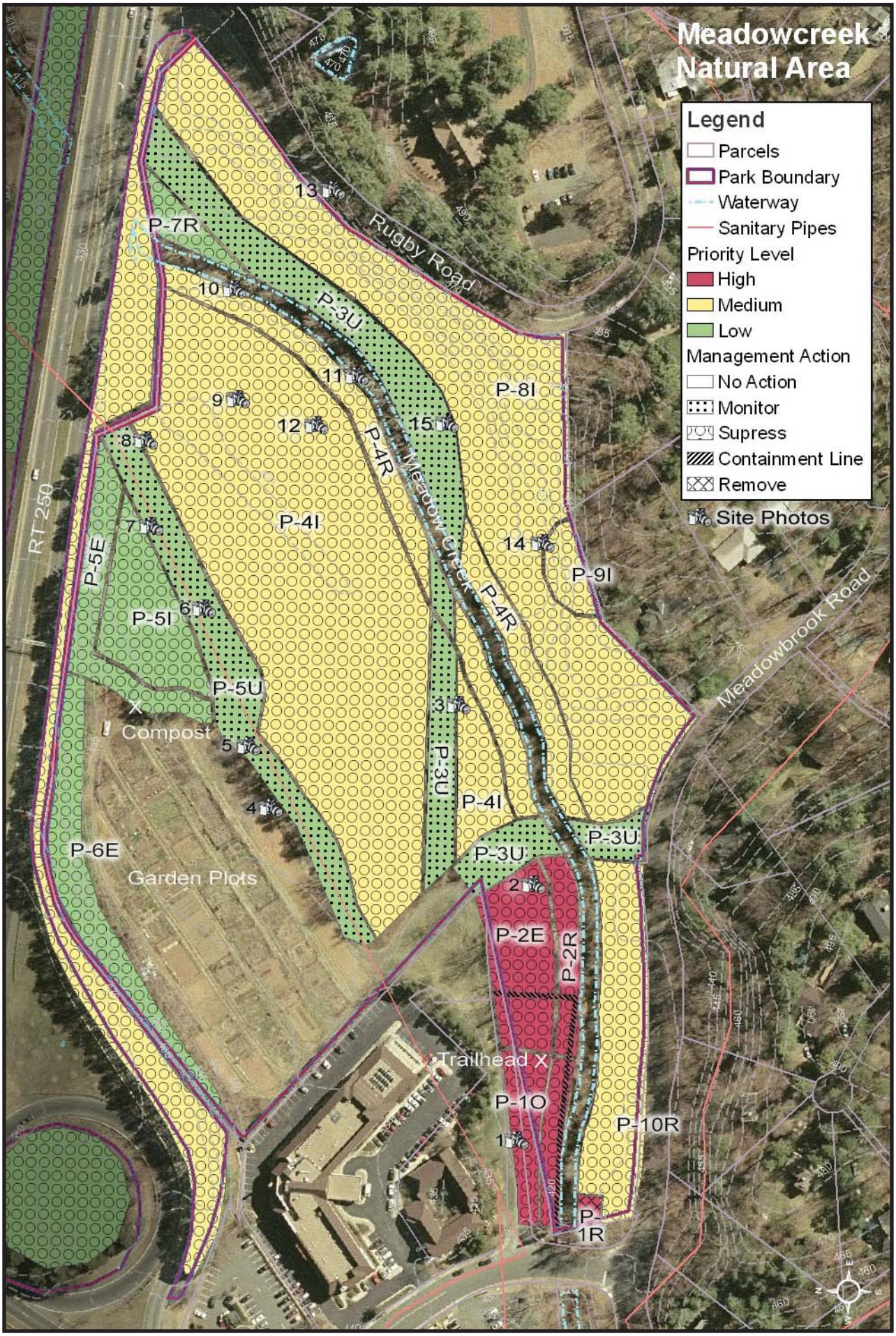
Inventory Summary

This is an 18.5 acre park with a majority of the park being unmanaged land. There is approximately 13.5 acres of invasive management areas. This park is mainly used for its garden plots and narrow earthen walking trails, which is part of the Rivanna Trail system. The park is bordered by a highway, residential and commercial property. There are power and sewer utility paths that run through the site and along Meadow Creek which runs through the site as well.

The utility paths are mowed and have no tree canopy to speak of. The trail is only 5' wide and has a full tree canopy overhead. The creek in this area is about 10' in width with most of its bank being tree lined.
The native forest community consists mainly of Tulip Poplar, Beech, Pine, and Sycamore. Other existing native species are: Holly, Dogwood, Cedar, White Oak, Locust, Boxwood, Ash, Willow, Cherry, Pokeweed, ferns, Jewelweed, Poison Ivy, and Virginia Creeper.

Overall, the tree canopy is young with scatterings of mature trees throughout the park, mostly Poplar. The canopy is mainly deciduous with most of the evergreen plantings being around utilities or roadways.

A large percentage of the terrain to the north of the creek is of moderate slope with scattered low wet areas and drainage ditches. The area to the south of the creek rises steeply along Rugby Road and is generally higher along the creek bank.


Meadowcreek
Natural Area
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos
Rugby Road
RT 250
Meadowbrook Road
Meadow Creek
P-7R
P-3U
P-8I
P-4R
P-4I
P-5E
P-5I
P-5U
P-6E
Garden Plots
Compost
P-9I
P-2E
P-2R
P-1O
P-10R
P-1R
Trailhead
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Meadow Creek Nature Area Photo Inventory

1 Kudzu area

2 Utility passage

3 Typical utility passage

4 Edge condition

5 Trail edge

6 Utility/trail condition

7 Vines in trees of forest interior

8 Typical forest interior

Area Inventories

M-1O

Site Description: This area is an entryway to the Rivanna Trail with a potential parking area for trail users. There is no canopy save three saplings that have been planted along the creek. It is completely engulfed in Kudzu and is mowed a couple of times a year in order to keep the vine under control. The kudzu area extends about 50' into the wooded edge where the canopy has been completely compromised. Kudzu from this area is starting to spread into the wooded areas and across the creek banks.
Site Type: Open
Acreage: 0.21 acres
Invasive Species: Kudzu, Mimosa, Grape
Site Concerns: creek

M-1R

Site Description: This area has an open canopy and the river bank is dense with shrubby growth. Kudzu has covered the floor of this area. The bank in this area has a 4-5' drop.
Site Type: River Buffer
Acreage: 0.15 acres
Invasive Species: Kudzu, Mimosa, Grape
Site Concerns: creek, steep bank

M-2E

Site Description: This is an area with a young canopy and some scattered mature Sycamore trees. The canopy is open in some areas allowing the floor to be very dense with weedy invasive shrubs and vines.
Site Type: Edge
Acreage: 0.32 acres
Invasive Species: Kudzu, English ivy, Multiflora-rose, Grape
Site Concerns: none

M-2R

Site Description: same as above. The trail runs along the creek here and there is a buffer of about 5'' with a 5' drop down to the creek.
Site Type: River Buffer
Acreage: 0.18 acres
Invasive Species: Kudzu, English ivy, Multiflora-rose, Grape
Site Concerns: creek, steep bank

M-3U

Site Description: This is a cut through for the power line, varying from 30'-50', and there is no canopy here. It is high with perennial plants and is maintained by mowing. Dense growths of invasives have established along the edges. In some areas bordering the creek there is no canopy or only a single row of trees, consequently no creek buffer, and the vines are fully established.
Site Type: Utility
Acreage: 1.32 acres
Invasive Species: Kudzu, Multiflora-rose, Grape, Tree-of-Heaven, Bittersweet, Honeysuckle
Site Concerns: water

M-4I

Site Description: This area has a fairly young canopy with open areas scattered throughout that are dense with berries, rose, and vines. It is mostly deciduous with some very large Sycamores. The under story is very weedy with invasive shrubs and perennials that seemed to have naturalized as the invasive groupings are consistent even away from the trail edge. The canopy is in good condition with a few areas of blow down. Vines are beginning to establish on the forest floor and attach themselves to the tree trunks.
Site Type: Interior
Acreage: 4.23 acres
Invasive Species: Multiflora-rose, Grape, Bittersweet, English Ivy, Garlic Mustard, Honeysuckle
Site Concerns: water

M-4R

Site Description: The trail runs along the creek in this area. There is a 5' buffer between the trail and creek bank where there is some tree canopy. Invasive vines and perennials have established themselves along the trail

edge and banks of the creek. Individual trees are being invaded with vines and there are sections where there is no buffer and the canopy is open.
Site Type: River Buffer
Acreage: .64 acres
Invasive Species: Multiflora-rose, Grape, Bittersweet, English Ivy, Garlic Mustard, Honeysuckle
Site Concerns: water

M-5U
Site Description: The sewer runs along here on a 30' wide open canopy area that is also used as a trail. There is Bittersweet that has almost reached the canopy that borders the utility area which is mostly young deciduous trees such as Maples. This area does not seem to be managed or mowed as frequently as M-3U.
Site Type: Utility
Acreage: 0.75 acres
Invasive Species: Multiflora-Rose, Grape, Bittersweet, English Ivy, Privet, Tree-of-Heaven,
Site Concerns: maintenance coordination

M-5I
Site Description: This is a young stand of mostly Pine and Maple that is bordered by Route 250 and a sewer line. There are open canopy areas scattered thought out. The canopy is compromised in areas by large vines. The open areas and under story are populated with thick stands of invasive shrubs and vines.
Site Type: Interior
Acreage: 0.47 acres
Invasive Species: Tree-of-Heaven, Multiflora-Rose, Bittersweet, Grape
Site Concerns: none

M-5E
Site Description: This is a transitional area that forms a buffer between Route 250 and the park. It is mostly Pine that has been planted by VDOT. There is a thick under story of invasive shrubs. There is a compost pile here that is spreading into the interior area. There may be concerns of cultivated plants spreading from the compost area into the woods.
Site Type: Edge
Acreage: 0.38 acres
Invasive Species: Tree-of-Heaven, Multiflora-Rose, Bittersweet, Grape
Site Concerns: none

M-6E
Site Description: This is another planted area that is mostly mature Pine and serves as a buffer between the on ramp and the garden areas. The canopy is in good shape with some mature invasive trees and some areas with vine cover. The terrain in this area is very steep as it rises to meet the roadway.
Site Type: Edge
Acreage: 0.52 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet
Site Concerns: slope

M-7R
Site Description: This is a buffer area between the power line, Route 250 and the creek. This is a young sparse canopy of Cedar, Pine, and Sycamore that is experiencing some dieback. The vines have begun to enter the canopy.
Site Type: River Buffer
Acreage: 0.13 acres
Invasive Species: Tree-of-Heaven, Bittersweet, Multiflora-Rose
Site Concerns: water

M-8I
Site Description: There is a healthy canopy of young to mature Pines and Poplar. The terrain is steep in the area that borders Rugby Road. Vines have worked their way about 30' up the tree trunks and the under story is scattered, however less dense than other areas, with invasive shrubs.
Site Type: Interior
Acreage: 3.03 acres
Invasive Species: English Ivy, Bittersweet, Multiflora-Rose
Site Concerns: steep slope

M-9I
Site Description: This is an area at the base of a slope scattered with mature Poplars. These are probably the largest and oldest trees in the park. There are no saplings to speak of. Invasives have established consistently throughout and vines are growing 30' up the tree trunks.
Site Type: Interior
Acreage: 0.13 acres
Invasive Species: English Ivy, Bittersweet, Multiflora-Rose, Garlic mustard
Site Concerns: steep slope, mature natives

M-10R
Site Description: This is a creek buffer area that has many open canopy areas. The canopy is young Pine, Sycamore, Dogwood, Holly, and Willow. On the western end the canopy is consumed with Bittersweet and there is some dieback as a result. There are some large stands of ornamentals, such as Buxus. There are some erosion issues along the creek bank.
Site Type: River Buffer
Acreage: 0.76 acres
Invasive Species: English Ivy, Bittersweet, Multiflora-rose, Garlic mustard
Site Concerns: water

Meadow Creek Natural Area Management

Management Summary

The main issues at this park are Kudzu vines, the maintenance of the utility right of ways, and the prevalence of Multiflora-Rose and Vines in the interior forest areas.

Eradication is not applicable here because the invasive flora has already become naturalized. The primary focus is on monitoring and management of the invasives. The native canopy is mostly healthy and should be maintained to prevent further invasion. Cut all Kudzu from the canopy in early spring or late fall and evaluate the situation. Establish a containment line where appropriate based on ease of management.

Establish a regular mow pattern for this area and monitor surrounding areas for spread. It might be beneficial to establish a parking area here for the RTF that would receive regular mowing. Work to eliminate the vine from the P-1R area across the creek.

Next, focus on the interior areas by targeting Rose, Bittersweet, Garlic Mustard, and English Ivy. Work with newly established weeds first and then move towards more dense infestations.

Manage invasive saplings on the edge and river areas with cutting and treating or basal applications. Establish a consistent maintenance plan for these trees for at least a couple of growing seasons. Reduce the percentage of invasive flora by 1/3 or more.
Establish a maintenance program and schedule with the utility companies.

Maintaining the integrity of the Creek buffers through re-vegetation is a secondary focus. Re-establish plants of recommended species in areas where there saplings have been out

competed by invasives or where open canopy exists within an interior or buffer area (be sure to include a fair number of evergreen species as the site in mostly deciduous). The appendix has a species specific management guide that applies to all of the management areas as well as a recommended species list.

Management Priorities

1. Manage the **high priority** areas first, **M-1O, M-1R, M-2E, M-2R, and the containment line**. Cut all Kudzu from the canopy initially and mow to prevent further spread until able to manage completely. Cut and treat all Kudzu and establish a regular mowing schedule for M-1O. Establish containment lines in best possible location and eliminate and Kudzu plants that fall outside of this line.

2. Manage English Ivy, Multiflora-rose, and Garlic Mustard, on the interior canopy floor. Reduce the visual presence of the invasive by at least 1/3.

3. Manage invasive trees, Tree-of-Heaven and Mimosa

4. Establish saplings in areas that are lacking saplings, in the open canopy areas, and where Kudzu has been removed. Focus on replanting evergreens and under story plants.

5. Establish a joint maintenance plan with the utility companies.

Management Suggestions

M-1O Open, Suppression, High
First, manage this site for Kudzu. Cut all existing Kudzu at the base to kill it in the canopy; allow the healthiest trees to re-establish. Then, focus on eradication at the base. This process will take at least 3 years as Kudzu tubers can remain dormant for 2 years after receiving damage.

Secondly, re-establish native vegetation to create a 30' creek buffer. The cleared area outside of the buffer could be established as a RTF parking area that will follow a regular mowing schedule.

M-1R Riparian, Suppression, High
Cut all Kudzu from the tree canopy. Treat as above. Replant the riparian buffer here after 3-4 years of successful management for Kudzu.

M-2E Edge, Suppression, High
Focus on the eradication of Kudzu and management of the Multiflora-rose. Remove Kudzu completely from this area and establish it outside of the containment line. Remove the dense mature stands of rose and maintain a level of invasiveness of less than 1/3 Rose. Replace any compromised canopy with new plantings after invasives have been successfully managed.

M-2R Riparian, Suppression, High
Remove all Kudzu from this site. In conjunction with an evaluation, try and establish this area outside of the containment line.

Cut other invasive vines from the tree canopy. Manage for Rose, English Ivy and Bittersweet to reduce and maintain a level of invasiveness at 1/3 or less.

M-3U Utility, Monitor, Low
This area is mainly maintained by the utility company. A unified and cohesive maintenance plan needs to be established between Parks and Recreation and the utilities. The maintenance situation creates an opportune environment for the introduction of new invasives, due to both the open canopy and the machinery used here. Low growing native plants should be encouraged and planted in this area. For areas along the creek, low growing bank stabilizing plants should be established to create a 30' buffer.

M-4I Interior, Suppression, Medium
This area should be managed for invasives with an emphasis on Multiflora-Rose, English Ivy, and Bittersweet. Remove the dense mature stands of Rose and maintain the level of invasiveness at less than 30%. Secondly, focus on the scattered incidents of vines that have invaded the canopy of individual trees. Cut these vines from the canopy and manage appropriately.

M-4R Riparian, Suppression, Medium
Manage the dense mature stands of Rose and Tree-of-Heaven. Maintain the level of invasiveness at less than 40%. Cut Bittersweet and Grape from the tree canopy and manage appropriately. Re-vegetate where the riparian buffer has been compromised.

M-5I Interior, Suppression, Low
Manage for the inventoried invasives with a focus on Multiflora-Rose and Bittersweet. Reduce Rose thickets and cut the Bittersweet from the tree canopy.

Reduce and manage this area to a level of 30% invasive species or less. Monitor this area for the migration of the compost area.

Educate gardeners to be aware of species that they may plant or compost that could escape into neighboring woods. Monitor the compost pile and garden plots for invasives. Discourage private yard waste dumping.

M-5E Edge, Suppression, Low
See response to M-3 with concern to the utilities. Manage for the inventoried invasives with a focus on Multiflora-Rose and Bittersweet. Reduce Rose thickets and cut the Bittersweet from the tree canopy.

Reduce and manage this area to a level of 30% invasive species. Establish a 20' clear zone around the compost pile, or relocate from under the tree canopy; it is migrating into the forested area.

Educate gardeners to be aware of species that they may plant or compost that could escape into neighboring woods. Monitor the compost pile and garden plots for invasives. Discourage private yard waste dumping.

M-5U Utility, Monitor, Low
This area is mainly maintained by the utility company. A unified and cohesive maintenance plan needs to be established between Parks and Recreation and the utilities. The maintenance situation creates an opportune environment for the introduction of new invasives, due to both the open canopy and the machinery used here. Low growing native plants should be encouraged and planted in this area.

M-6E Edge, Suppression, Low
Cut all invasive vines from the tree canopy especially on the western edge. Treat all cut stumps. Cut/treat, girdle/treat, or basal treat all invasive saplings in this area.

M-7R Riparian, Suppression, Low
Cut and treat all vines that are establishing in individual trees. Next, girdle/treat or basal treat all invasive saplings in this area. Do not remove saplings by mechanical means as their roots may help control erosion. Reestablish woody vegetation in this area as suggested on the riparian plant list.

M-8I Interior, Suppression, Medium
Manage the dense mature stands of Rose and Tree-of-Heaven. Maintain the level of invasiveness at less than 40%. Cut Bittersweet and Grape from the tree canopy and manage appropriately.

Establish a monitor line along the residential edge to prevent further invasion of English Ivy. Educate surrounding residents on the effects of invasive species in their parks.

M-9I Interior, Suppression, Medium

Cut all vines from the tree canopy and establish a clear zone of 5' around the base of each tree. Secondly, reduce and manage for the invasives listed above to a level of 15% invasive species. Establish a limit line along neighboring properties. After invasive populations have been successfully decreased, re-vegetate with tree species matching the existing canopy.

M-10R Riparian, Suppression, Medium
Monitor for Kudzu in this area. Secondly, manage for the existing invasives, reduce and maintain to a level of 1/3 invasives. After the invasives have been reduced, establish a 30' vegetated creek buffer in areas where the canopy has been compromised.

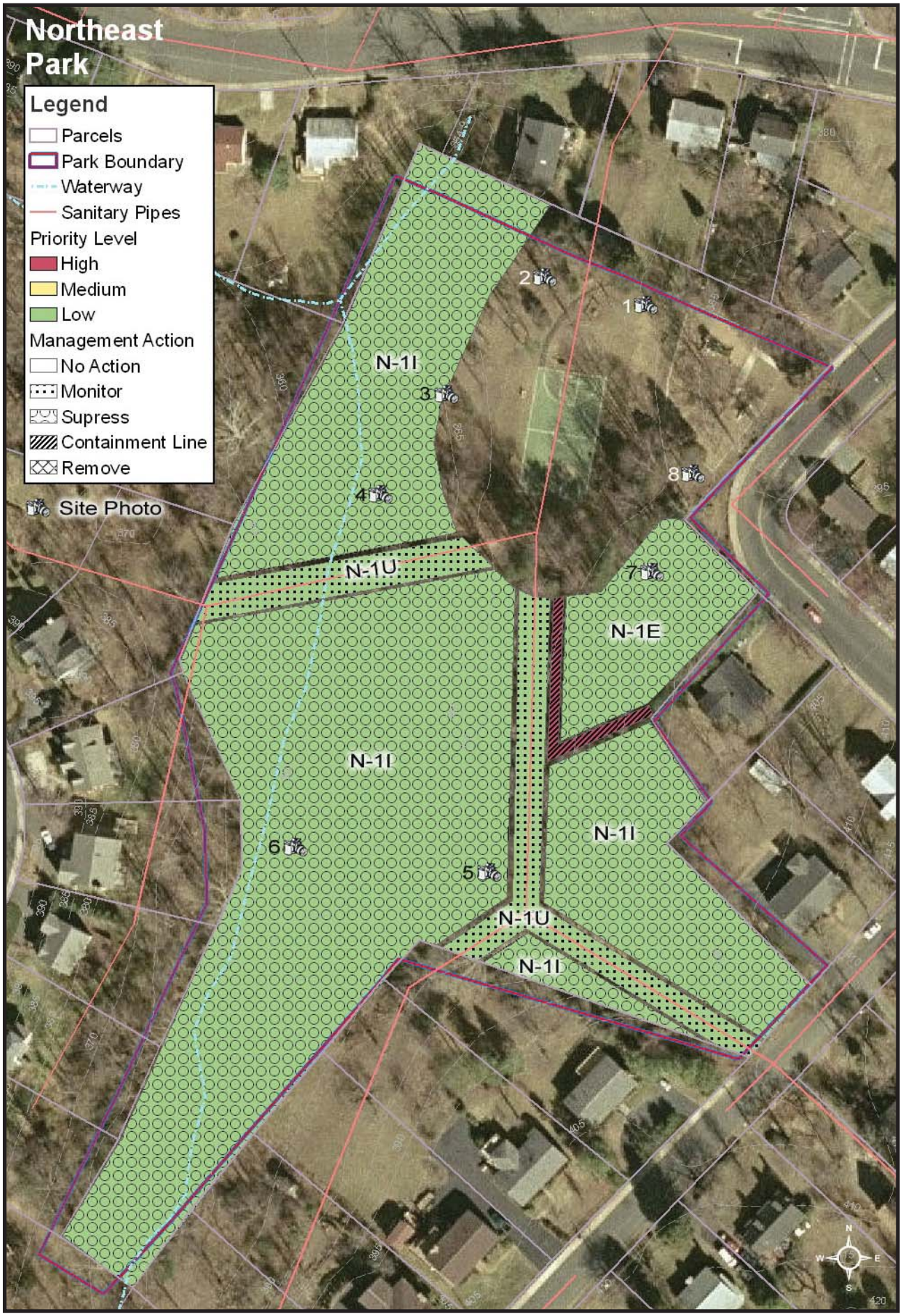
4.12 Northeast Park Inventory

Inventory Summary

This is a 4.8 acre park with approximately 3 acres of invasive management areas. This neighborhood park is mainly used for its basketball court, play area, and picnic tables. It is bordered by residential property. There are utility paths that run throughout the site. There is also a small stream that traverses this park.

The native forest community consists mainly of Tulip Poplar, Beech, Pine, and Sycamore. Other existing native species are: Holly, Dogwood, Cedar, White Oak, Locust, Boxwood, Ash, Willow, Cherry, Pokeweed, ferns, Jewelweed, Poison Ivy, and Virginia Creeper.

Overall, the tree canopy is young with scatterings of mature trees throughout the park, mostly Poplar. The canopy is mainly deciduous. The understory is fairly thick with shrubby and viney undergrowth. The terrain is low and moist especially in the wooded areas.


Northeast Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photo
N-1I
N-1U
N-1E
N-1I
N-1I
N-1U
N-1I
1
2
3
4
5
6
7
8
N
S
E
W

Northeast Park Photo Inventory

1 Park edge

2 Edge condition

3 Ivy on interior trees

4 Bittersweet on interior trees

5 Multiflora-Rose on interior areas

7 Typical Ivy infestation on interior areas

6 Riparin buffer condition

8 Vinca at park entrance

Area Inventories

N-1I

Site Description: Nice canopy of mostly Tulip Poplar. The level of invasiveness is approximately 60%. The canopy is free of vines but there is considerable infestation on the canopy floor. The terrain is damp and slopes towards the creek. There are many issues where erosion is a concern due to slope and compaction.
Site Type: Edge
Acreage: 3.25 acres
Invasive Species: Honeysuckle, English Ivy, Mimosa, Multiflora-rose, Grape, Tree-of-Heaven, Privet
Site Concerns: none

N-1U

Site Description: This is a cut through for the sewer line, varying from 30'-50'. Dense growths of understory invasives have established. In some areas bordering the creek there is no canopy or only a single row of trees, consequently no creek buffer and the vines are fully established.
Site Type: Utility
Acreage: .36 acres
Invasive Species: Honeysuckle, English ivy, Mimosa, Multiflora-rose, Grape, Tree-of-Heaven, Privet
Site Concerns: maintenance schedules

N-1E

Site Description: This area still has a nice canopy but a higher concentration of invasives. English Ivy has established itself on almost all of the tree trunks. There is a utility path that runs through here and establishes a line where the Ivy infestation decreases.
The area with the park signage should also be included in this area. There is Vinca that has been planted under the sign which is considered an invasive and has been documented in the wooded areas.
Site Type: Edge
Acreage: .29 acres
Invasive Species: English Ivy, Multiflora-Rose, Privet, Bittersweet, Vinca
Site Concerns: planting beds with planted invasives

Northeast Park Management

Management Summary

The main concern of this park is to reduce the overall weed population by 30% or more with a focus on vines that are establishing on the canopy floor. The target species are English Ivy and Multiflora-Rose.

First treat the **high priority** areas, the **containment line**. The utility path establishes a great containment line and should be utilized.

Secondly, cut and treat any invasive vines in the canopy. This applies mainly to the N-2I area where English Ivy is a big concern. Scout the other areas for small pockets of English Ivy that may be starting to establish.

Next, reduce the invasives in the interior areas starting with the newly established invasives working towards the more mature infestations. Juvenile plants can be hand pulled with a focus on and forest floor vines.

Focus on the edge species, treating the invasive saplings with a basal application. Only manage Mimosa and Tree-of-Heaven when a follow up plan for maintenance is in place. Areas where invasives have been planted in formal planting beds should be replanted with a non-invasive plant material and invasive vines should be disposed of in an appropriate location.

Erosion is a big issue at this park. An effort should be made to establish clearly delineated pedestrian paths that lead from the play areas to the bridge. Many of these areas are currently mowed. Consideration should be given to mulching these areas to prevent further compaction underneath the tree canopy and to allow the roots a chance to reestablish.

Management Priorities

1. Manage the **high priority** areas first, the **containment line**. Establish a containment line around area N-1E along the utility path. This may also involve establishing a joint management plan with the utilities company.

2. Manage for the target invasive shrubs and vines on the interior and reduce their overall visual presence by at least 1/3.

3. Establish pedestrian paths and mulch areas around canopy areas to prevent further erosion and compaction.

4. Re-plant formal planting beds with noninvasive plant material

Management Suggestions

(Type, Treatment, Priority)

N-1I Interior, Suppression, Low
This area ahoudl be managed with a focus on English Ivy, Multiflora Rose, and Privet. Hand pull all juvinile invasives and cut and treat all mature groupings of invasive shrubs. There are erosion concerns in this area and a clear walking path should be delineated in order to minimize compaction. Revegetate with native plants and mulch in order to establish a clear path edge.

N-1U Utility, Monitor, Low
Establish a joint management plan for this area. This utility pathway can serve as a containment line for the English Ivy located in area N-1E and should be mowed accordingly.

N-1E Edge, Suppression, Low
The main focus of this area is English Ivy and keeping it from climbing. Cut all Ivy at the base and treat mature vines with herbicide. The main goal is to maintain a clear containment line in order to prevent further spread.

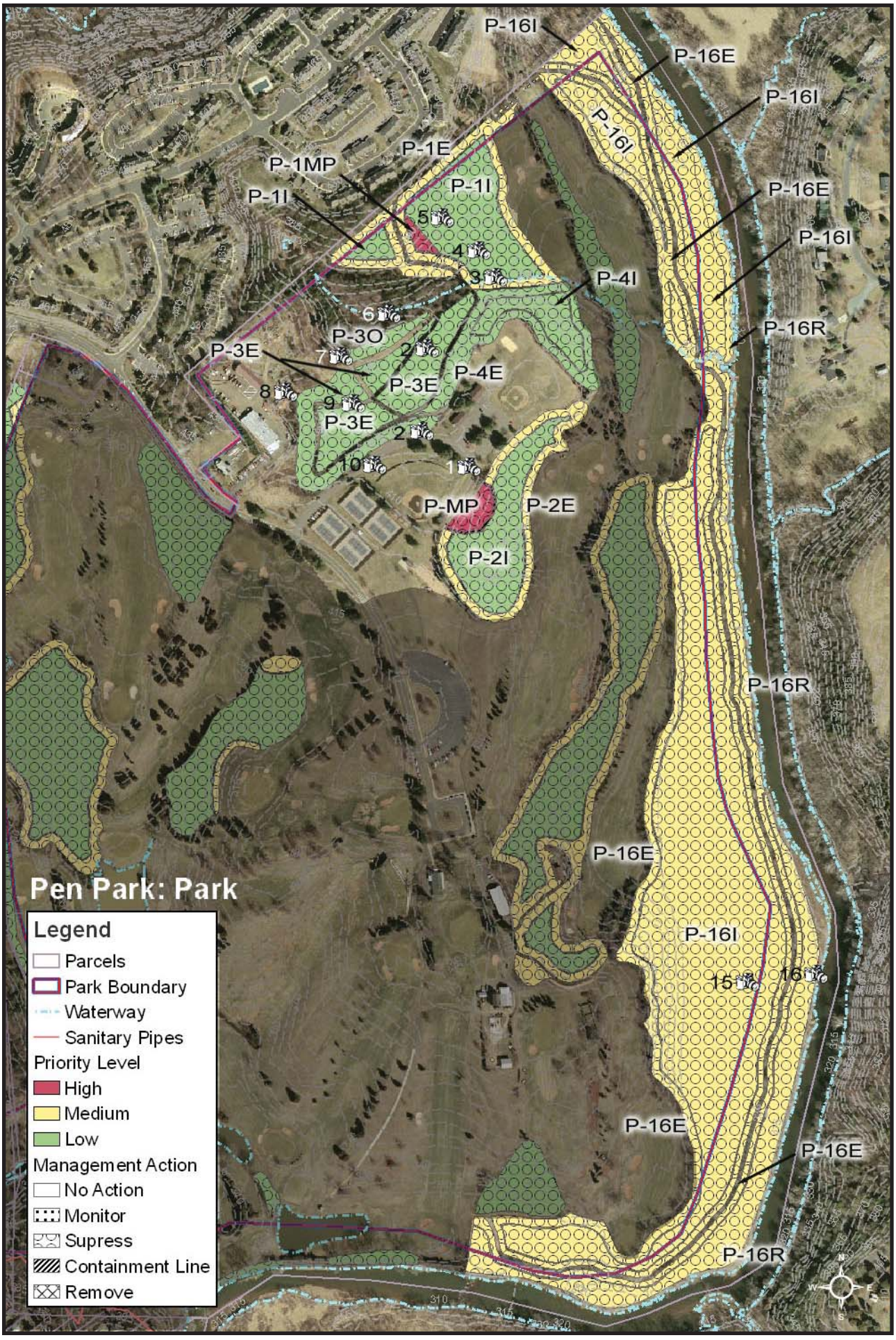
4.13 Pen Park Inventory

Inventory Summary for Park and Golf

This is a 280 acre park that for the purpose of this study has been divided into two sections. There is the 18-hole golf course and then there is the park section. The park area is used mainly for sports, tennis, baseball, and basketball, picnicking, and the nature/exercise trail that runs through a large wooded section of the park. The golf area is mostly managed with wooded islands throughout. The canopies of these islands are consistently in good condition with a good mix of deciduous and evergreen trees.

The canopy is young consisting of Tulip Poplar, Cherry, Oaks, Hickory, Beech, Cedar, and Pines. The understory is moderately invaded with invasive shrubs and vines. Vines are establishing along the floor and working their way into individual trees. The perimeter of these islands usually has a more dense infestation with vines in the canopy and a healthy population of Elaeagnus that seems to have escaped from landscape plantings around the golf course.

The park section has larger sections of unmanaged wooded areas with trails. A significant part of this area is low lying flood plain that runs along the Rivanna River. The canopy is healthy in all areas with a few exceptions where vines are growing up individual trees. Species include those mentioned above and are young in age. There are a few areas of blow down where vines have fully established. The canopy floor is consistently scattered with young vines and grouping of invasive shrubs.


P-16I
P-16E
P-16I
P-16I
P-1E
P-1MP
P-1I
P-1I
5
4
3
P-16E
P-16I
P-4I
6
P-3O
2
P-16R
P-3E
7
P-4E
8
9
P-3E
P-3E
2
10
1
P-MP
P-2E
P-2I
P-16R
P-16E
P-16I
15
16
P-16E
P-16E
P-16R
Pen Park: Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove

Pen Park Photo Inventory

1 Kudzu infestaton

2 Ligustrum on trail edge

3 Erosion concerns

4 Invasive vines on interior

5 Typical trail edge condition

6 Open space areas

7 Typical canopy along trail edge

8 Typical canopy along trail

9 Vine infestation along trail

10 Tree-of-Heaven along trail

15 Typical forest interior with vines

16 Typical riparian buffer

Park Area Inventories

P-1I

Site Description: There are healthy communities of Pine and Cedar here. The canopy is in good condition with some exceptions of open areas where the vines have grown into individual trees. There are patches of invasive shrubs and vines consistently throughout the forest floor. The terrain is hilly here and there are some erosion issues along the nature trail.
Site Type: Interior
Acreage: 4.80 acres
Invasive Species: Multiflora-Rose, Bittersweet, Honeysuckle, Grape
Site Concerns: erosion

P-1E

Site Description: This canopy area runs along the nature trail and is a buffer between the park and a residential area. The trail is 8' wide and has an open canopy above. In general the areas where there is heavy vine infestation occur along the trail edge. There are some areas along the trail where Elaeagnus has been planted.
Site Type: Edge
Acreage: 2.06 acres
Invasive Species: Multiflora-Rose, Bittersweet, Honeysuckle, Grape, Elaeagnus, Privet
Site Concerns: erosion

P-2I

Site Description: The interior of this area has a healthy tree canopy. Invasive infestations cover about 15% of the forest floor.
Site Type: Interior
Acreage: 2.56 acres
Invasive Species: Multiflora-Rose, Bittersweet, Grape
Site Concerns:

P-2E

Site Description: The edge canopy is fairly healthy. There is a serious problem with vines compromising the canopy on the NE edge.
Site Type: Edge
Acreage: 1.34 acres
Invasive Species: Multiflora-Rose, Honeysuckle, Mimosa, Grape, Elaeagnus
Site Concerns: neighboring Kudzu

P-2MP

Site Description: The tree canopy has been compromised up to 90% in this area with Kudzu.
Site Type: Parent Plant
Acreage: .4 acres
Invasive Species: Kudzu
Site Concerns: highly aggressive

P-3E

Site Description: This wooded area is at the beginning of the fitness trail. There are some serious infestation of invasive saplings and vines that have compromised the canopy in many areas. Some of the invasive trees are at least 25' tall and have formed dense stands. There are many open canopy areas and areas where the vines comprise 95% of the vegetation.
Site Type: Edge
Acreage: 3.65 acres
Invasive Species: Grape, Elaeagnus, Tree-of-Heaven, Bittersweet, Mimosa
Site Concerns: none

P-3O

Site Description: This is a no mow area with no canopy. Invasive shrubs are starting to establish here.
Site Type: Open
Acreage: .76 acres
Invasive Species: Honeysuckle, Mimosa, Privet, Elaeagnus, Bittersweet, Tree-of-Heaven
Site Concerns: mow line

P-4I

Site Description: The canopy has nice evergreens and Locusts. The canopy is in god condition. The understory is open with lightly scattered invasives. There is some hilly topography here.
Site Type: Interior

Acreage: .98 acres
Invasive Species: Bittersweet, Elaeagnus, Grape, Tree-of-Heaven,
Site Concerns: none

P-4E

Site Description: This edge area has a good canopy with some trouble spots. There are some areas of dense infestation of vines and Elaeagnus. There is a trail here that connects the exercise trail to the golf green. It runs beside a small creek that has some infestation issues along its bank especially as it open onto the golf green.
Site Type: Edge
Acreage: 1.54 acres
Invasive Species: Honeysuckle, Elaeagnus, Bittersweet, Multiflora-Rose, Grape
Site Concerns: creek

P-16I

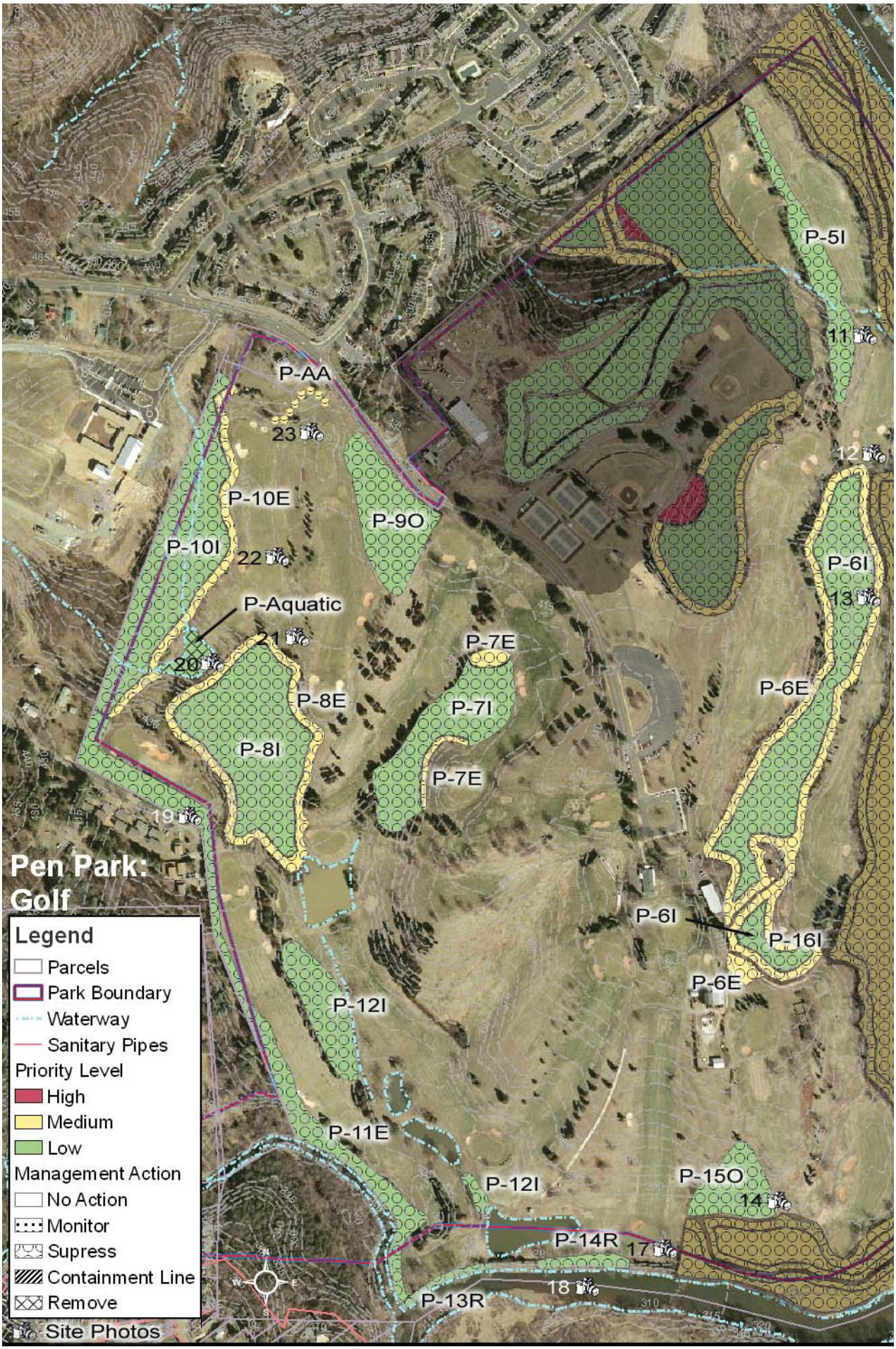
Site Description: The canopy in this area is healthy. The forest floor is consistently covered with invasive vines and shrubs. This is a very low area with saturated soils in some places. There are large infestations of invasive perennials that seem to love these moist environments. There are large infestations of English Ivy that are climbing the tree trunks.
Site Type: Interior
Acreage: 22.41 acres
Invasive Species: Garlic Mustard, Bittersweet, Multiflora-Rose, Elaeagnus, Grape, English Ivy
Site Concerns: floodplain

P-16E

Site Description: This 30' edge has scattered infestations of vines and shrubs. This edge follows the nature trail, which is 10' wide, which runs along the Rivanna. There are some mature vines scattered throughout, but the canopy overall is in good condition. There is a healthy mix of evergreens and deciduous trees.
Site Type: Edge
Acreage: 9.68 acres
Invasive Species:
Site Concerns: floodplain

P-16R

Site Description: In most places there is a wide healthy buffer, excepting a few spots where the trail meanders to the river side. The buffers drops on average 5' to the river and there is erosion in the places where there is pedestrian access. The canopy is healthy with the main infestation on the forest floor.
Site Type: River Buffer
Acreage: 5.97 acres
Invasive Species: Mimosa, Privet, Elaeagnus, Bittersweet, Multiflora-Rose, Honeysuckle, Garlic Mustard
Site Concerns: river


Pen Park: Golf
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos
P-5I
11
P-AA
23
12
P-10E
P-9O
P-10I
22
P-6I
13
P-Aquatic
21
20
P-7E
P-6E
P-8E
P-7I
P-8I
P-7E
19
P-6I
P-16I
P-6E
P-12I
P-11E
P-12I
P-15O
14
P-14R
17
18
P-13R

Pen Park: Golf Photo Inventory

11 Typical Elaeagnus growth after cutting

12 Typical forest interior

13 Path edge vine growth

14 Open area

17 typical riparian buffer

18 English Ivy in riparian edge

19 Residential edge

20 Aquatic invasives

21 Invasive vine in tree canopy

22 typical wooded edge

23 Tree-of-heaven infestation

Golf Area Inventories

P-5I

Site Description: There is a good canopy here with an understory of scattered invasives. The area along the creek is more densely invaded than neighboring areas.
Site Type: Interior
Acreage: 1.77 acres
Invasive Species: Honeysuckle, Privet, Elaeagnus, Bittersweet, Multiflora-Rose
Site Concerns: creek

P-6I

Site Description: Overall this is a young canopy that is relatively healthy with a good mix of deciduous and evergreens. The areas near the maintenance shed are more densely infested than neighboring areas.
Site Type: Interior
Acreage: 4.8 acres
Invasive Species: Climbing Yam, Honeysuckle, Bittersweet, Multiflora-Rose
Site Concerns: none

P-6E

Site Description: This edge has some young invasive trees that have established in groups. The canopy is in good condition overall with invasives establishing on the forest floor.
Site Type: Edge
Acreage: 3.89 acres
Invasive Species: Elaeagnus, Mimosa, Honeysuckle, Bittersweet
Site Concerns: none

P-7I

Site Description: The canopy is healthy with invasive vines and shrubs scattered thgoughout the interior forest floor.
Site Type: Interior
Acreage: 2.78 acres
Invasive Species: Privet, Bittersweet, English Ivy, Multiflora-Rose
Site Concerns: none

P-7E

Site Description: There are some areas where the vines are beginning to compromise the canopy, otherwise it is mainly a scattered, and in some areas dense, floor covering of invasive shrubs and small vines.
Site Type: Edge
Acreage: .35 acres
Invasive Species: Bittersweet, English Ivy, Multiflora-Rose, Privet, Tree-of-Heaven
Site Concerns: none

P-8I

Site Description: This is a healthy canopy of Pine, Holly, Maple and Sumac. There are scattered vines and shrubs on approximately 25% of the floor.
Site Type: Interior
Acreage: 4.65 acres
Invasive Species: Privet, Grape, Elaeagnus, Bittersweet, Multiflora-Rose
Site Concerns: none

P-8E

Site Description: The edge area has higher levels of invasives up to 75% in places.
Site Type: Edge
Acreage: 1.62 acres
Invasive Species: Honeysuckle, Mimosa, Privet, Elaeagnus, Bittersweet, Multiflora-Rose, Grape
Site Concerns: none

P-9O

Site Description: This is a no mow area that looks relatively good. There are some invasive saplings and vines that have established.
Site Type: Open
Acreage: 2.39 acres
Invasive Species: Bittersweet, Tree-of-Heaven
Site Concerns: none

P-AA

Site Description: This is an edge area next to the golf cart path that is a solid stand of adult Tree-of-Heaven.
Site Type: parent Plant

Acreage: .05 acres
Invasive Species: Tree-of-Heaven
Site Concerns: none

P-10I
Site Description: The canopy is good in this area with an invasive cover on the forest floor of approximately 15%.
Site Type: Interior
Acreage: 4.53 acres
Invasive Species: Mimosa, Privet, Elaeagnus, Bittersweet, Multiflora-Rose
Site Concerns: none

P-10E
Site Description: This edge has areas of infestation up to 90% where vines have established in the canopy.
Site Type: Edge
Acreage: 1 acre
Invasive Species: Mimosa, Privet, tree-of-Heaven, Bittersweet, Multiflora-Rose
Site Concerns: none

P-Aquatic
Site Description: The surface of this pond is covered approximately 75% in invasive species.
Site Type: Aquatic
Acreage: .41 acres
Invasive Species: to be determined
Site Concerns: water

P-11E
Site Description: This is a narrow edge that buffers the golf from neighboring residences. The canopy is in good condition but sparse. The floor is largely covered in invasive shrubs and vines ranging from 60-90% in areas. There are some established groups of adult of Tree-of-Heaven.
Site Type: Edge
Acreage: 3.57 acres
Invasive Species: Tree-of-Heaven, Bittersweet, Elaeagnus, Grape, Privet
Site Concerns: none

P-12I
Site Description: This is a healthy canopy of mostly young Pine trees. There is a consistent cover of invasive vines and in some areas it has invaded the canopy.
Site Type: Interior
Acreage: 1.51 acres
Invasive Species: Elaeagnus, Bittersweet, Multiflora-Rose
Site Concerns: none

P-14R
Site Description: see description for P-11E. The buffer area is less than 10' before it drops sharply to the river. In some areas there are formal evergreen hedges that have been planted.
Site Type: River Buffer
Acreage: .56 acres
Invasive Species: Tree-of-Heaven, Bittersweet, Elaeagnus, Grape, Privet
Site Concerns: river, steep bank

P-15O
Site Description: This area has been left open as a maintenance area and is screened form the course by a thin edge of trees. It is generally weed free with approximately 15% invasive population.
Site Type: Open
Acreage: 1.33 acres
Invasive Species: Bittersweet. Tree-of-Heaven, Mimosa
Site Concerns: none

P-Aquatic
Site Description: This pond is densely populated with Watermilfoil. This plant could potentially escape into other water bodies through drainage ways.
Site Type: Aquatic
Acreage: .4 acres
Invasive Species: Watermilfoil
Site Concerns: water

Pen Park: Park and Golf Management

Management Summary

This area should be approached as two separate management areas, as the park and the golf areas. The main issues for Pen Golf are vines and Elaeagnus Shrubs, which have probably escaped from a formal planting, and a creating a more established river buffer. The main issues at Pen Park are the control of vines that have compromised the canopy and a general reduction of invasives throughout the nature trail area, especially where invasive saplings are beginning to compromise part of the tree canopy.

Target species are invasive vines, Multiflora-Rose, Elaeagnus, Mimosa and Tree-of-Heaven. Remove all vines from the tree canopy in the park area treating all the larger vines as they are cut. Establish a containment line around the area with Kudzu, P-2MP, and try to eliminate the interior Kudzu in area P-1MP as it is not as fully established. Determine a regular maintenance schedule for these areas and monitor any surrounding areas for spread.

Next, work on the interior areas to reduce newly established weed by hand pulling and then work your way towards larger infestations using chemicals methods in combination. There are some areas in P-16I where English Ivy has established; this area should be contained and kept from the tree canopy.

Treat Mimosa and Tree-of-Heaven saplings on the edge communities and where there are dense stands of these trees. Cut and treat may be more appropriate in open golf areas and basal applications may be more appropriate in interior areas.

Again, only manage these areas when there is a commitment to follow up treatments. Some of these areas, especially around the fitness trail will need to be replanted as the weeds have started to comprise a large part of the canopy.

Management Priorities: Pen Park

1. Treat **high priority areas** first, **P-1MP, P-2MP, and containment areas**. Cut the Kudzu vines from tree canopy and establish containment line around or eliminate the Kudzu infestation where possible.

2. Cut and treat all other vines along the fitness that are affecting the tree canopy.

3. Hand pull and treat any small immature infestations that are establishing on the canopy floor.

4. Cut/treat, girdle/treat, or basal treat all invasive saplings and large shrubs that have established in open areas and along the edges of the trail.

5. Reduce overall invasive population in the interior areas by 1/3 or more.

6. Re-vegetate open areas around the fitness trail with native trees/shrubs

Management Suggestions

The following suggestions are organized by general sites and not divided out by site type as in some previous sections.

P-1

Treat high priority areas first, P-1MP and containment lines. Cut all Kudzu from the tree canopy and treat; establish a containment line around the infestation. There not much tree canopy in the infested area some consideration should be given to clearing the site and managing for a minimum of 3 years and then replant natives.

Reduce the overall visual presence of invasives by 1/3 or more on the canopy floor, focus on small Bittersweet vines which are prevalent and Multiflora Rose. Trailside erosion issues should be addressed. Replace the formal Elaeagnus hedge that buffers the golf green from the nature trail.

P-2

Treat all high priority areas first, P-2MP and the containment line. Cut all Kudzu from the tree canopy and assess the tree damage, erosion concerns, and the extent of infestation. Establish a containment line around the Kudzu where logical; be sure to exclude any salvageable trees.

Establish a regular maintenance schedule for this area to keep the infestation out of the tree canopy and under control. After a few seasons of successful maintenance, evaluate the need to remove trees that are a safety hazard. Reduce the over weed infestation on the forest interior by 1/3 or more. Monitor regularly for Kudzu spread.

P-3

Cut all vines from the tree canopy, treat and assess canopy damage. Remove any safety hazards. Cut and treat all invasive saplings along the fitness trail. Re-vegetate this area after 2-3 years of management. Replant with native shrubs and trees and possibly some formal plantings that will discourage the re-sprouting of invasives. Establish a regular mowing line for the open areas.

P-4

Reduce the weed population in this area by 1/3 or more. Focus on removing small vines and groupings of Multiflora-Rose on the forest floor. Watch for erosion issues near the creek.

P-16

Reduce the overall visual presence of the invasive population by 1/3 or more. Focus on aggressive invasives such as Garlic Mustard, English Ivy, Bittersweet, and Rose. There are some pockets of established English Ivy populations which should be contained and eliminated to the best extent possible.

Be mindful of wetland soils and the close proximity to the river when using herbicides in this area.

It may be helpful to establish a joint maintenance plan with the golf course for the areas located on the perimeter of the golf course. They currently manage the plants on their perimeter, but only for golf course considerations.

Management Priorities: Pen Golf

1. Establish a training meeting with the golf staff for appropriate identification and treatment of invasives. Establish a maintenance plan that utilizes their current management practices.

2. Remove any immature invasive populations, esp. bittersweet, that is establishing on the interior areas.

3. Reduce overall invasive population by 1/4 or more, focus on invasive saplings, Elaeagnus, and Bittersweet

4. Re-define and replant riparian buffer to be at least 30’ wide where possible

5. Remove Aquatic invasives from pond. Discuss appropriate measures with person qualified for water management.

Management Suggestions

(Type, Treatment, Priority)

The following suggestions are organized by general sites and not divided out by site type as in some previous sections.

P-5
Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on edge areas where Elaeagnus and Bittersweet are the main issues. There are also some areas of more dense infestations along the creek area that need to be managed.

P-6
Reduce the visual presence of invasive plants in this area by 1/4 or more. Establish a management plan for the area around the storage building as there are many perennial invasives taking advantage of this open edge. Focus on Bittersweet and Multiflora-Rose.

P-7
Cut all vines from the canopy and treat mature invasive vines. Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on Multiflora-Rose, Elaeagnus, and Bittersweet.

P-8
Cut all vines from the canopy and treat mature vines. Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on Multiflora-Rose, Elaeagnus, and Bittersweet.

P-9
Establish a mowing schedule for this space. Cut and treat all invasive saplings. Plant native trees, shrub or grass in areas where invasive saplings have been managed.

P-10
Reduce the visual presence of invasive plants in this area by 1/4 or more. Treat all invasives especially on the edge areas. Focus on Tree-of-Heaven, Elaeagnus, and Bittersweet.

P-Aquatic
Completely remove weeds in this pond if it is deemed practical by qualified personnel. Many times aquatic species do not respond to treatment and there is a risk of spreading it through removal.

P-11
Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on invasive vines and Ealaeagnus. This area seems to be cut annually by the golf crew. Work to establish an invasive management plan to be conducted during their cuts.

P-12
Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on Bittersweet and Elaeagnus.

P-13
Extend this riparian buffer to be a minimum of 30' fill in open areas with native plantings where possible.

P-14
Extend this riparian buffer to be a minimum of 30' fill in open areas with native plantings where possible. Cut and treat all English Ivy that is establishing on the tree trunks.

P-15
Establish a management plan for this area. Revegetate with grasses or shrubs. Reduce the visual presence of invasive plants in this area by 1/4 or more. Focus on the cut/treat of Tree-of-Heaven and Mimosa.

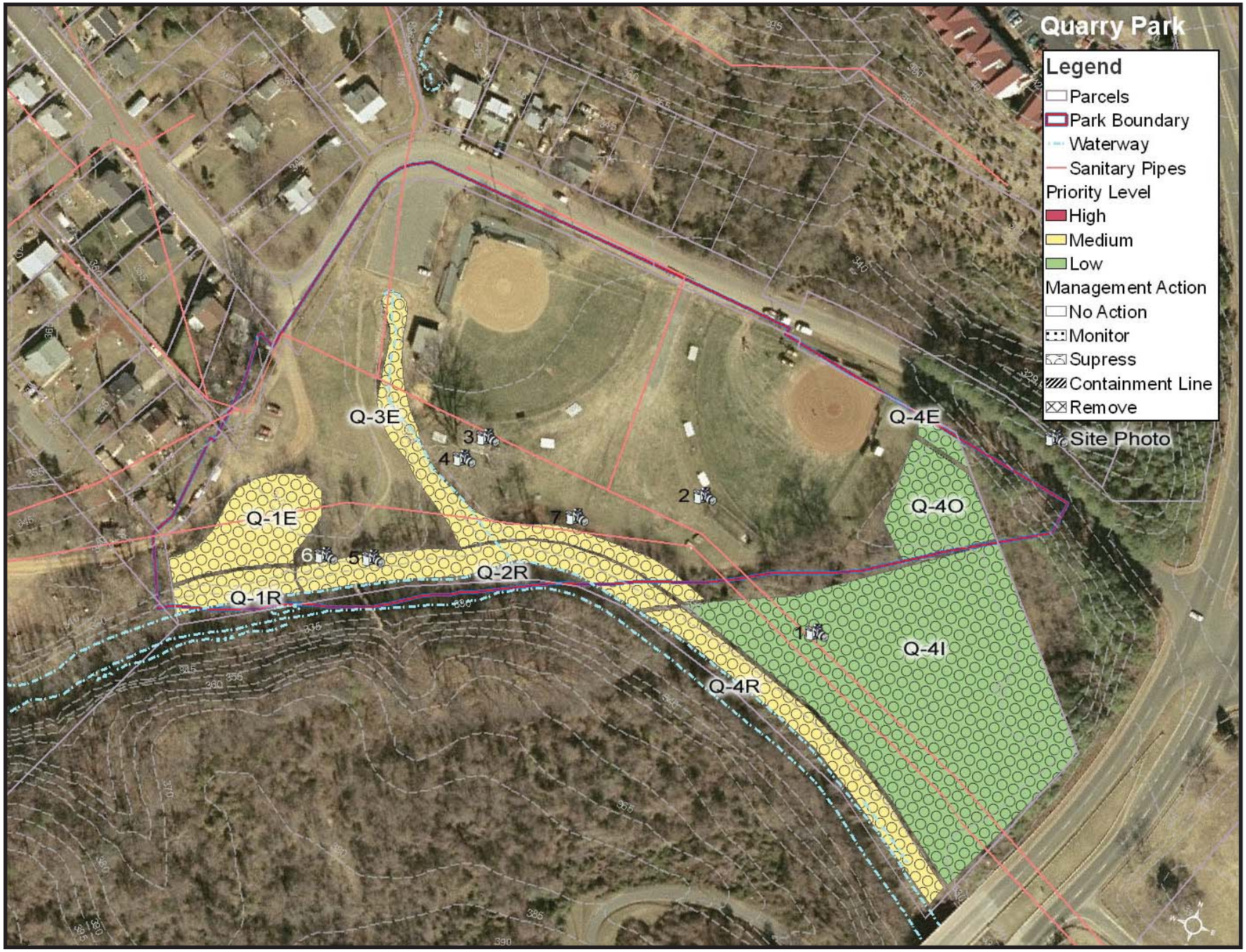
P-Aquatic
This plant can be removed by hand with a hand rake. Another option includes lowering of the water level to kill off the plant. This plant can escape easily and the plant should be disposed of in an area where it will completely dry out and will not be in proximity to wany water or drainage area. t

4.14 Quarry Park Inventory

Inventory Summary

This is a 9.1 acre neighborhood park that is part of the Rivanna Trail system. There are three baseball fields located here which constitute the major use of this park. The park is bordered by Moore's Creek, residential areas and Monticello Road. Most of the park is designated for active recreation so there is only 3.61 acres of management area, most of which is along the creek.

The wooded section to the east is not accessible or managed. Overall the canopy is deciduous young Sycamore, Maple, Locust, Hickory, Oak, and Locust with some Pine along the roadways. The canopy is healthy in most areas except along the creek where vines are establishing in the canopy.


Quarry Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photo
Q-1E
Q-1R
Q-2R
Q-3E
Q-4E
Q-4O
Q-4I
Q-4R
1
2
3
4
5
6
7

Quarry Park Photo Inventory

1 Typical edge condition

2 Riparian buffer condition with Mimosa

3 Riparian canopy covered in vines

4 Riparian buffer with Multiflora-Rose

5 Invasive trees on creek bank

6 Riparian buffer

7 Invasives on forest floor

Area inventories

Q-1E
Site Description: This area has a good young canopy of trees that has a fairly open understory. Invasive vines and shrubs have established here and cover about 40% of the floor.
Site Type: Edge
Acreage: .28 acres
Invasive Species: Multiflora-Rose, Honeysuckle, Mimosa, Grape
Site Concerns: none

Q-1R
Site Description: This site runs along the creek and invasives are establishing in the understory with saplings beginning to compete with native trees. There is some erosion along the banks of the creek and a small pedestrian bridge. The canopied buffer area is about 10' in width and the slopes steeply to the water.
Site Type: River Buffer
Acreage: .11 acres
Invasive Species: Kudzu, Honeysuckle, Mimosa, Tree-of-Heaven, Elaeagnus
Site Concerns: creek

Q-2R
Site Description: This area is the same as above only the invasive population in the canopy is much greater, up to 90% in some areas.
Site Type: River Buffer
Acreage: .30 acres
Invasive Species: Tree-of-Heaven, Mimosa, Privet, Elaeagnus, Bittersweet, Garlic Mustard
Site Concerns: creek, steep creek bank

Q-3E
Site Description: This area borders a small creek that runs into Moore's Creek and is very unhealthy. The canopy is sparse and about 80% covered in Grape. Many invasive saplings have established here as well as shrubs.
Site Type: Edge
Acreage: .28 acres
Invasive Species: Multiflora-Rose, Honeysuckle, Mimosa, Grape
Site Concerns: creek

Q-4I
Site Description: There is a full canopy in this area with a few open canopy areas. The floor is consistently scattered with invasive shrubs and vines up to 60% in some places. There are areas where the vines have begun to grow into the canopy and it is being compromised.
Site Type: Interior
Acreage: 1.87 acres
Invasive Species: Tree-of-Heaven, Mimosa, Privet, Elaeagnus, Bittersweet
Site Concerns: none

Q-4R
Site Description: The canopy is similar to Q-2R however there are less invasives here. There is a trail, that is not accessible, that runs close to the creek here but there is a wide buffer area with healthy trees. There is no creek access.
Site Type: River Buffer
Acreage: .28 acres
Invasive Species: Tree-of-Heaven, Mimosa, Privet, Elaeagnus, Bittersweet, garlic Mustard
Site Concerns: creek, steep creek bank

Q-4O
Site Description: This is a no mow area without an established canopy. Grape vines are beginning to establish here.
Site Type: Open
Acreage: .26 acres
Invasive Species: Grape
Site Concerns: none

Q-4E
Site Description: This is a young Pine canopy that is in good condition. There are some invasives establishing on the road side but they are not interfering with the canopy. The slope here is very steep falling about 20' to the wooded area.
Site Type: Edge
Acreage: .03 acres
Invasive Species: honeysuckle, Mimosa, Privet, Elaeagnus, Bittersweet, Multiflora-Rose
Site Concerns: none

Quarry Park Management

Management Summary

A majority of the wooded areas at Quarry Park are not readily accessible, and some areas are even legally off limits. The edge and riparian areas are highly invaded especially with vines. So the management of invasives at this park will focus on the quality of the riparian buffers and visual integrity of the wooded areas.

The target species are Grape, Bittersweet, Tree-of-Heaven and Mimosa.

Cut all vines from the canopy and treat the remaining stumps in the open or shrubby riparian areas. Reduce the vine population as much as possible in areas where it is not fully established. In areas of fully established vines, define a physical containment and monitor line that the vine is not to spread beyond and maintain vines to that limit. For example, the bridge in section Q-3E would be a good containment line.

Where the vines have been successfully managed, re-plant the riparian buffer to be at least 30' wide along Moore's Creek and 10' along the drainage creek.

Hand pull any newly established invasives in interior and edge areas. Cut and treat all invasive saplings and shrubs along the riparian buffer. Only do so when a follow-up maintenance plan is in place.

Establish a regular maintenance plan for the open area, Q-4O.

Management Priorities

1. Establish clear lines to delineate between county and city maintenance areas. Establish a joint maintenance plan for any overlapping areas.

2. Cut all vines from the tree canopy and define acceptable limits of spread for management purposes.

3. Treat larger saplings and shrubs along the edges and riparian buffer areas by the cut/treat, girdle/treat, or basal application method. Hand pull all newly established trees and vines. Reduce the visual presence of invasives by at least 1/3. Focus mainly on the invasive saplings.

4. After 3-5 years of management, replant any riparian buffer areas that have open canopy areas. Aim for 30' buffers along Moore's Creek and 10' buffers along the drainage creek.

5. Establish maintenance schedule and mow line for the no mow areas in Q-4O

Maintenance Suggestions

(Type, Treatment, Priority)

Q-1E Edge, Suppression, Medium
Cut and treat all mature invasive vines and shrubs. Establish a regular mowing/weed eating plan for this area to keep the understory open and free of mature invasives.

Q-1R Riparian, Suppression, Medium
Focus on the management of the invasive saplings. A basal application may be the best option in this area in order to prevent unnecessary disturbance of the creek bank. Consider widening the riparian area by planting more native trees. Cut and treat large shrubs. Do not use mechanical methods here as the roots are needed to help with erosion.

Q-2R Riparian, Suppression, Medium
see Q-1R. Focus on the management of iinvasive trees and the establishment of a healthy riparian buffer. Increase the width of the buffer in areas where there are erosion concerns or a narrow buffer.

Q-3E Edge, Suppression, Low
Cut and remove all vines along the drainage ditch in order to assess the situation. Treat larger vines where possible. If there is no healthy native vegetation consider mowing this area until it is more manageable and eventually reestablishing a native buffer area. Cut and treat all invasive saplings and shrubs.

Q-4R Riparian, Suppression, Medium
Focus on the treatment of invasive trees here using the basal or girdle method.

Q-4I Interior, Suppression, Low
Cut all vines fro the canopy and treat the mature stems. This is not an area that is readily accessable so the management should be minimal. Focus on keeping the vines out of the canopy and treatment of invasive saplings. There are more invasives on the SW side and most effort should be focused there. Effort on the NE side should be on the hand pulling of establishing plants and monitoring.

Q-4O Open, Suppression, Low
Establish a regular mow line for this area and monitor to make sure that invasives do not establish in the no mow area. Replant with native Pine if a canopy is desired.

Q-4E Edge, Suppression, Low
Focus on the management of invasive saplings. Basal or girdling treatments is suggested.

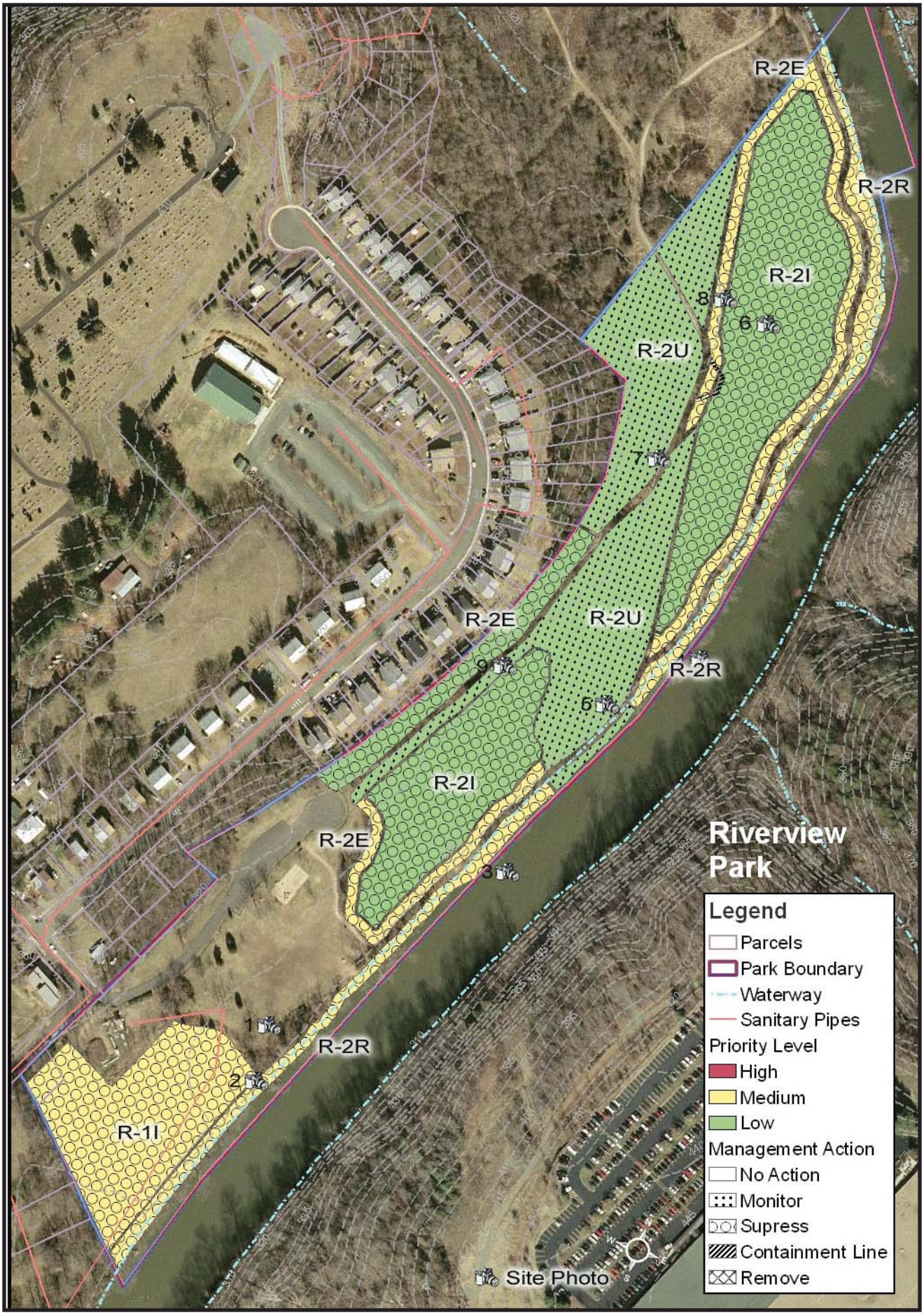
4.15 Riverview Inventory

Inventory Summary

This is a 26.6 acre park with 16.19 acres of invasive management. There is a paved greenway that runs the length of the park. There is also an open field area with a play space and picnic areas. This park is mainly for passive use and trail users.

A majority of the wooded area lies within the areas between the trails and is not readily accessible to users. There are many utilities that run along the path where there is no canopy. Much of the canopy is healthy except in a few areas that are experiencing die back from what looks to be the result of flooding.

The canopy consists mainly of young White Pine, Box elder, Cedar, Ash, Cherry, Locust and mostly Sycamore. The understory is quite thick with invasive shrubs and perennials. The terrain is relatively flat with some hydric soils with the exception of the river bank which has a steep 5' drop to the water.


R-2E
R-2R
R-2I
R-2U
R-2E
R-2U
R-2R
R-2I
R-2E
R-2R
R-1I
1
2
3
5
6
7
8
9
Site Photo
Riverview Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove

Riverview Park Photo Inventory

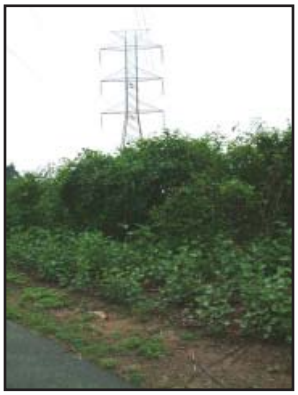
1 No mow area with saplings

2 Riparian buffer area

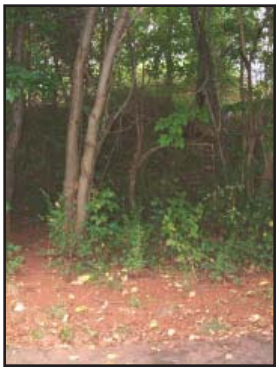
5 Typical trail edge

6 Vines in canopy of trail edge

7 Condition of utility area

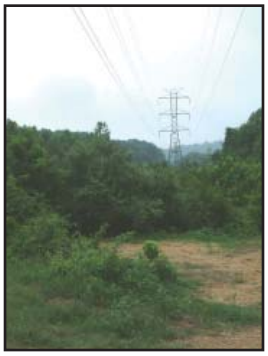


8 Knotweed in utility area



9 Forest interior

11 Ligustrum on trail edge



12 Typical utility area

Area Inventories

R-1I

Site Description: The canopy in this area looks good. There are some open canopy areas but they are relatively free of hardy invasives. There is a good mix of deciduous and evergreen here that is not found on many sites.
Site Type: Interior
Acreage: 2.19 acres
Invasive Species: Multiflora Rose, Honeysuckle, Privet, Bittersweet,
Site Concerns: none

R-2E

Site Description: The canopy is fairly open and young here as it runs the length of the trail. It is free of invasives. The invasives are consistent on the edge to the interior and are very thick with understory and viney invasives.
Site Type: Interior
Acreage: 2.0 acres
Invasive Species: Multiflora Rose, Bittersweet, honeysuckle, Garlic Mustard
Site Concerns: trail

R-2I

Site Description: This area comprises a majority of the forested area at the park and is largely inaccessible. The canopy is healthy, however there are some areas of dieback and vines are scattered consistently throughout the interior forest floor that are making their way up the tree trunks. The floor is very weedy with invasive shrubs and vines. The terrain is manly flat and low lying with saturated soils in some areas.
Site Type: Interior
Acreage: 5.23 acres
Invasive Species: English Ivy, Multiflora Rose, Bittersweet, Honeysuckle, Mimosa
Site Concerns: saturated soils

R-2R

Site Description: This area borders the Rivanna River along the entirety of the park. There is an average of an 8' buffer between the trial and where the topography begins to slope downward. The canopy is healthy and young but there are many vines that are starting to climb into the canopy. There are many places where people have accessed the river creating erosion issues. The terrain is level and sandy with a average and steep 5' drop to the river.
Site Type: River Buffer
Acreage: 1.5 acres
Invasive Species: Multiflora- Rose, Honeysuckle, Mimosa, Tree-of-Heaven, Elaeagnus
Site Concerns: river

R-2U

Site Description: There is little canopy in this area as it is mowed somewhat regularly. In areas where there is some sapling canopy it is competing heavily with the invasive vines and shrubs. It is perennials and wildflowers with some fairly mature invasive shrubs. Some areas to the NW are 100% invasives with large populations of Japanese Knotweed and Mature Elaeagnus.
Site Type: Utility
Acreage: 4.2 acres
Invasive Species: Elaeagnus, Multiflora- Rose, Japanese knotweed, Mimosa, Tree-of-Heaven,
Site Concerns: Maintenance coordination

Riverview Management

Management Summary

Most of the forested areas in
this park are not readily accessible; therefore the focus should be on the visual character of the forested edge and the quality of the river buffer. Target the aggressive hard to manage species such as English Ivy, Bittersweet, Rose, and Garlic Mustard.

First priority is to cut invasive vines from the tree canopy in areas along the trail and river side. Cut and treat any mature vines, note and make a regular maintenance schedule for larger infestations to keep them out of the canopy. Try and eradicate smaller infestations through both mechanical and chemical methods.

Next, reduce the invasives on the interior by at least 25%. Focus on the newer infestations and then move onto larger more mature infestations. Top priority is to hand pull any vines that are beginning to establish on the canopy floor. There are some large infestations of English Ivy that need to be contained.

Because the utility areas are such a large and heavily infested area of this park, they are a higher priority than in other parks. Establish a joint maintenance plan or agree on a regular and scheduled maintenance pattern with the utility company.

Replant riparian buffers in areas where there is excessive access or no buffer present. Establish consistent and planned river access areas to avoid further erosion issues.
There are some areas where there is pedestrian/dog river access. These areas should be more defined or re-vegetated in order to address erosion issues.

Management Priorities

1. Cut all vines from the tree canopy and treat the remaining stumps.

2. Establish a joint maintenance and vegetation planting plan with the utility company

3. Reduce the overall visual presence of invasives by at least 1/4.

4. Where possible, re-vegetate the riparian buffer where there are erosion issues or a buffer less than 30' in width. Establish river access points to reduce potential for erosion.

Maintenance Suggestions

(Type, Treatment, Priority)

R-1I Interior, Suppression, Medium
Reduce the invasives by 1/4 or more on the interior with both manual and chemical methods. Focus on plants that are aggressive or may be a potential canopy hazard such as Bittersweet, Multiflora-Rose, Honeysuckle, and Garlic Mustard. Monitor the no mow area for intrusion of invasives.

R-2E Edge, Suppression, Low
Reduce the number of weeds by at least 30% focusing on those invasives that may be a potential canopy hazard like young vines. Also focus on weeds that thrive in wet areas such as Multiflora-Rose, Knotweed and Garlic Mustard to prevent spreading of any colonies. Cut and treat all mature parent plants with expanded seeding capabilities.

R-2I Interior, Suppression, Low
Reduce the invasives in this area by at least 1/4. Explore the need to re-vegetate in the areas where there has been canopy dieback. Focus on Multiflora-Rose, Honeysuckle, and Bittersweet.

R-2R Riparian, Suppression, Medium
Address the river access areas for erosion issues. Cut all invasives vines from trees and reduce invasives by at least 30%. Focus on

Multiflora-Rose, Bittersweet, and Honeysuckle.

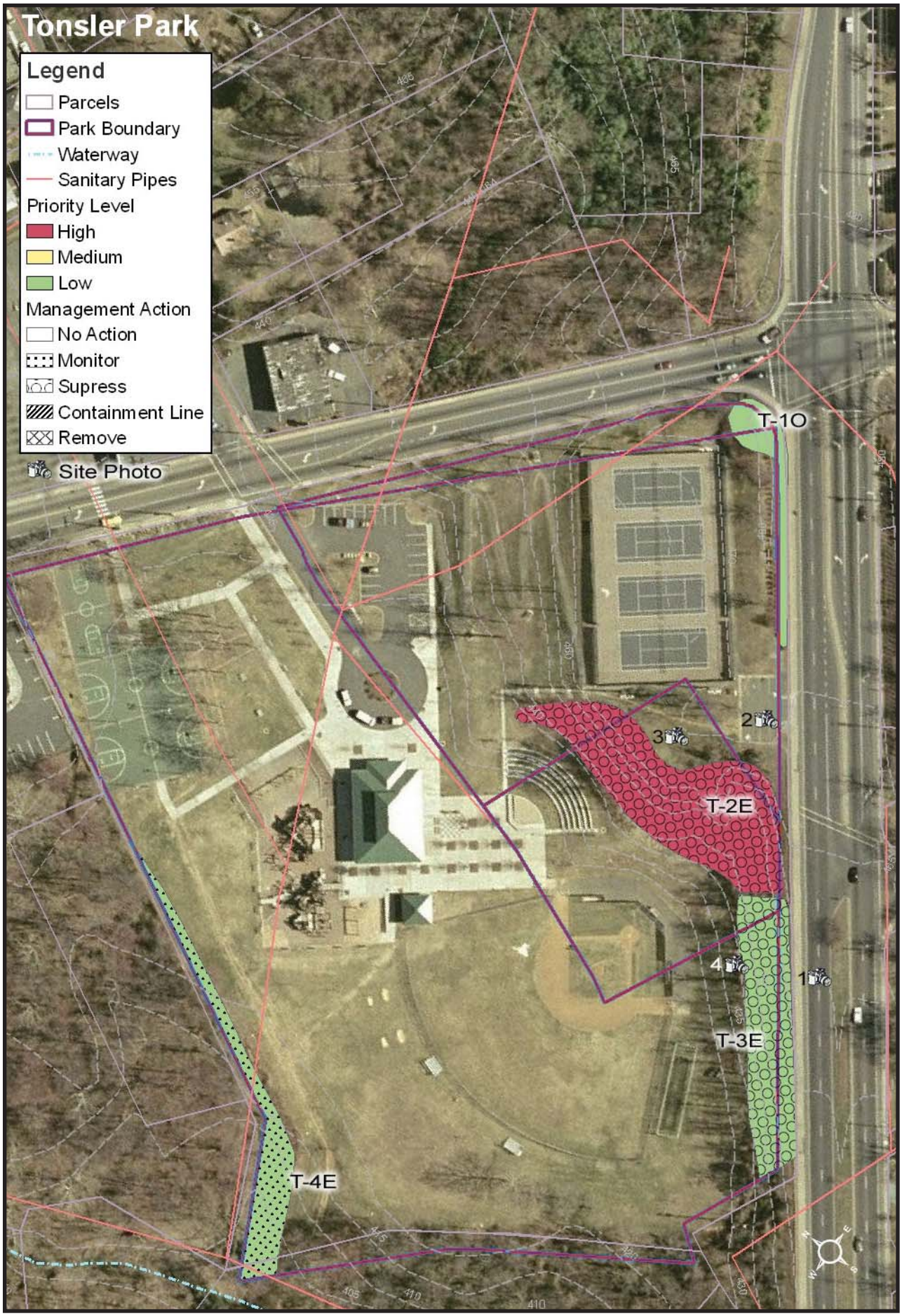
R-2U Utility, Monitor, Low
Establish a joint management plan with the utility company. Discuss options of planted native wildflowers, shrubs or trees to help eliminate opportunities for invasive infestation.

Elaeagnus is prevalent here, cut and treat all mature shrubs. Cut and treat areas infected with Knotweed replant with grasses that can be regularly maintained where applicable.

4.16 Tonsler Park Inventory

Inventory Summary

This is a 7.4 acre park with .85 acres of management area. The park is mainly used for it tennis courts, play area, ball field, basketball courts, and the recreation center. The park is used for active recreation and most areas are mowed and maintained heavily. It is bordered by 5th street and Cherry Ave. and on the NW side by forested area that is heavily infested with invasives. The main canopy area is a buffer between the roadway and the park where there is some steep grade. This area is heavily infested with ground level weeds as well as some that have worked their way into the canopy. There are scattered invasive saplings throughout the T-2E area with a dense understory of herbaceous invasives.


Tonsler Park
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photo
T-1O
T-2E
T-3E
T-4E
1
2
3
4

Tonsler Park Photo Inventory

1 Condition of park edge

2 Tree of Heaven and Knotweed infestaion

3 Knotweed infestation under canopv

Area Inventories

T-1O

Site Description: This area consists of planted rows of shrubbery. There is no tree canopy here. The species planted here, while not aggressive, are considered invasives.
Site Type: Edge
Acreage: .7 acres
Invasive Species: Nandina, Tree-of-heaven, Ligustrum, Burning Bush
Site Concerns: planted species

T-2E

Site Description: The canopy in this area consists mainly of young locust and is in good condition. There are some invasive saplings beginning to establish. The understory is approximately 85% invasive perennials. The terrain in this area becomes fairly steep as it slopes towards the amphitheater.
Site Type: Edge
Acreage: .39 acres
Invasive Species: Japanese Knotweed, Vinca, Mimosa, Tree-of-Heaven
Site Concerns: none

T-3E

Site Description: The canopy is comprised of young walnut and locust. There are many areas where the canopy is being compromised by grape vine that has invaded the canopy. The understory is very dense with deciduous invasives. The terrain here is very steep and due to the vines in the understory, it is not traversable.
Acreage: .23 acres
Invasive Species: Grape, Privet, Tree-of-Heaven
Site Concerns: steep topography

T-4E

Site Description: There is a sparse canopy here as it is the edge of a small creek that runs through the park and it is mowed almost to the edge on one side. The invasive understory is very dense here and is bordered on two sides by neighboring property that is also thick with invasives.
Site Type: Edge
Acreage: .16 acres
Invasive Species: Multiflora- Rose, Japanese knotweed, Mimosa, Tree-of-Heaven,
Site Concerns: creek

Tonsler Park Management

Management Summary

This park is mainly used for its sports fields and the forested areas are used exclusively as a buffer from the roadway where the grade is very steep. The focus should be on suppressing the vines to improve the visual character of this space. Target species are vines, Knotweed, and saplings of Mimosa and tree-of-Heaven. Cut and remove all vines from the tree canopy treat any mature vines. Establish a regular cutting schedule to keep the canopy weed free. Next, cut the Knotweed colony and treat with a foliar spray. This process should be done repeatedly as Knotweed will resprout aggressively. After the Knotweed community has been reduced by at least 2/3 reestablish this area as lawn where possible so that it will be incorporated into a regular mowing schedule. If this is successful for at least three growing seasons, consider re-establishing the tree canopy. This area should also be managed for saplings. Apply a basal application or cut and treat all Mimosa and Tree-of-Heaven in this area and along the edge environments. Establish a regular mow line for the area around the creek so that woody weeds do not establish here. A long range goal is to replace the formal planting area with Burning Bush and Nandina at the entrance to the park. These plants are considered invasive and should be removed from planting lists, as well as some Elaeagnus and Koelreuteria. They are not overly aggressive, and are in managed areas, so they are not a high priority.

Management Priorities

1. Clear the vines from the canopy to improve visual character of roadway buffer, and establish a maintenance schedule for these areas.

2. Eradicate the Knotweed community to allow native plants to repopulate

3. Treat all invasive saplings especially in the area where there is Knotweed.

4. Replace formal planting beds with non-invasive plants

Management Suggestions

(Type, Treatment, Priority)

T-1O Open, No Action, Low
There are invasive plants used in the planting beds that should be replaced. While they are not highly aggressive plants and this is not a top priority, it does set a standard of acceptable planting material.

T-2E Edge, Suppress, High
Cut and treat all invasive saplings and Knotweed. Knotweed will take successive treatments and due its ability to re-sprout from root pieces, it will most likely not be fully eliminated. After a few seasons of successful treatments with a reduction in invasive cover to 1/3 or less, re-vegetate this area with native shrubs and trees. Some suggestions are Sumac, Sweet Pepperbush, or Sweetspire.

T-3E Edge, Suppression, Low
Remove the vines from the tree canopy and evaluate the situation in reference to erosion issues and tree damage. Treat damaged trees appropriately and establish vegetation in areas where erosion is a concern. The maintenance goal is to maintain a canopy free of vines and this will require regularly scheduled maintenance.

T-4E Edge, Monitor, Low
This is a small area that is bordered by a large forested area that is infested with invasives. There is not much that can be done with this area as re-infestation will occur. Do make sure the Knotweed does not establish in this area, remove if plants are spotted.

Route 250 By-Pass Inventory

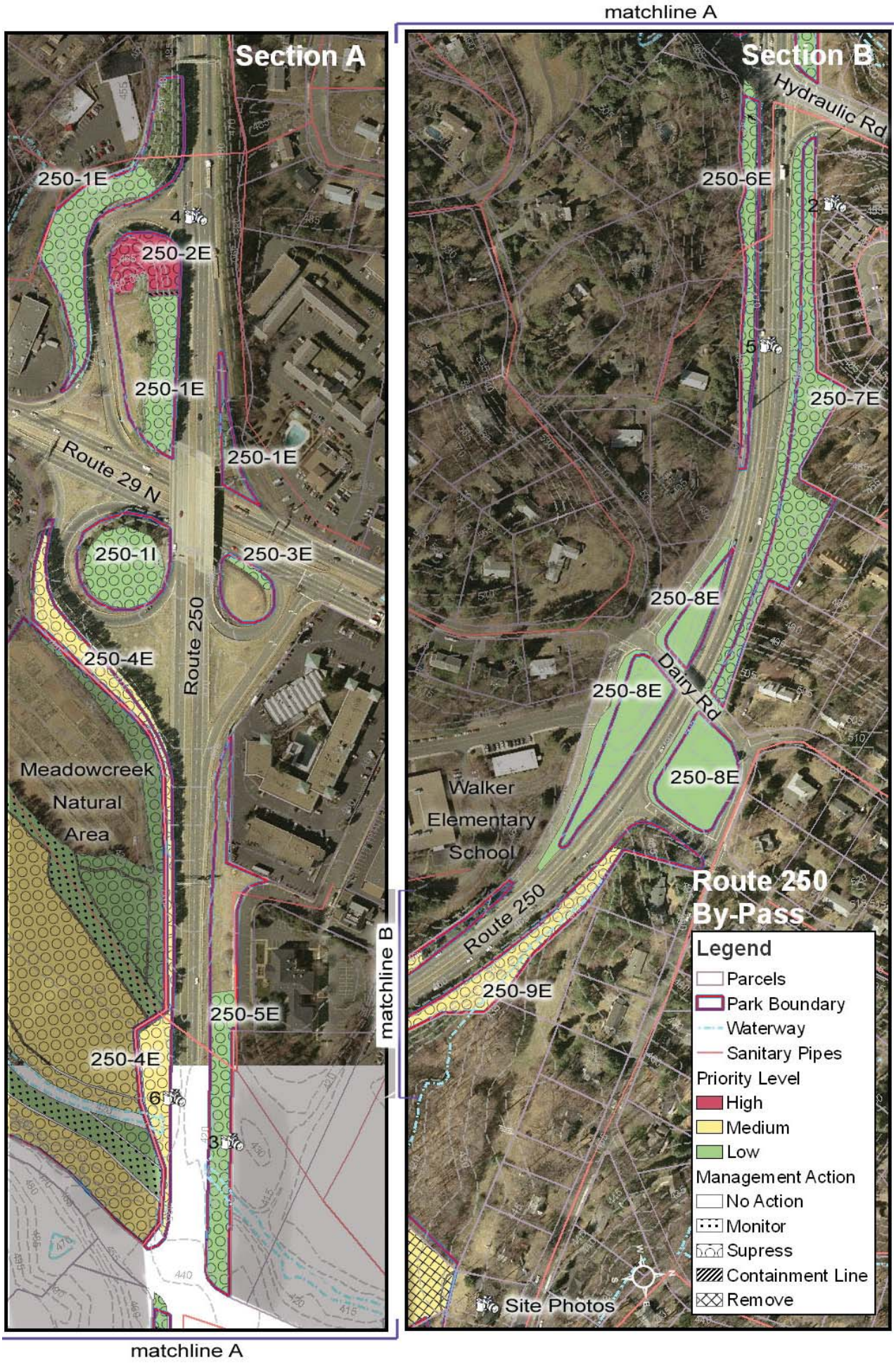
Inventory Summary

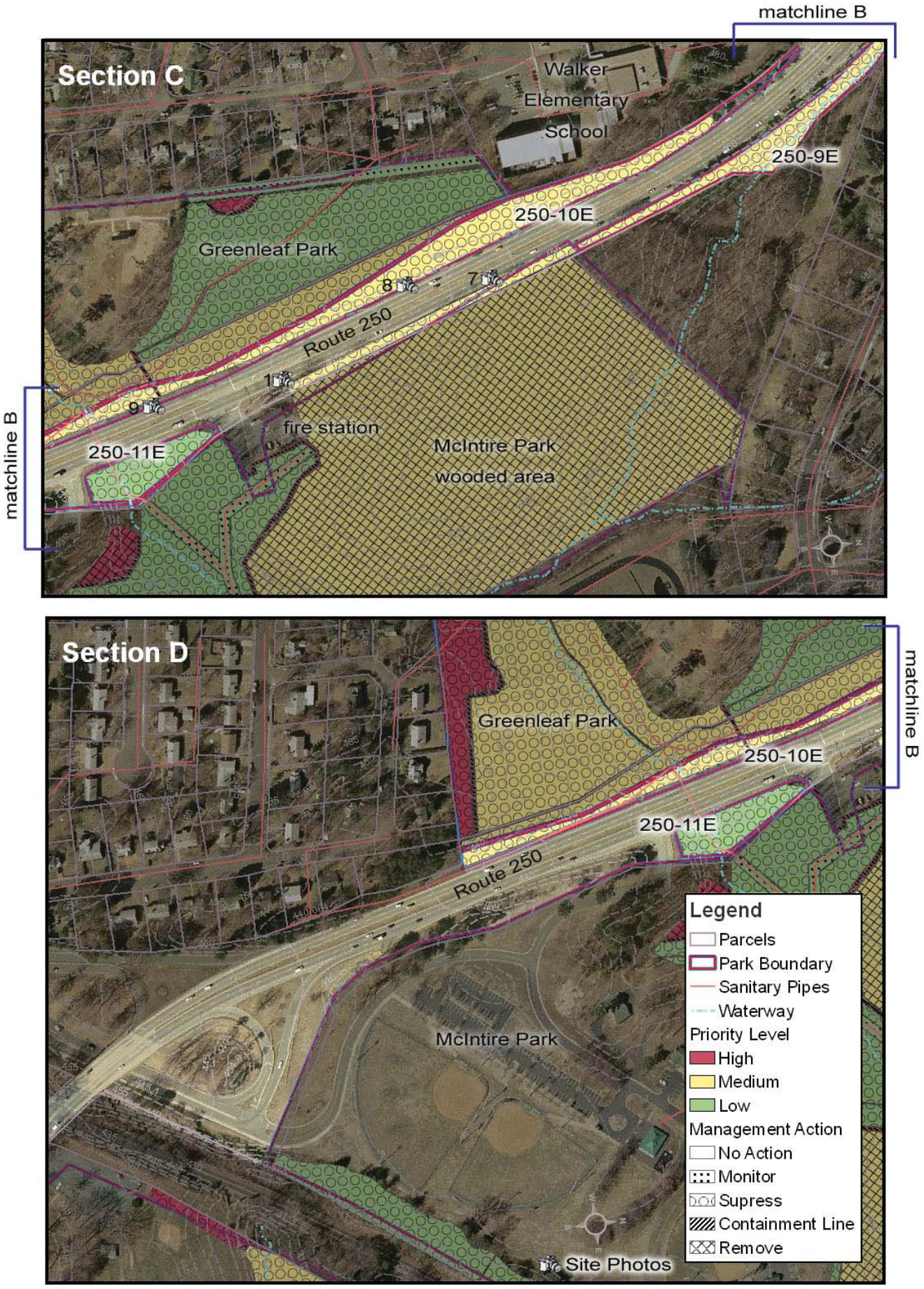
This is the area that borders Route 250 by-pass between McIntire Park and the cloverleaf at the intersection of Route 29N. There are 15.26 acres of management area. There is a wide variety of spaces such as planting beds, mowed areas, and forested areas ranging in width from 10' to 30'.

There are many evergreen species especially around the cloverleaf; otherwise the canopy is consistent with the parks they border. The canopy is in good condition in most areas. There are some areas where invasive vines and saplings have begun to overtake the native canopy especially around the cloverleaf, along Meadow Creek, and the NW end of McIntire Park.

English Ivy and Tree-of-Heaven are the most prevalent invasive plants in this area. There are some areas of concern where there Grape and Kudzu are taking over the tree canopy. This is mainly at the cloverleaf.

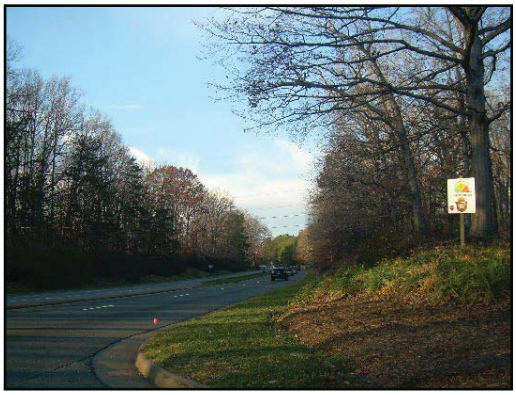
Areas that seem to be the most resistant to invasives are where planting beds have been established, the perimeter of Greenleaf Park for example. This could be due to the fact that they provide a physical barrier and receive some regular maintenance.


matchline A
Section A
Section B
Hydraulic Rd
250-1E
250-2E
250-1E
250-1E
Route 29 N
250-1I
250-3E
Route 250
250-4E
Meadowcreek
Natural
Area
250-5E
250-4E
matchline B
250-6E
250-7E
250-8E
Dairy Rd
250-8E
250-8E
Walker
Elementary
School
Route 250
By-Pass
Route 250
250-9E
Site Photos
Legend
Parcels
Park Boundary
Waterway
Sanitary Pipes
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
matchline A


matchline B
Section C
Walker
Elementary
School
250-9E
250-10E
Greenleaf Park
8
7
Route 250
1
9
fire station
250-11E
McIntire Park
wooded area
matchline B
Section D
Greenleaf Park
250-10E
250-11E
Route 250
McIntire Park
matchline B
Legend
Parcels
Park Boundary
Sanitary Pipes
Waterway
Priority Level
High
Medium
Low
Management Action
No Action
Monitor
Supress
Containment Line
Remove
Site Photos

Route 250 Photo Inventory

1 Edge condition across from fire station



2 Edge condition at fire station

3 Ivy infestation across from fire station

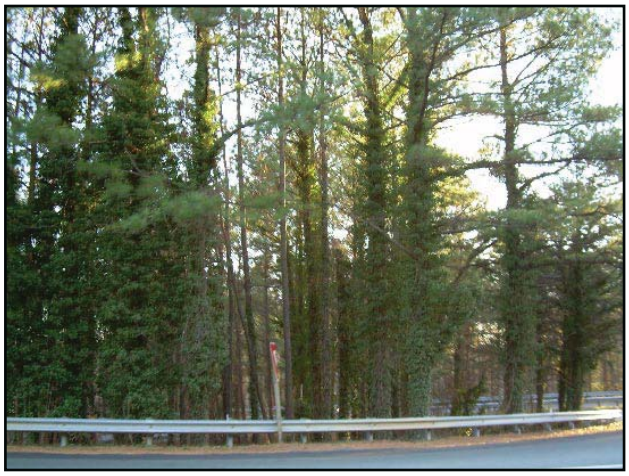
4 Typical roadside plantings

5 Healthy Pine stand

6 Planting beds along roadway

7 English Ivy infestation in canopy

8 Riparian buffer condition



9 English Ivy within the tree canopy

10 Roadside plantings

11 Infestation in tree canopy

12 Greenbrier Park buffer condition

13 Grape and Ivy infestation

Area Inventories

250-1I

Site Description: This is a good stand of young Pine with a fairly good canopy. The outer 10' edge is 70% invasive in some areas. The interior decreases to approximately 20% invasives. Most plants are on the canopy floor with the exception of some scattered vines working their way into the canopy.
Site Type: Interior
Acreage: .62 acres
Invasive Species: Tree-of-Heaven, Multiflora-Rose, English Ivy, Bittersweet, Elaeagnus
Site Concerns: none

250-1E

Site Description: There is a canopy of mostly young Pine with scattered White Oak. The canopy is in good condition. There is some steep terrain here sloping down form the roadway. Vines and invasive shrubs are consistently scattered throughout the area.
Site Type: Edge
Acreage: 1.50 acres
Invasive Species: Tree-of-Heaven, Multiflora-Rose, English Ivy, Bittersweet, Elaeagnus
Site Concerns: neighboring invasives, steep slope

250-2E

Site Description: There are some serious canopy concerns here. The young Pine canopy is being overtaken by Grape and Kudzu. The terrain in this area is steep forming a bowl shaped landscape. The invasive vines have covered the canopy up to 80% in some areas.
Site Type: Edge
Acreage: .44 acres
Invasive Species: Kudzu, Grape, Tree-of-Heaven, Multiflora-Rose, English Ivy, Bittersweet
Site Concerns: steep slope

250-3E

Site Description: This is a planted landscape area that has no canopy. It appears that it has not been maintained and there are invasive saplings starting to establish here.
Site Type: Edge
Acreage: .06 acres
Invasive Species: Tree-of-Heaven, Mimosa
Site Concerns: none

250-4E

Site Description: This is the canopy area that buffers Meadow Creek Natural Area from the roadway. It is mostly a young Pine canopy. There are some invasive issues especially around Meadow Creek and the sewer lines. The terrain is steep in areas where it slopes down from the roadway. At the entrance of Rugby Road there are some thick stands of Tree-of-Heaven where there seems to have been some inconsistency in mowing schedule allowing for the thick regrowth.
Site Type: Edge
Acreage: 1.31 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet
Site Concerns: none

250-5E

Site Description: This area consists mainly of a landcaped bank. The bordering canopy is in fair condition with many invasive saplings starting to establish on the wood edge.
Site Type: Edge
Acreage: .83 acres
Invasive Species: Mimosa, Tree-of-Heaven,
Site Concerns: none

250-6E

Site Description: This is a canopy of young Pines and Oaks. There are also some great native shrubs as well. The canopy is in healthy condition however vines are established on the canopy floor and are climbing the trunks.
Site Type: Edge
Acreage: .54 acres
Invasive Species: English Ivy
Site Concerns: none

250-7E

Site Description: Most of this area has an open

canopy and is in good condition.
Site Type: Edge
Acreage: 2.2 acres
Invasive Species: Tree-of-Heaven, Mimosa, Bittersweet, Honeysuckle
Site Concerns: none

250-8E
Site Description: This is an area pf open canopy that is mowed regularly and it is in good condition.
Site Type: Edge
Acreage: 2.3 acres
Invasive Species:
Site Concerns: none

250-9E
Site Description: This canopy area buffers McIntire Park from the roadway. There is some steep terrain here and a small foot trail that runs along the creek. Invasives vines and saplings have begun to establish on the floor, but for the most part it is open and clean as the neighboring forest here is very healthy. Some areas around the fire station have invasives as well as the area on the northern end. There are some landscape beds in this area with small shrubs.
Site Type: Edge
Acreage: .86 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet
Site Concerns: creek

250-10E
Site Description: This is a healthy canopy that buffers Greenleaf Park from the roadway. There are some planted beds of Azalea that are relatively free of invasives and seem to do a good job of keeping invasives out of the wooded areas. There is an area of blow down that has not yet established invasives.
Site Type: Edge
Acreage: 4 acres
Invasive Species: Mimosa, Tree-of-Heaven, English Ivy
Site Concerns: none

250-11E
Site Description: There are some issues here with invasives; however the canopy is in good condition. The terrain is steep in areas and there are some issues with neighboring invasives.
Site Type: Edge
Acreage: .58 acres
Invasive Species: Mimosa, Tree-of-Heaven, Bittersweet, English Ivy
Site Concerns: neighboring Kudzu

Route 250 By-Pass Management

Management Summary

The target species are English Ivy, Kudzu, Tree-of-Heaven, and Mimosa. The main goal is to keep the vines off of the tree trunks and to reduce their ability to seed. In general, if there is an available physical barrier that can act as a containment line, utilize this as a stop point for the spread of the plant.

Manage the high priority areas first, **250-2E** and the containment area. The vines in this area should be cut from the tree canopy and the remaining stumps treated with herbicide. Assess the area for tree damage and any potential safety hazards and act accordingly. Establish a regular cutting schedule for this area to keep the canopy free of invasives.

The second priority is to cut all invasive vines, mainly English Ivy, off of the tree trunks. **The areas buffering the exceptionally healthy areas of McIntire Park should be managed and monitored for spread before any other areas**.

Next, manage areas that buffer the parks for any newly establishing invasive plants and treat immediately. Pull by hand where possible.

Lastly, manage for saplings and large shrubs. Cut and treat any Mimosa, Tree-of-Heaven or Elaeagnus that is present. A follow-up maintenance plan should be in tact before managing for saplings and shrubs. They will need to be retreated at least twice during a growing season as they will root sucker, continue to seed and establish thickets, growing in size. re-plant any areas that have experienced blow down.

Areas with established planting beds on the perimeter of wooded areas seem to remain relatively free of invasives. This may be a good management option especially for the areas buffering Meadow Creek Natural Area and McIntire Park.

Management Priorities

1. Cut all Kudzu, Grape, and English Ivy from the tree canopy. establish an annual cut ting program to keep the canopy free of invasives. Focus on high priority ar eas first and areas that border McIntire Park.

2. Cut/treat, girdle/treat, or basal treat all Mimosa,Tree-of-Heaven and large shrubs

3. Manage the areas buffering Greenleaf Park and Meadow Creek for any newly es tablished invasives and prevent from spreading to the interior

4. Re-plant any areas that had significant tree damage or blow down with fast growing native trees.

5. A long term goal to establish planting beds of thick native shrubs along the areas buffering the parks may limit invasive intrusion in the future.

Management Suggestions

(Type, Treatment, Priority)

250-1I Interior, Suppress, Low
This is not a priority area. The focus should be on keeping the vines out of the tree canopy and preventing the establishment of saplings. Cut and treat all vines. Cut and treat all saplings along the road edge as they have formed a thickett here. Establish a regular mowing plan for this area and coordinate with all involved entities.

250-1E Edge, Suppress, Low
Focus on keeping vines from establishing in this area. Cut and treat all vines, removing them from the tree canopy.

CHAPTER 5 BUDGET

5.1 Summary

Budget sheets were created for each area. They outline all of the written inventory information and the information contained on the maps. Each sub area is listed with its corresponding acreage, maintenance action, and priority level. All other items listed on the budget sheet are used to create a cost for each sub-area. There are seven management treatments listed: hand pull/cut for vines and sprouts, foliar spray for shrubs and larger vines, basal cut/treat or girdle/treat, mow/weed eat, limit line by brush mowing, monitor, and restoration. The appropriate maintenance actions were chosen based on what types of invasive plants were present, the condition of the native canopy, and the topology.

Each of these actions has an associated per acre cost listed below it. This cost is multiplied by the number of applications per year (indicated below it on the budget sheet) and all treatment costs are added together. This cost is multiplied by the level of invasiveness to account for the intensity of the infestation and corresponding increased work load. This is the total per acre cost which is then multiplied by the acreage of each area to get the actual total cost of management for that area

The cost for management materials was established using industry standards, and a labor cost of 30 dollars per hour was determined by Parks and Recreation based on an anticipated contract labor cost. A general estimate of time to complete one acre of moderately infested interior land using a combination of spraying and cutting methods was established as the constant.

The monitoring costs were figured separately as this should be done for all sites bi-annually regardless of maintenance actions preformed or needed. The monitoring cost was calculated by multiplying the labor cost per acre times the total number of acres for each park,.

The budget summary sheet divides the total project cost out over a ten year period. In the first year, sites with high priority classification are tended to first. This course of action will get the most vulnerable and visible areas under control and will also help to set the stage for how the project can be executed, what works and what approaches will need altering.

After the first year of high priority city wide management has been completed, the budget is then determined area by area. A cost for the intial year of managment for each area is highlighted in tan. This cost then spans three years to account for follow-up maintenance. The cost diminishes each year with the degree of infestation and amount of effort that each site will require. All costs after the three year management are to be determined case by case. The only cost accounted for is the continued cost of monitoring.

The areas are phased in by their priority ranking. Each area's priority was determined by park staff and directly relates how accessible the area is and how serious the infestation is. This will help to spread te cost out and ensure that the management schedule does not become too overwhelming.

This sheet is designed to be updated as the management progresses and a more accurate account of the work involved and the progress made can be expressed.

5.2 Terms and Vocabulary on Budget Sheets

Maintenance Actions

A maintenance action is defined for each inventoried area. The action will help to determine what type of material and effort that will be required for each site as well as the general

degree of effectiveness the maintenance should have. The maintenance actions generally correspond to the degree of invasiveness and urgency for action. The following are the maintenance actions as indicated on the inventory maps. They are listed in order of intensity: removal (X), suppression (S), containment(C), restoration (R), monitor (M), and no action (N).

Removal

Complete removal of invasives, seeds, and root/tuber material to the best of ability with either chemical and/or mechanical means over a reasonable period of time, usually a 3-5 years of active management followed by bi-annual monitoring. This strategy applies mainly to a highly aggressive weed such as Kudzu and Porcelainberry.

Suppression

First, Contain newly established populations of invasives that are likely to spread into weed-free zones by preventing the leading edge from advancing and ensuring that weed seed or other reproductive plant parts are not spread. Secondly, remove new invaders and small populations of invasives that threaten management goals working your way towards larger more mature infestations that can be more easily contained. Thirdly, suppress expansive populations that are likely to harm management goals at their present location by reducing the intensity of infestation and potential for seed production.

Containment Line

In areas where the problem is too great for the available resources to maintain or there are promoters that would lead to constant re-infestation, a containment line shall be established. The infestation is be kept within the established containment line either mechanically or chemically to maintain the size of the existing infestation and prevent spread into neighboring areas. This may also involve the systematic removal of large parent plants within the infested area where it is deemed constructive. A containment line, for example, could be along the perimeter of a utility right of way or around an unmanageable Kudzu infestation. In the latter case, a 8' mow line may need to be established around the infestation, for ease of control. This could possibly involve the cutting and removal of trees and shrubs.

Restoration

Restoration is the replanting of appropriate native species in areas of concern. All 30' riparian buffer areas should be re-vegetated where necessary or where there are erosion concerns. The interior tree canopy should be revitalized where it has been compromised by either blow down or weed damage. Continue to establish tree and understory canopy in areas that have been established as no mow.

Monitor

Provide training on ecological monitoring within all appropriate agencies and to the public. Visit sites in the early spring and late summer and record any presence or change in the prevalence of invasive weed species using the form in the appendix. Also record the condition and any change in the canopy and understory native species and restoration projects. Prevent reinvasion by returning to controlled stands annually to determine if new plants have established. Monitor specifically to determine if weed management programs accomplish the objectives.

No Action

This applies to certain sites where there is no risk of weed invasion, or where there are resource limitations or site issues prevent effective management or removal of invasives. This most commonly applies to utility areas where a more coordinated inter/intra-agency management plan needs to be established.

Priority Levels

The management priorities express the urgency with which to control or eliminate invasives according to their current and potential impacts on the native tree canopy, river buffer, the value of the existing habitat, and the perceived difficulty of invasive control.

Priorities are defined as high, medium, or low for each site, giving highest priority to the sites with the most aggressive or prevalent invasives that need to be managed first. These sites also have the most potential to respond to the management resources available. It is assumed that most high priority areas will be managed through contract labor. This will allow the Parks and Recreation Department to make efficient progress in the first year of management as well as providing a great starting point from which to continue. This will provide a great example for training park staff as well as possibly alert the staff to the most effective and efficient methods currently used in the control of invasives.

High

- These areas have invasive plants that are considered extremely aggressive, such as Kudzu, Porcelainberry, or English Ivy, with a tendency to disrupt ecosystem processes and cause major alterations to the native plant community, or
- Invasive areas that border healthy native areas, with little or no invasives, that are at risk of being invaded, or
- Areas with a high percentage of invasives, visually calculated at 3/4 or more of the total vegetative cover, which will reasonably benefit from management.
- These areas should be attended to first

Medium

- These areas have a moderate amount of invasive cover, visually calculated at 1/2 or less of the total vegetative cover, with most of the disruption happening on the canopy floor.
- The native community is healthy and still viable and able to respond to management.
- There are no extremely aggressive invasives present.

Low

- These areas have a low percentage of invasives cover, visually calculated at 1/4 or less of the total vegetative cover, and the focus is on monitoring, or
- Areas that are mutually maintained by utilities and coordinating a maintenance plan is of a higher priority
- These sites should be attended to after higher priority sites have been successfully managed

Degree of Invasiveness

The invasiveness ranking was established in order to adjust the budget for the amount of invasives that are on a site assuming that sites that are heavily infested will require more time and energy than sites that are moderately infested. This is a way to define the overall budgetary impacts of each individual site. The multiplier was derived from Site Work & Landscape Cost Data by RS Means.

The incremental increase they use in their cost estimates for the selective clearing of light, medium, and heavy density forested areas was found to be 1.5. This is the multiplier that is used in this budget for the increase in the cost of more intense removal versus a more moderate removal. One represents the constant of a site with a very moderate amount of infestation.

Rating System
1 An invasiveness of 1 describes a site that has, upon visual inspection, less than 1/4 total invasive species.
1.5 An invasiveness of 1.5 means that between 1/4-1/2 of a site's species are invasive.
2.3 An invasiveness of 2.3 means that between 1/2-3/4 of a site's species are invasive.
3.4 An invasiveness of 3.4 means that over 3/4 of a site's species are invasive.

Management Treatments

Overall Management:
The focus is on preventing further spread rather than strict removal by maintaining the level of invasiveness to at least the current surveyed percentage, if not less. Seeds, parent materials, tubers, and roots of invasives shall be minimized to a level that allows the native species to maintain positive growth.

Hand pull/cut vines and sprouts:
Pull by hand any invasives less than 6" tall. Be careful of erosion sensitive areas where root mass may need to be maintained and be aware of plants that will resprout from root pieces. As an interim treatment vines can be cut from the tree canopy to prevent further damage. Vines too big to be pulled can be cut to the ground.

Foliar spray shrubs and vines
Herbicide sprays from backpack sprayers that are aimed at target plant foliage covering all leaves to the point of runoff. This is the most cost effective means to control invasives. Dye can be added to track treatment and for training as well. Foliar sprayed herbicides don't have the damage potential to neighboring plants like soil-active herbicides do.

Basal, cut and treat, or Girdle and treat
Basal application uses a herbicide-oil-penetrant mixtures painted onto the base of a woody invasive plant upwards for 12"-20" and does not require cutting of the plant. It is good for plants less than 6" in diameter or on plants with juvenile (thin) bark, or in areas where snags are desired for wildlife. It also eliminates the need for plant removal.

Cut and treat involves cutting any large invasive to a few inches above the ground and promptly, within 10 minutes, cover the cut stump surface with herbicide.

Girdle and treat can be used on single stem invasives by cutting a line approximately 3" wide around the circumference of the plant, effectively removing the cambium. The cut should be treated within 10 minutes with herbicide.

Mow or weed eat
This is for the purpose of controlling a weed infestation that can not be eradicated. It is also used for the establishment and maintenance of moderate containment line that does not involve the removal of woody plant material. It is a good method to use for Kudzu that is in more open areas. The area will never be eradicated of Kudzu, but can be guaranteed maintenance if it is on a regular mowing schedule.

Control line/brush mow
This is the same as above but utilized for tougher more mature infestations. The purpose is to establish a line of limitation for the spread of the targeted invasive plant. This works best on vines that do not spread extensively by seed. An area is established around the infestation that is 8' wide. This area is to be regularly maintained by brush mowing in order to prevent the infestation of surrounding areas.

Monitor
This is the visit and walk through of a site while recording visual information about the site characteristics and invasive and native species present. Information is recorded on an inventory sheet for the purpose of updated and measuring the effectiveness of the prescribed management procedures.
Restoration

This is the reestablishment of a native tree canopy or understory through the planting of saplings and shrubs. Restoration can also include erosion control measures which should be evaluated on a site by site basis and may require slightly more investment than tree planting.

5.3 Budget Sheets

CHAPTER 6
RESTORATION

The establishment of invasives in some areas has resulted in the deterioration of the native habitat to a point where restoration is nescessary. Restoration will also be helpful in areas where there has been tree loss due to natural casues; restorating the native tree canopy will help to prevent the intrusion of invasives.

The following restoration guidelines are recommended by the Society for Ecological Restoration International. They have been modified slighly to account for the scale of the project and the inventory work that has already been completed.

Conceptual Planning

1. Identify the project site and boundaries
2. Identify the need for restoration
   tell what happened and what the antici pated improvements will be
3. identify the kind of ecosystem to be re stored
4. Identify the restoration goals:
5. Identify the physical site conditions in need of repair
6. Identify the stressors in need of regulation
7. Identify landscape restrictions

8. Identify project duration
9. Identify stratigies for long term management and protection

Preliminary Tasks

1. Document existing project site conditions
2. Document site history that led to need for restoration
3. Establish a reference ecosystem and identify key species
4. Prepare a list of objectives

Implementation Planning

1. Describe interventions that will be imple mented
2. Acknowledge the role of passive restoration
3. Establish monitoring protocol to measure success of objectives

Implementation Tasks

1. Mark boundaries or work area
2. Implement restoration tasks as described in implementation planning
3. monitor to determine effectiveness of implementation and adjust as necessary

For the most effectiveness, restoration should only be approached after progress has been made towards the management goals. This will generally be around the third year of management.

Areas to focus on are those with severe canopy loss, areas of servere erosion, and riparian buffers that need to be expanded. Another area of consideration is the trail and wood edge. As mentioned, it may be beneficial to plant these areas with native shrubs in order to decrease the number of invasive seeds that are penetrating the wood edge into the interior.

For areas with erosion issues, the first steps are to deal with the watercourse and to establish a nurse crop of vegetation that will allow the topsoil to re-establish. Many of the sites are eroding due to compaction and off site run off. Clearly delineate pedestrian paths in any areas that are experiencing compaction and discourage traffic in eroded areas. Next, Begin to establish a nurse crop to prevent further run off and to allow larger plants to establish themselves.

Keep in mind that the watercourse issue must be resolved before any planting occurs or the plants must be established before damaging runoff occurs. Attached is a list of sutablie na-

tive grasses that may serve as a nurse crop. For hard to manage areas or areas within stream channels, erosion controls mats with pregrown native riparian grasses can be used.

Lists of suggested plant material are included in Appendix B for specific areas of management; utility areas, no mow areas, edge areas, and riparian buffers. These lists were based on the DCR's list of native plants for Virginia.

CHAPTER 7
REMOVAL METHODS

7.1 Summary of Plant Removal Methods

In general work with the Bradley Method[1], as described in this section. Begin by hand pulling invasives in areas with the healthiest native areas first. Secondly, focus on areas that have scattered more recently established invasives and work your way in towards the more heavily infested areas with dense infestations. In this manner, you can control the spreading potential of the invasives more effectively by attacking the plants before they have a chance to fully establish.

Focus on invasives that occur singly or in small groups first working your way inward towards the more mature groups of parent plants. Try first to not disturb the soil this will create opportunities for seeds to sprout. Use chemicals in areas where erosion is a concern and root material needs to be preserved. All applications should be specific, avoid heavy foliar applications, because many of the invasives are in areas where there is still a healthy native community.

7.2 General Guidelines

The following are general guidelines to follow when working to control invasives that will help to prevent further damage or loss of native species:

- Use only mechanical methods where natives may be harmed by the root absorption of chemicals. For example, areas where invasives are growing in the root shadow of mature native trees.
- When using chemicals near native species, try to work at times of the year when natives are dormant. Use spot and basal applications where fitting and when foliar spray is necessary, spray until the leaves are wet but not dripping to avoid unnecessary ground contact.
- Use chemical methods in addition to mechanical methods for best results where water, erosion and natives are not an issue
- Do not use mechanical methods in areas subject to erosion, try and leave the weed's root mass in tact to help hold the soil
- Replant eroded, open and susceptible areas first

As a rule, work to control small infestations first, then work your way in towards larger more mature groupings of invasives and focus on decreasing the intensity of these larger more mature infestations.

7.3 Grass

Bamboo
The infestation can be cut. Repeat this process several times during the growing season for several years to exhaust the rhizome. The cut stump method can also be used, applying glyphosate directly after cutting
Treat with 50% Glyphosate on the cut stump.

7.4 Vines

Bittersweet
This plant is easy to monitor two weeks after leaf change in the fall when it will appear bright yellow after other plants have lost their leaves. Cut this vine to the ground early in the growing season and allow resprouting. One month later apply a foliar spray of triclopyr. Triclopyr will not kill monocots and allow them to take over after the bittersweet is removed to help with erosions issues. Reconsider this approach if stilt grass or celandine is a big problem. For large vines cut and treat the stump directly after cutting.
Treat with 2% Triclopyr foliar spray.

1 Bradley, Joan (1971) Bush Regeneration. The Practical Way to Eliminate Exotic Plants from Natural Reserves. Sydney, New South Wales: The Mosman Parklands and Ashton Park Association.

English Ivy
Hand remove as much as possible, cut from trees leaving as wide a gap as possible to prevent a foundation for re-growth. Spray left over plants in mid-December to mid January on a sunny day with temps at 65 and clear for a couple of days. Spray when native plants are dormant and before bud break and waxy coating on ivy hasn't yet formed on the young growth. Minimize spraying to areas of low native populations and focus on spot spraying. Re-spray following winter. Spraying after hand removal keeps spraying to a minimum and lessens chance of effecting native plants. Do not spray near base of natives, follow up these areas with a hand pull session. Follow up 6 months to a year. You will not see results for up to 5 months. If it is a light ivy infestation within a healthy native population use all manual methods.
Treat with 25% Glyphosate on the cut stump or 5-7% foliar spray.

Honeysuckle vine
Because this plant is evergreen, a foliar spray of glyphosate can be applied in the winter when native plants are dormant. It is important for the spray to reach the root crown. Make sure the base of the plant is clear of debris before a spray application. This plant can resprout and grow more vigorously after a chemical application than without one. Be prepared to monitor this plant for effectiveness of control after the first application.
1.5% glyphosate foliar spray

Kudzu
If the infestation is very small consider digging up the rhizome being careful not to leave pieces in the ground. The cut stump method can be applied to larger infestations around non-target species. Apply glyphosate or triclopyr to the cut stem after cutting. Foliar spray is good for large populations. Treatment must extend at least three seasons.
Treat with a 2% glyphosate spray.

Porcelain Berry
If hand pulling this vine, be careful. It roots have a tendency to merge with native rootstock and there is a risk of damaging neighboring plants. Cut this vine to the ground early in the growing season and allow resprouting. One month later apply a foliar spray of glyphosate. Triclopyr will not kill monocots and allow them to take over after the Porcelain Berry is removed, this will help with erosions issues. Reconsider this approach if stilt grass or celandine is a big problem. For large vines cut and treat the stump directly after cutting.
Treat with 2% glyphosate foliar spray.
Cut and treat the remaining stump with 25% glyphosate.

Wintercreeper
A foliar spray of triclophr or glyphosate applied repeatedly from July to October. Cut all climbing vines from trees as they will produce seeds that birds will carry.

7.5 Herbaceous

Garlic Mustard
Monitor in late fall or early spring. Cut the plant at ground level when the plant is in bloom, to prevent re-growth of seeds, is the most effective mechanical control. Theses stems must be removed from the job site to a approved disposal site. A foliar spray of glyphosate can be applied in the fall or triclopyr can be applied in the spring. A foliar spray may adversely affect native graminoids.
Treat with 1-3% glyphosate spray.

Japanese Knotweed
Rhizomes can be dug out but this is a labor intensive process. Foliar spray of glyphosate can be applied after cutting in the fall for best results. This plant will require yearly maintenance as the rhizomes will continue to resprout. Knotweed should be treated at least twice annually.
Treat with 1.5% glyphosate spray.

7.6 Shrubs

Elaeagnus
Small seedlings can be pulled. Foliar sprays and basal applications are effective for larger plants. Use triclopyr for basal applications and should be reserved for younger trees with smooth bark. Glyphosate and triclopyr should be applied to the cut stump directly after cutting. This should be followed up with foliar sprays and/or cutting for up to two years.
Treat cut stump with 10-20% glyphosate

Honeysuckle bush
Mechanical method includes clipping once in the spring and once in the late summer, winter clipping will encourage vigorous resprouting and should be avoided. Only manage mechanically where necessary as any root pieces left can resprout. A foliar application of glyphosate is one recommendation. This should be done late in the growing season. Larger shrubs can be cut and treated with a glyphosate application painted onto the remaining stump. This can be done any time during the dormant season.
2% glyphsoate for foliar spray
20-25% glyphosate for stump applications

Multiflora-Rose
Control in open areas by mowing many times a year. A foliar spray of glyphosate or triclopyr can be applied in the spring. The results will take a while and be dieback expect a 2 year application. Roses are resilient and treatment should be expected to last many seasons.
Treat cut stump with 25% glyphosate.

Privet
Pull young seedlings. For larger plants, treat with a foliar spray of glyphosate or triclopyr in late autumn or early spring. The cut stump method can also be used when treated individual species or there is presence of healthy native plants. Apply chemicals immediately after cutting.
Treat the cut stump with 25% glyphosate.

7.7 Trees

Mimosa
Hand pull young seedlings. Adult trees can be cut and the stump immediately treated with chemicals. This tree will send out root suckers and should receive follow-up treatments one or more times a year. It may be best to do the cutting in winter time when the likelihood of root suckers is less. Chemical treatments include glyphosate or triclopyr. Trees that are not a safety hazard and could possible provide good trees for wildlife habitat should be left standing and therefore treated with either a basal application or girdled with a treatment applied to the girdled area. Trees should be cut and chemicals applied directly afterwards. This can be done any time of year as long as the ground is not frozen. Treat the cut stump with 25% glyphosate.

Tree-of-Heaven
Pull young seedlings when soil is moist. Foliar sprays of Glyphosate or triclopyr seem to be effective. Cutting or girdling in the spring in conjunction with the application of chemicals when sap flow is low is also effective. Cutting should be done in areas where a dead tree will present a safety or aesthetic concern, otherwise girdling or basal application is recommended. If doing a basal application over the bark, mix with oil and do in fall when fluids are moving to roots. Treat 5-20 minutes after cutting. If only one cutting can be made do it when the plant begins to flower in early summer; however, they require several cuttings to exhaust the root stock. Treated areas should be checked one or more times a year after treatment and treatments should be expected to last a couple of years. Ailanthus is shade tolerate so continue to monitor after natives are established.
Treat the cut stump with 25% triclopyr.

7.8 Detailed Procedures

Appendix 1 was compiled from The Nature Conservancy website, http://tncweeds.ucdavis.edu/. They offer a more detailed overview of

the removal strategies and typical growth habits of each of the targeted invasives. For any plants not listed on their website, the information was obtained from the Plant Conservation Alliance's Alien Plant Working Group website.

Appendix B
Lists of Suggested Restoration Plants

Charlottesville Invasive Management Plan
Plant List for Beneath Power Lines

SUGGESTED LIST OF PLANT SPECIES
FOR SCREENING ON TRANSMISSION RIGHTS-OF-WAY
OUTSIDE CONDUCTOR AREA

(Defined as portion of right-of-way 10 foot horizontal width or greater from overhead wire, typically along edge on both sides)

Common Name	Scientific Name
American Hazelnut	*Corylus cornuta*
Cherry Laurel	*Prunus laurocerasus*
Crimson Cloud Hawthorne	*Crataegus laevigata 'superba'*
Dwarf Burford Holly	*(Ilex cornuta 'bufordi nana'*
Eastern Red Cedar	*Juniperus virginiana*
Fringetree	*Chionanthus virginicus*
Holly Osmanthus	*Osmanthus heterophyllus*
Saucer Magnolia	*Magnolia x soulangiana*
Shadblow Serviceberry	*Amelanchier canadensis*
Southern Wax Myrtle	*Myrica cerifera*
Star Magnolia	*Magnolia stellata*
Washington Hawthorne	*C. phaenopyrum*
White Flowering Dogwood	*Cornus florida*
Winged Sumac	*Rhus copallina*
Winterberry Holly	*Ilex verticillata*

These plants have been culled from a list of recommended species recommended by Domion Power.

Charlottesville Invasive Management Plan: Open Space Plant List

SUGGESTED LIST OF PLANT SPECIES SUGGESTED
FOR NO MOW AREAS (adapted from the DCR Native Plants List)

KEY
Uses: W=wildlife C=conservation
Native Regions: M=mountains P=piedmont
Light Requiremnet: S=full shade P=partial shade F=full sun

Scientific Name	Common Name	Uses			Region			Light		
		W	C		M	P		S	P	F
Herbaceous plants										
Acorus americanus (A. calamus)	sweet flag		x		x	x			x	x
Asclepias incarnata	swamp milkweed	x	x		x	x			x	x
Aster umbellatus	flat-top white aster		x		x	x			x	x
Bidens cernua+	nodding beggar-ticks	x	x		x	x			x	x
Chamaecrista fasciculata+	partridge pea		x		x	x				x
Coreopsis tripteris	tall coreopsis		x		x	x			x	x
Equisetum hyemale	horsetail, scouring rush		x		x	x		x	x	x
Eupatorium coelestinum	mistflower	x	x		x	x		x	x	x
Eupatorium fistulosum	Joe Pye weed	x	x		x	x			x	x
Eupatorium perfoliatum	common boneset		x		x	x			x	x
Helenium autumnale	sneezeweed	x	x		x	x			x	x
Helianthus decapetalus	ten-petaled sunflower	x	x		x	x			x	x
Heliopsis helianthoides	oxeye sunflower	x	x		x	x			x	x
Hibiscus moscheutos	Eastern rosemallow	x	x		x	x				x
Iris virginica	Virginia blue flag		x			x			x	x
Lilium superbum	Turk's cap lily				x	x			x	x
Lobelia cardinalis	cardinal flower	x	x		x	x			x	x
Mimulus ringens	monkeyflower		x		x	x				x
Nymphaea odorata	American water lily	x	x		x	x				x
Oenothera fruticosa	sundrops	x	x		x	x				x
Peltandra virginica	arrow arum	x	x			x			x	x
Phlox divaricata	woodland phlox		x		x	x			x	
Phlox paniculata	summer phlox		x		x	x			x	x
Podophyllum peltatum+	mayapple	x	x		x	x			x	x
Pontederia cordata	pickerel weed	x	x			x				x
Rhexia virginica	Virginia meadow-beauty	x	x		x	x				x
Rudbeckia laciniata	cut-leaved coneflower	x	x		x	x			x	x
Sagittaria latifolia	broadleaf arrowhead	x	x		x	x				x
Saururus cernuus	lizard's tail		x		x	x			x	x
Solidago rugosa+	rough-stemmed goldenrod	x	x		x	x			x	x
Verbena hastata	blue vervain	x	x		x	x			x	x
Vernonia noveboracensis	New York ironweed	x	x		x	x			x	x
Viola cucullata	marsh blue violet	x	x		x	x			x	x
Ferns and fern allies										
Onoclea sensibilis+	sensitive fern		x		x	x			x	x
Osmunda regalis	royal fern		x		x	x			x	
Thelypteris palustris	marsh fern				x	x			x	x

Charlottesville Invasive Management Plan: Border Plant List

SUGGESTED LIST OF PLANT SPECIES FOR A FOREST OR TRAIL EDGE BUFFER (adapated from the DCR Native Plant List)

KEY

Uses: W=wildlife C=conservation

Native Regions: M=mountains P=piedmont

Light Requiremnet: S=full shade P=partial shade F=full sun

Scientific Name	Common Name	Uses		Region		Light		
		W	C	M	P	S	P	F
Shrubs								
Alnus serrulata	common alder	x	x	x	x	x	x	x
Aronia arbutifolia	red chokeberry		x	x	x	x	x	
Aronia melanocarpa	black chokeberry		x	x	x		x	x
Cephalanthus occidentalis	buttonbush		x	x	x		x	x
Corylus americana	hazelnut	x		x	x	x	x	x
Cornus amomum	silky dogwood	x	x	x	x	x	x	
Hamamelis virginiana	witch hazel		x	x	x	x	x	
Hydrangea arborescens	wild hydrangea			x	x	x	x	
Ilex decidua	possumhaw	x	x		x	x	x	
Ilex verticillata	winterberry	x	x	x	x		x	x
Leucothoe racemosa	fetterbush, sweetbells		x	x	x		x	x
Lindera benzoin	spicebush	x	x	x	x	x		
Rhododendron viscosum	swamp azalea		x	x	x		x	x
Rhus copallinum	winged sumac	x	x	x	x	x	x	
Rubus allegheniensis	Alleghany blackberry	x	x	x	x			x
Salix sericea	silky willow		x	x	x		x	x
Sambucus canadensis	common elderberry	x	x	x	x			x
Vaccinium corymbosum	highbush blueberry	x	x	x	x	x	x	x
Viburnum dentatum	So. arrow-wood viburnur	x	x	x	x		x	x
Viburnum prunifolium	black-haw viburnum	x	x	x	x		x	x
Small trees								
Amelanchier arborea	downy serviceberry	x	x	x	x		x	x
Amelanchier canadensis	Canada serviceberry	x	x	x	x			x
Asimina triloba	paw paw	x	x	x	x	x	x	
Cercis canadensis	redbud	x		x	x	x	x	
Chionanthus virginicus	fringetree			x	x		x	x
Cornus alternifolia	alternate-leaf dogwood	x	x	x	x	x	x	
Crateagus flava	October haw	x		x	x		x	x
Ilex opaca	American holly	x	x	x	x	x		
Morus rubra	red mulberry	x	x	x	x	x	x	
Ostrya virginiana	Eastern hop-hornbeam			x	x	x	x	
Rhus glabra	smooth sumac	x	x	x	x			x
Salix nigra	black willow		x	x	x		x	x
Medium to Large Trees								
Betula lenta	sweet birch, black birch	x	x	x	x		x	x
Betula nigra	river birch	x	x	x	x			x
Carya alba	mockernut hickory		x	x	x	x	x	
Carya glabra	pignut hickory	x	x	x	x	x	x	
Carya ovata	shagbark hickory		x	x	x		x	x
Diospyros virginiana	persimmon	x	x	x	x	x	x	x
Fraxinus americana	white ash	x		x	x		x	x
Fraxinus pensylvanica	green ash	x	x	x	x		x	x
Juniperus virginiana	red cedar	x		x	x		x	x
Juglans nigra	black walnut	x	x	x	x		x	x
Liquidambar styraciflua	sweetgum		x	x	x	x	x	x
Liriodendron tulipifera	tulip poplar	x	x	x	x			x
Nyssa sylvatica	black gum	x	x	x	x		x	x
Oxydendrum arboreum	sourwood			x	x		x	
Pinus virginiana	Virginia pine		x	x	x			x
Pinus taeda	loblolly pine	x	x		x			x
Platanus occidentalis	sycamore		x	x	x		x	x
Prunus serotina	black cherry	x	x	x	x		x	x
Quercus falcata	southern red oak	x	x	x	x	x	x	
Quercus michauxii	swamp chestnut oak	x			x		x	x
Quercus alba	white oak	x	x	x	x		x	x
Quercus palustris	pin oak	x	x	x	x	x	x	
Quercus phellos	willow oak	x	x		x		x	x
Sassafras albidum	sassafras		x	x	x		x	x
Tsuga canadensis	eastern hemlock	x	x	x	x		x	x

Studies have shown that a thick border of native vegetation will result in less invasives. Approximately four times more invasive seeds penetrate into the forest without a thick, healty native edge (Institute for Ecosystem Studies).

Charlottesville Invasive Management Plan: Riprian Buffer Plant List

SUGGESTED LIST OF PLANT SPECIES FOR RIPARIAN BUFFER AS ERCOMMENDED BY DCR

KEY

Uses: W=wildlife C=conservation

Native Regions: M=mountains P=piedmont

Light Requiremnet: S=full shade P=partial shade F=full sun

Riprian Vegetation Zones: 1=emergent 2=riverside thicket 3=saturated Thicket 4=well-drained Forest

Scientific Name	Common Name	Uses		Region		Light			Zone			
		W	C	M	P	S	P	F	1	2	3	4
Grasses, sedges, reeds												
Agrostis perennans	autumn bentgrass		x	x	x	x	x	x	x	x	x	x
Andropogon gerardii	big bluestem	x	x	x	x		x	x		x	x	
Andropogon glomeratus	bushy bluestem		x	x	x		x	x			x	
Arundinaria gigantea	wild cane, river cane	x	x	x		x	x	x		x	x	x
Carex crinita var. crinita	long hair sedge	x	x	x	x		x	x	x	x	x	
Carex lurida	sallow sedge	x	x	x	x		x	x	x	x	x	
Carex stricta	tussock sedge	x	x	x	x		x	x	x	x	x	
Chasmanthium latifolium	river oats, spanglegrass		x	x	x	x	x	x		x	x	x
Dichanthelium clandestinum	deer-tongue	x	x	x	x		x	x	x	x	x	x
Dichanthelium commutatum	variable panicgrass	x	x	x	x	x	x					x
Elymus hystrix (Hystrix patula)	bottlebrush grass	x		x	x	x	x	x				x
Elymus virginicus	Virginia wild rye	x	x	x	x	x	x			x	x	x
Juncus canadensis	Canada rush	x	x		x		x	x	x	x	x	
Juncus effusus	soft rush	x	x	x	x		x	x	x	x	x	
Leersia oryzoides	rice cutgrass	x	x	x	x		x	x	x	x	x	
Panicum virgatum	switch grass	x	x	x	x		x	x	x	x	x	
Saccharum giganteum	giant plumegrass	x	x		x		x	x	x	x	x	
Scirpus cyperinus	woolgrass bulrush	x	x	x	x		x	x	x	x	x	
Sparganium americanum	American bur-reed	x	x	x	x		x	x	x			
Tripsacum dactyloides	gama grass	x	x	x	x		x	x	x	x	x	x
Typha latifolia	broad-leaved cattail	x	x	x	x			x	x			
Shrubs												
Alnus serrulata	common alder	x	x	x	x	x	x	x	x	x	x	
Aronia arbutifolia	red chokeberry		x	x	x	x	x			x	x	x
Aronia melanocarpa	black chokeberry		x	x	x		x	x		x	x	x
Cephalanthus occidentalis	buttonbush		x	x	x		x	x	x	x		
Cornus amomum	silky dogwood	x	x	x	x	x	x			x	x	
Hydrangea arborescens	wild hydrangea			x	x	x	x					x
Ilex decidua	possumhaw	x	x		x	x	x			x	x	x
Ilex verticillata	winterberry	x	x	x	x		x	x		x	x	x
Leucothoe racemosa	fetterbush, sweetbells		x	x	x		x	x		x	x	
Lindera benzoin	spicebush	x	x	x	x	x					x	x
Rhododendron viscosum	swamp azalea		x	x	x		x	x		x	x	
Rubus allegheniensis	Alleghany blackberry	x	x	x	x			x		x	x	x
Salix sericea	silky willow		x	x	x		x	x		x	x	
Sambucus canadensis	common elderberry	x	x	x	x			x		x	x	x
Vaccinium corymbosum	highbush blueberry	x	x	x	x	x	x	x		x	x	x
Viburnum dentatum	So. arrow-wood viburnum	x	x	x	x		x	x				
Viburnum prunifolium	black-haw viburnum	x	x	x	x		x	x				
Small trees												
Amelanchier arborea	downy serviceberry	x	x	x	x		x	x				x
Amelanchier canadensis	Canada serviceberry	x	x	x	x			x		x	x	x
Asimina triloba	paw paw	x	x	x	x	x	x				x	x
Cornus alternifolia	alternate-leaf dogwood	x	x	x	x	x	x					x
Crateagus flava	October haw	x		x	x		x	x			x	
Morus rubra	red mulberry	x	x	x	x	x	x				x	x
Ostrya virginiana	Eastern hop-hornbeam			x	x	x	x					x
Rhus glabra	smooth sumac	x	x	x	x			x			x	x
Salix nigra	black willow		x	x	x		x	x	x	x	x	
Medium to Large Trees												
Betula lenta	sweet birch, black birch	x	x	x	x		x	x			x	x
Betula nigra	river birch	x	x	x	x			x		x	x	
Diospyros virginiana	persimmon	x	x	x	x	x	x	x		x	x	x
Fraxinus americana	white ash	x		x	x		x	x		x	x	x
Fraxinus pensylvanica	green ash	x	x	x	x		x	x		x	x	
Juglans nigra	black walnut	x	x	x	x		x	x		x	x	x
Liquidambar styraciflua	sweetgum		x	x	x	x	x	x		x	x	x
Liriodendron tulipifera	tulip-tree, tulip poplar	x	x	x	x			x			x	x
Nyssa sylvatica	black gum	x	x	x	x		x	x		x	x	x
Oxydendrum arboreum	sourwood			x	x		x				x	x
Pinus taeda	loblolly pine	x	x		x			x		x	x	x
Platanus occidentalis	sycamore		x	x	x		x	x		x	x	x
Quercus bicolor	swamp white oak	x	x	x	x	x	x			x	x	
Quercus michauxii	swamp chestnut oak	x			x		x	x		x	x	x
Quercus palustris	pin oak	x	x	x	x	x	x			x	x	
Quercus phellos	willow oak	x	x		x		x	x		x	x	x

+May be aggressive in garden setting.

This list has been edited from an original list by DCR of plants for conservation and riprian buffers

Appendix C
Public Information Phamplet

List of References

Publications

Andre Clewell, John Rieger, and john Munro. December 2005. *Guidelines for Developing and Managing Ecological Restoration Projects, 2nd edition*. www.ser.org and Tucson: Society for Ecological Restoration International.

Bradley, Joan. 1971. *Bush Regeneration. The Practical Way to Eliminate Exotic Plants from Natural Reserves*. Sydney, New South Wales: The Masman Parklands and Ashton Park Association.

Swearingen, J., K. Reshetiloff, B. Slattery, and S. Zwicker. 2002. *Plant Invaders of Mid-Atlantic Natural Areas*. National Park Service and US Fish and Wildlife Service, Washington, DC. 82 pp.

Organizations and Websites

Department of Conservation and Recreation, Natural Heritage Program, http://www.dcr.virginia.gov/dnh/

Ecology and Management of Invasive Plants Program, http://www.invasiveplants.net/biological-control/default.asp

Institute of Ecosystem Studies, http://www.ecostudies.org/

North American Weed Management Association, http://www.nawma.org

The Nature Conservancy, www.tnc.org

The Nature Conservancy and The Global Invasives Species Initiative, http://tncweeds.ucdavis.edu/outreach.html

Plant Conservation Alliance's Alien Plant Working Group. www.nps.gov/plants/alien/pubs/index.htm

Virginia Department of Conservation and Recreation, www.dcr.state.va.us

Virginia Department of Conservation and Recreation. Native Plants for Conservation, Restoration, and Landscaping. http://www.state.va.us/dcr/dnh/native.htm

Virginia Native Plant Society, www.vnps.org