
Urban parks are often complex places to manage due to their past land uses and their association with numerous stakeholders who hold an interest in the park. The North Carolina Museum of Art Park (NCMA Park) is no exception. The mission of the NCMA Park is to integrate art and ecology and to engage visitors through recreation, outdoor art, ecosystem management, partnership development, and education. Due to the past agricultural history of the site, the landscape is degraded and required aggressive land management to provide an inspirational location for art installations. The multiple objective mission, as well as the location of the park, has involved numerous multidisciplinary stakeholders.

This thesis presents a comprehensive management plan for the NCMA Park produced in coordination with NCMA staff and includes an update from the recreation plan developed by Dr. Roger Moore and Dena Justice. It provides basic information, partnership relationships, and recommendations for management. A detailed natural resource management section that includes site analysis and restoration prescriptions for 15 different management units is included. The management units were mapped in a geographical information system (GIS) and prioritized based on degree of exotic species invasion. Treatment and monitoring recommendations were made for each species of concern. This plan should provide a comprehensive guide to better manage the property and help ensure the long-term success of the park.
The co-management of the NCMA Park led to a common interest analysis of the stakeholders. The common interest analysis is used to analyze environmental policies related to large scale environmental issues. I conducted a common interest analysis on this small scale urban park to determine if the common interest was being served. I found that the common interest at this park was not fully served due to a lack of inclusiveness and transparency in the decision making process even though there was a clear vision, goals, and priorities of all participants. The problem with lack of participation in the decision making process came through not in the big picture scope of the park but in the smaller components. To assure the long term success of small scale urban parks, it is necessary for all participants to share a common interest and participate in both the planning and implementation phase of the park when the decisions affect them.
A Comprehensive Management Plan for the North Carolina Museum of Art Park, Raleigh, North Carolina, with a Common Interest and Analysis of Stakeholders

by

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A thesis submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the degree of Master of Science

Natural Resources

Raleigh, North Carolina

2011

APPROVED BY:

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Dr. Theodore H. Shear  Dr. Toddi A. Steelman

Chair of Advisory Committee
DEDICATION

I dedicate this work to my mother, father, brother, step father, aunt Luann, and all of my wonderful friends without whose love, guidance, support, and encouragement, this would not have been possible.
BIography

Kimberly Shumate was born on April 30\textsuperscript{th}, 1981 to Raymond Shumate and Deborah Jester in Wilkesboro, North Carolina. She graduated from North Carolina State University, Raleigh, North Carolina with a Bachelor of Landscape Architecture degree and an Art and Design minor. In undergrad, Kim studied architecture and landscape architecture abroad in Prague, Czech Republic. After completing her degree, she left North Carolina for the west coast.

In Seattle, Washington, she worked as an assistant director of an environmental non-profit, raising funds and working on environmental campaigns. After the bustle and poverty of non-profit life, Kim decided to change her path and work as a buyer/supervisor for a plant nursery. After a couple of years working in Seattle, she decided to spend her life savings and travel to New Zealand and Australia for four months and work on organic farms, climb volcanoes, and kayak through the Fiordlands.

In 2008, Kim was accepted into the Natural Resources Management masters program at North Carolina State University with a focus in ecological restoration. She was awarded a fellowship from the North Carolina Museum of Art to work as the Museum Park Fellow. Her researched focused on park management in urban settings. During her time in graduate school, Kim traveled abroad to South Africa to study ecosystem services. She also served as president of the Department of Environment and Natural Resources Graduate Student Association.
ACKNOWLEDGEMENTS

I would like to thank my committee members, Drs. Ted Shear (Chair) and Toddi Steelman for giving me constant guidance and input throughout this study. Thank you to Dr. Roger Moore for the recreation analysis used in the comprehensive management plan and serving on my committee. I would also like to thank to Dr. Tom Wentworth for not only serving on my committee but also teaching me the plant community ecology necessary to generate my management plan.

My research would not have been possible without the assistance from Kathryn Asad and Dan Gotlieb at the North Carolina Museum of Art for her help on the Museum and Park relationship portion of the management plan. Thanks to all of the interviewees who gave up their time to talk with me about the management at the park. Thanks to all my fellow lab members, Megan Malone, Yari Johnson, Joelle Lang, Yang Lixen, Matt O’Driscoll, Kim Hamlin, Joe Sullivan, Patrick Chess, Ryan Unks, Ashley Steele, Amanda Johnson, and Yuan Fang for providing me with feedback on my thesis and presentations, growing plants in the greenhouse, and planting vegetation at the park.

This research could not have been possible without the financial support of the North Carolina Museum of Art and North Carolina State University Department of Forestry and Environmental Resources.
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PREFACE

This thesis consists of two very different chapters, a Comprehensive Management Plan and a Common Interest Analysis. The North Carolina Museum of Art Park was the study site for both chapters. The Comprehensive Management Plan was originally my project for a Master of Natural Resources degree but later morphed into Chapter 1 of my thesis. The Common Interest Analysis, Chapter 2, is a scientific study intended for publication.
CHAPTER 1

COMPREHENSIVE MANAGEMENT PLAN FOR THE
NORTH CAROLINA MUSEUM OF ART PARK
RALEIGH, NORTH CAROLINA*

*This research was co-funded by the North Carolina Museum of Art and the Department of Forestry and Environmental Resources at NCSU.
PREFACE

The Comprehensive Management Plan was a joint effort between North Carolina Museum of Art (NCMA) and North Carolina State University (NCSU). The plan includes an updated draft of the recreation plan developed in 2007 by Dr. Roger Moore, NCSU Parks, Recreation, and Tourism Management professor, and Dena Justice, Dr. Roger Moore’s master’s degree student. The overall structure was developed by Kathryn Asad, a staff person at the NCMA, and me. All mapping and final compellation was completed by me. The Appendices includes the NCMA Park Master Plan developed by Lappas and Havener Landscape Architects. This plan provides a comprehensive guide to better manage the property on a day to day basis. The table below shows who contributed to each section of the plan.

Table 1.1 List of contributors to the management plan.

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1. **INTRODUCTION**

1.1 **Purpose and Objectives of the Plan**

1.1.1 **Purpose**

The purpose of this plan is to establish sound management policies and directions to help ensure that the Museum Park at the North Carolina Museum of Art (NCMA) is a high quality natural setting where visitors can have outstanding nature and art oriented experiences for generations to come.

1.1.2 **Objectives**

1) Establish management objectives in consideration of the natural, social, and economic environment.

2) Establish operating policies and procedures to guide the management and protection of the cultural and natural resources, programs, and land development.

3) Provide educational opportunities using the surrounding resources that exemplify and encourage land stewardship.

4) Provide a safe and enjoyable outdoor recreation venue while minimally harming the environment.

1.1.3 **Plan Organization**

1) A review of existing conditions, including natural, cultural and administrative resources.

2) A discussion of issues and concerns related to management of the Park.

3) A management plan addressing existing conditions and subsequent issues & concerns.
1.1.4 Management Plan Process

1) Draft produced by NCSU faculty, the Museum Park Fellow, and others in consultation with NCMA staff.

2) Review and revisions by NCMA and the Partnership for Art and Ecology.

3) Approval of plan by Director of Planning and Design or current Park Director.

4) Yearly review with modifications by Director of Planning and Design, current Park Director, or Museum Fellow.

5) Five-year review and update of plan organized by the Museum Park Manager.

1.2 History

The 164-acres of land on which the NCMA Museum Park is located has a long and rich history. In the antebellum era, the land served agricultural purposes and was owned by several individuals at various times. It was the site of military encampments during the Civil War and World War I and continued to be farmed in the intervening generations.

In 1920, the State’s Prison (predecessor to NC Department of Correction) exercised the option to purchase 2,600 acres (including the future site of the Park) for a new prison farm. The State’s Prison initially used the bunkhouses at the civilian camp to house prisoners. The State later built additional facilities for prisoners in that area with the main building being constructed in 1923–1924. Camp Polk was operated as a prison farm for nearly sixty years. In December 1963, Camp Polk became the Polk Youth Center and the first prisoners moved into the facility.

NCMA, an institution under the Department of Cultural Resources, was founded in 1947 when the North Carolina General Assembly appropriated one million dollars in state
funds to purchase works of art, making North Carolina the first state in the nation to use public funds to buy an art collection. The Museum relocated to its current site in 1983.

In 1988, NCMA held a national competition and commissioned a design for the undeveloped and unmanaged property that had previously been the Polk Youth Center. A concept was proposed for a museum park as a flexible framework for development over time. It suggested zones of activity controlled by a zoning board empowered to review proposals for projects in the landscape. The plan was developed throughout the 1990s with the construction of an amphitheater and new trails and the installation of works of art.

In July 2000, after the Youth Center was relocated to Butner, the General Assembly enacted legislation transferring the former Polk Youth Center property from the Department of Corrections to the Department of Cultural Resources for use by the NCMA, expanding the site from 50 to 164 acres. The Museum Park was officially founded in 2003.

1.3 Mission and Vision Statement

1.3.1 Mission

The Museum Park is committed to providing a destination for environmental art, education, and recreation, achieved through responsible land stewardship, ecological management, and active partnerships with universities and organizations. The Park will act as a living laboratory for faculty, graduate and undergraduate research and programs. The Museum is committed to serving people of diverse cultural backgrounds and of all ages, and extending the awareness of the Museum Park to the people of the State. The Park’s mission is an extension of the institution’s core mission.
1.3.2 Vision

1) The Museum Park is:

   a. a venue for regional, national, and international artists to create temporary and permanent works of art in response to the Park’s landscape.
   b. an accessible part of the Museum for guests to informally experience art.
   c. a community-gathering place that fosters dialogue about the relationships between art and public space; art and landscape design; art and the environment.
   d. an attractive, well maintained place that attracts new audiences to the Museum by encouraging encounters with art through recreation and entertainment.
   e. Preserved as open space and managed responsibly as a publicly accessible laboratory for art in an ecologically restored landscape.

2) Strategies:

   a. Art Program:

      • Integrate art into the Park’s natural areas and provide connections between art and nature by commissioning visionary artists’ projects that expand the perception of both art and nature.
      • Present the work of regional, national and international contemporary artists in the informal park environment.
      • Provide opportunities for the creation of new work and experimental projects in the landscape.
      • Foster collaborations between artists, architects, landscape architects and environmental scientists.
b. Education Program:

- Inform and stimulate dialogue about the relationships between art, public space, landscape design, and the natural environment.
- Create opportunities for public participation in land restoration and management.
- Create a resource for education through expanded partnerships with educational, cultural, and environmental agencies and institutions.
- Design programs on the subjects of art and nature for a variety of interests.

c. Audience Development:

- Increase the Museum’s total attendance by reaching a more diverse constituency, and encourage repeat visitation with a variety of trails, changing art, and new programs.
- Expand community development and reach new audiences by providing a unique opportunity for interaction and participation in nature, recreation, and culture.

d. Environmental Preservation:

- Study, protect, restore, and preserve the natural environments of the Park.
- Restore several historical ecosystems indigenous to North Carolina.

e. 2006 Master Plan (see Appendix A):

- Integrates the Museum’s present building, new gallery building, gardens, and parking structures into a cohesive overall plan.
- Graphically defines zones of programmatic activity and environmental management that restricts future use.
- Delineates a comprehensive infrastructure for visitor and operational circulation, including vehicular roads and parking, pedestrian trails, access controls and security.
• Suggests innovative landscape design elements to make the Park a unique public experience.

• Provides a sequence, suggested priorities, and cost estimates for funding and development over time.

• Provides illustrative materials to communicate the Park vision to the community and potential supporters.

1.4. Goals

Museum Park goals and Museum Park Management goals are driven by the Park’s vision.

1.4.1 Museum Park Goals

1) Provide outstanding opportunities for nature and art-oriented experiences.

2) Restore the natural resources and ecological processes within the Park.

3) Provide trails for non-motorized activities that provide access to Park features.

4) Provide convenient access to the Park by connecting trails to surrounding communities and destinations through the Capital Area Greenway System.

5) Increase opportunities available to traditionally underserved populations.

1.4.2 Museum Park Management Goals

Goals define the direction of the Park and should be measurable. Therefore, the highest priority is to set measureable goals.

1) Short-term goals include:

   • Increase staff and staff training.

   • Increase the number of Museum Park volunteers.

   • Develop a Park Conservancy Group.
• Identify funding opportunities.

2) Long-term goals include:

• Continue the Partnership for Art and Ecology.
• Continue building relationships with other partners.
• Develop an endowment to financially support Park operations.

3) On-going goals include:

• Control non-native species.
• Protect native ecology.
• Commission art work.
• Continue development of education and volunteer programs.
• Apply for grants that support the Park’s current needs and projects.

1.5 Public and Agency Involvement

1.5.1 Managing Authority

1) Museum Park Staff:

Currently, the Museum Park Manager oversees the daily operations of the Museum Park and is assisted by two Park Technicians. The Park Manager reports to the Director of Planning and Design. Additional positions are being considered to create a more structured operation for the Museum Park. As the Park matures, it is suggested the following positions oversee Park operations:

• Museum Park Manager
• Museum Park Fellow
• Two Museum Park Technicians
- Two seasonal part-time Museum Park Assistants
- Park Educator
- Grounds Maintenance Technician
- NCMA Security patrolling the grounds
- Volunteer Coordinator (Museum Park Service Committee Chair)
- Various volunteers for certain programs and community activities
- Park Interns

2) The Museum Park works closely with many Museum departments to achieve smoothly operate (see Appendix B).

1.5.2 The Partnership for Art and Ecology

1) Mission is to guide the Museum Park’s development from both an art and an ecological perspective.

2) Meets quarterly to discuss current management issues and proposed environmental, art, and educational projects.

3) The partners jointly support a Park Fellow, a competitive two-year appointment reserved for a graduate student in the College of Natural Resources.

4) An ecologist, a park management expert, and the Park Fellow represent NCSU in the quarterly meetings.

a. NCSU Responsibilities:

- Provide ongoing guidance for management of the Park’s natural systems and artists’ projects.
• Conduct research, in collaboration with NCMA, as a demonstration site for environmental best management practices.

5) The Museum Park Manager, Curator of Contemporary Art, and Director of Planning and Design represent NCMA in the quarterly meetings.

a. NCMA Responsibilities:

• Provide an ongoing curatorial program of temporary and permanent artists’ projects in the Park and educational programs related to art and nature.

• Facilitate artists’ collaboration with NCSU environmental experts.

6) The Partnership for Art and Ecology Advisory Committee shall consist of the following representatives:

• NCMA Museum Park Manager
• NCMA Director of Planning & Design
• NCMA Curator of Contemporary Art
• NCSU College of Natural Resources Faculty
• NCSU Museum Park Fellow
• City of Raleigh Greenway Planner
• City of Raleigh Parks Superintendent

7) The Memorandum of Understanding provides a structure to the relationship between NCMA and NCSU, and is located in Appendix C.

1.5.3 City of Raleigh Parks and Recreation Department

1) The MOU establishes development, maintenance, and care of the House Creek Greenway (see Appendix C).
2) With this agreement the House Creek Greenway is a unified portion of the Capitol Area Greenway System, maintained by the City of Raleigh.

3) A seat on the Partnership is reserved for Raleigh’s Greenway Planner, who also brings public recreational expertise to the management team.

1.5.4 Park Volunteers & Park Affiliate Support Group

1) Park Volunteers:

Park volunteers are often engaged for different activities and events in the Museum Park, such as Volunteer Work Days and special events. The volunteers are recruited and supervised by the Museum Park Manager and/or a Park representative during all activities related to the Museum Park. All Park volunteers must complete a training/orientation before beginning work. Volunteers shall not have access to power tools except under extenuating circumstances as approved by the Museum Park Manager.

2) Park Affiliate Support Group:

A group is being formed to support and assist in promoting the Museum Park both locally and nationally. The group will be a connection to the community and park users. With a guided focus, they will develop and implement fundraising strategies and projects for which there are no dedicated institutional resources.

1.5.5 Other Supporting Organizations

1) Capital Police patrols the grounds and enforces laws.

2) North Carolina Department of Transportation helps maintain the House Creek Greenway.

3) Department of Administration (DOA) mows grassy areas on site.
4) Meredith Woods is the neighborhood adjacent to NCMA and the Museum Park.

(See section 4.5 Park Administration for further details)

2. CURRENT CONDITIONS and RESOURCES

2.1 Overview

2.1.1 Park Location (see Figure 1.1)

The NCMA is located within an urban setting in Raleigh, NC. It is within a two miles of Meredith College and three miles of North Carolina State University. It is also in close proximity to the RBC center, the North Carolina State Fairgrounds, and the Museum of Natural Science’s Prairie Ridge Ecostation. The area surrounding the NCMA is a mix of residential and commercial properties and Meredith College. Meredith Woods Subdivision, which consists of single family homes, abuts the Museum to the north nestled within L-shape of the property. Some of the backyards of these properties are encroaching on the property line. The northern most boundaries are delineated by Harden Road, Landmark Drive, and Myron Drive. The other boundaries of the Park are Blue Ridge Road to the West, Interstate 440 to the east and Wade Avenue to the south.

The Museum Park connects with Raleigh’s Regional Greenway system. House Creek Greenway transverses the Park from Meredith College to the I-440 Reedy Creek Pedestrian Bridge and meets up with Reedy Creek Greenway, which terminates at Umstead State Park.
Figure 1.1: Context Map
2.1.2 State Park Interpretive Themes

Even though NC Museum of Art Park is not technically recognized as a NC State Park, it is under the management of a North Carolina Department of Cultural Resources institution.

The State Park’s General Management Plans was used as a guide for the development of this plan. The following three excerpts are included to aid in indentifying interpretive themes at the Museum Park and further the development of education programming.

1) The 1987 State Parks Act defines the purposes of the state parks system. It establishes that:

*The State of North Carolina offers unique archaeologic, geologic, biologic, scenic and recreational resources. These resources are part of the heritage of the people of this State. The heritage of a people should be preserved and managed by those people for their use and for the use of their visitors and descendants.*

2) It further provides that:

*Park lands are to be used by the people of this State and their visitors in order to promote understanding of and pride in the natural heritage of this State.*

3) One of the best methods of meeting these purposes is through environmental education.

The definition of environmental education as set forth in *The North Carolina Environmental Education Plan* is given below.

*Environmental education is an active process that increases awareness, knowledge, and skills that result in understanding, commitment, informed decisions, and constructive action to ensure stewardship of all interdependent parts of the earth’s environment.*
As the population of the region continues to grow, it is important to provide an urban pocket of green space for visitors to learn about art and ecology. The NC Museum of Art Park will continue to provide a quality location for environmental and art education.

2.1.3 Regional Information

1) Population:

NC Museum of Art is located in Raleigh, the capital of North Carolina, which is in Wake County. Wake County’s population has been growing since the 1990s. As of July 1, 2008, the estimated population of Wake County was 866,410. This is a 38% population increase from the 627,850 in the 2000 US Census (2000). The population is growing two and a half times as fast as the State’s population, and almost five times faster than the nation’s population. Wake County currently has a population increase of 100 people per day which makes it the seventh largest numerical growth in the nation and the largest in North Carolina. According to the US Census Bureau, Wake County is the 57th largest county in the nation (2000). Wake County is comprised of twelve municipalities, Apex, Cary, Holly Springs, Garner, Fuquay-Varina, Knightdale, Morrisville, Rolesville, Wake Forest, Wendell, Zebulon, and Raleigh (the largest and most populated). The population of Raleigh, NC as of July 2007 from Raleigh City-data was 375,806.

2) Age:

Age is one of the most important factors used to predict citizen preferences for recreation activities. Wake County has 12 municipalities, including Raleigh, the urban center. Raleigh is more densely populated than the surrounding municipalities and has a
higher percentage of older adults. Families with children more commonly live in the suburban areas surrounding Raleigh. The urban area, however, is favored two to three times more than the suburbs by citizens over 65 years of age. The median age of Wake County residents is 34.1 years, whereas the median age for the nation is 36.4 years according to the 2000 US Census (2000).

3) Income:

The per capita income of Wake County is $30,466, more than $5000 above the nation’s average and $8000 above the State’s average. An estimated 10.3% of the population in Wake County is living below the poverty line, compared to 13.3% of the nation and 15.1% of North Carolina (US Census Bureau 2000).

4) Education:

The education level in Wake County also exceeds State and national levels; 91.4% of the adult population has a high school or higher degree; 48.2% has a bachelor degree or higher. Respectively, the national averages are 84.2% and 27.2%, and the State’s averages are 82.3% and 25.1 % (US Census Bureau 2000).

5) Age and Income as Recreation Use Indicators:

The following are findings from research conducted for the Texas Parks and Wildlife Department by Dr. John Crompton of Texas A & M University (2009). This information can be used to aid in the development of the Museum Park and outdoor programming.

- Age and income are the best predictors of the perceived constraints for using outdoor recreation facilities.
• Older adults cite more personal constraints (fear of crime, lack of companions, health).
• Younger adults cite access and time constraints (park areas are too far away).
• Low income citizens more frequently cite personal constraints, economic constraints, and information and access constraints.
• High income citizens more frequently cite time constraints.
• Signage should indicate trail length and time to complete.
• Citizens fear crime, and actions should be taken to make Park users feel more secure (i.e., lit trails and open areas, accessible trails, visible rangers or staff).
• By 2030, 20% of the population is likely to be over age 65. Outdoor recreation participation decreases with age.

6) Citizen Survey:

a. Introduction:

The Wake County Parks, Recreation, and Open Space Division conducted a Community Attitude and Interest Survey. In March 2007, the surveys were mailed to a random sample of 2,000 Wake County households; follow-up phone calls were administered to encourage participation. The survey period ended in April 2007, and 423 surveys were completed by both mail and phone. The survey was used to establish goals for park, facility, and program development in Wake County.

b. Selected Results (Wake County Parks, Recreation, and Open Space 2007):

• Lake Crabtree County Park is the most used park in Wake County, with 31% of the respondents having visited.
Sixty-two percent (62%) of respondent households have visited at least one of the Wake County parks and trails over the past year.

Thirty-eight percent (38%) of the respondents claimed “not enough time” was the main reason that prevented or limited park usage. This was followed by “I use city and town parks and facilities” (31%), “I do not know what is being offered” (29%), “I do not know locations of parks/facilities” (25%) and “parks too far from our residence” (25%).

The most desired new facility was walking/hiking trails.

Fifty-one percent (51%) of respondents indicated being “very supportive” and 25% “somewhat supportive” of “Wake County continuing to concentrate on the acquisition, development, and operations of large regional parks and longer trails systems,” while leaving neighborhood parks operations to Wake County cities and towns.

Outdoor Recreation Participation in North Carolina (USDA Forest Survey 1990):

a. The five most popular outdoor recreation activities in North Carolina are walking for pleasure, driving for pleasure, viewing scenery, participating in beach activities, and visiting historical sites. Three out of every four households participated in walking for pleasure at least once in the past 12 months. In addition to the five most popular activities, over fifty percent of the households responding to a 1989 survey participated at least once in the following activities: swimming (in lakes, rivers, or oceans), visiting natural areas, picnicking, attending sports events, visiting zoos, and freshwater fishing. The North Carolina Outdoor Recreation Participation Survey was mailed to 3,100
randomly selected residents in the spring of 1989. Forty-five percent, or 1,399 people, returned completed surveys. Each person receiving the survey was asked to estimate the number of times that household members had participated in each of 43 activities. The survey results provide good insight into the current participation of North Carolinians in a wide range of outdoor recreation activities. The survey results also closely mirror those of the National Survey on Recreation and the Environment conducted in 1994-1995.

b. Outdoor Recreation Activities Ranked by Popularity.

(Ranked by percentage of households participating)

1. Walking for Pleasure 75%
2. Driving for Pleasure 72%
3. Viewing Scenery 71%
4. Beach Activities 69%
5. Visiting Historical Sites 62%
6. Swimming (in Lakes, Rivers, and Oceans) 54%
7. Visiting Natural Areas 53%
8. Picnicking 52%
9. Attending Sports Events 52%
10. Visiting Zoos 51%
11. Fishing - Freshwater 50%
12. Use of Open Areas 41%
13. Swimming (in Pools) 40%
14. Fishing - Saltwater 38%
15. Attending Outdoor Cultural Events 35%
16. Bicycling for Pleasure 32%
17. Other Winter Sports 31%
18. Camping, Tent or Vehicle 29%
19. Softball and Baseball 28%
20. Hunting 28%
21. Use of Play Equipment 28%
22. Power Boating 26%
23. Trail Hiking 26%
24. Jogging or Running 24%
25. Basketball 24%
26. Nature Study 22%
27. Golf 22%
28. Target Shooting 20%
29. Water Skiing 19%
30. Camping, Primitive 14%
31. Tennis 14%
32. Use Motorcycles, Dirt Bikes, ATV's 13%
33. Use Four Wheel Drive Vehicles 13%
34. Canoeing and Kayaking 13%
35. Horseback Riding 12%
36. Volleyball 12%
37. Downhill Skiing 12%
38. Football 11%
39. Soccer 7%
40. Sailboating 7%
41. Skateboarding 6%
42. Cross Country Skiing 2%
43. Windsurfing 1%

2.2 Natural Resources

2.2.1 Climate
The Park is located in the North Carolina piedmont and is characteristic of this region. The piedmont is a temperate climate and is therefore very mild and without extremes in either temperature and precipitation. The climate in Raleigh, NC features a moderate, continental climate with mild winters and warm summers. From the Raleigh Climate and Weather Charts from the Raleigh Durham International Airport, the mean annual precipitation for Raleigh is 42 inches. The annual mean high temperature is 88 degrees Fahrenheit and the annual mean low temperature is 50 degrees Fahrenheit. The average frost-free period is between 200 and 240 days per year. (Raleigh Climate and Weather Charts 2009)

2.2.2 Topography (see Figure 1.2)
The Park is comprised of a gently rolling topography with narrow floodplains flanking House Creek and its tributaries. There is a relatively large range of elevation within the Park. The site’s overall elevation change is 150 feet from the upper most elevation at 485 feet above sea level down to 335 feet above sea level at the northeastern extent of House
Creek. Steep north-facing slopes occur in two separate locations within the Park. One is located just south of the tributary along the Woodland Trail and the other is adjacent House Creek’s northeastern floodplain up to I-440.
Figure 1.2: Topography
2.2.3 Geology, Soils (see Figure 1.3)

The park is contained within the geological setting of the Raleigh belt, which contains granite, gneiss, and schist. The upland soils developed residually from these parent materials. The North Carolina Museum of Art grounds consist of six different soil series: Appling, Cecil, Chewacla, Man Made, Mantachie, and Worsham. Within each series there is a range of composition, slopes, and degree of erosion. The following descriptions of the soil series came from the USDA-NRCS Soil Survey Division (2008).

The Appling series consists of very deep, well drained, moderately permeable soils on ridges and side slopes of the Piedmont uplands. These soils are deep to saprolite and very deep to bedrock. They formed in residuum weathered from felsic igneous and metamorphic rocks of the Piedmont uplands. Slopes range from 0 to 25 percent. Near the type location, mean annual precipitation is 45 inches and mean annual temperature is 60 degrees F. The taxonomic class is fine, kaolinitic, thermic Typic Kanhapludults.

The Cecil series consists of very deep, well-drained moderately permeable soils on ridges and side slopes of the Piedmont uplands. These soils are deep to saprolite and very deep to bedrock. They formed in residuum weathered from felsic, igneous and high-grade metamorphic rocks of the Piedmont uplands. Slopes range from 0 to 25 percent. Near the type location, mean annual precipitation is 48 inches and mean annual temperature is 59 degrees F. The taxonomic class is fine, kaolinitic, thermic Typic Kanhapludults.

The Chewacla series consists of very deep, somewhat poorly drained moderately permeable soils on Piedmont and Coastal Plain river valleys. These soils are deep to saprolite and very deep to bedrock. They formed from alluvium parent material. Slopes
range from 0 to 2 percent. Near the type location, mean annual precipitation is 44 inches and mean annual temperature is 59 degrees F. The taxonomic class is fine-loamy, mixed, active, thermic Fluvaquentic Dystrudepts.

The Man Made series is a miscellaneous land type in which the areas have been altered by man to the extent that the profile of the original soils cannot be recognized.

The Mantachie series consists of somewhat poorly drained, moderately permeable soils. They formed in loamy alluvium. These soils are on flood plains. They usually flood late in winter and early in spring. The seasonally high water table is at a depth of 1.0 to 1.5 feet. Slope is dominantly less than 1 percent but ranges to 3 percent. The taxonomic class is fine-loamy, siliceous, active, thermic Fluventic Endoaquepts.

The Worsham series consists of very deep poorly drained very slow permeable soils on Piedmont uplands. These soils are deep to saprolite and very deep to bedrock. They formed from alluvium parent material. Slopes range from 0 to 8 percent. Near the type location, mean annual precipitation is 45 inches and mean annual temperature is 58 degrees F. The taxonomic class is fine, mixed, active, thermic Typic Endoaquults.
Figure 1.3: Soil Types

ApC: Apple gravelly sandy loam, 6-10% slopes
ApB2: Apple sandy loam, 2-4% slopes, moderately eroded
ApC2: Apple sandy loam, 6-10% slopes, moderately eroded
ApD: Apple sandy loam, 10-15% slopes
CeB2: Cecil sandy loam, 2-6% slopes, moderately eroded
CeC2: Cecil sandy loam, 6-10% slopes, moderately eroded
CeD: Cecil sandy loam, 10-15% slopes
CeF: Cecil sandy loam, 15-45% slopes
CiC3: Cicl clay loam, 6-10% slopes, severely eroded
CiE3: Cicl clay loam, 10-20% slopes, severely eroded
Cm: Chewacla sandy loam, 0.2% slopes, frequently flooded
Ma: Malgo land
Me: Mantachie sandy loam, 0.2% slopes, rarely flooded
Wy: Worsham sandy loam, 0.4% slopes
2.2.4 Hydrology

There are two main water features within the Park: the retention pond and House Creek and tributary. The retention pond holds the stormwater which drains from the site. The pond is currently under construction, but it will eventually be planted with native grasses and other aquatic and floodplain species to clean the runoff that eventually flows into the Neuse River. This pond will be made larger to manage the increase in stormwater runoff from both the new gallery building and the developing region.

The second water feature is House Creek and its tributary. House Creek is a class 1 stream which originates from a culvert under Wade Avenue in the southeastern end of the site and runs northeast through the woodland to a culvert under I-440. There is a tributary approximately halfway down the creek, from a culvert under Blue Ridge Road, which appears in the middle of the park along House Creek Greenway through the woodland to House Creek. Both creeks eventually drain into the Neuse River.

The creeks are flanked by steep north-facing banks on the south side of the creek and low-lying floodplains to the north. These areas contain some important wetland species such as *Arundinaria gigantea*, Christmas fern, various other fern species, evergreen wild ginger, jewelweed, cranefly orchid, button bush, strawberry bush. Because of the channeling of the creek into culverts at either end of the site, the water moves too quickly and has severely eroded the stream banks. Measures should be taken to slow the water flow and in some places stabilize the stream banks.
2.2.5 Vegetation

The Park contains a few distinct plant communities. A natural community is defined as “a distinct and reoccurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment” (The Nature Conservancy, 1981). Most of the dominant plant assemblages occurring within the Park cannot be classified as “natural” because they have developed as the result of human-induced disturbance (White et al., 2003). Unfortunately, the majority of the plant communities within the Park are dominated by exotic speices. An inventory of the plant species in the Park needs to be conducted in order to properly classify all of the occurring plant communities.

Upon simple observation, general plant classifications have been made throughout the Park. The most predominant plant community within the Park is the old fields being converted into a piedmont prairie. Unfortunately, this area has been over taken by blackberry, callery pear, and fescue. There are a few native warm season grasses that remain on the site along with some native wildflowers.

In addition to the prairie, there is a mesic mixed hardwood forest (Cornus florida, Diospyros virginiana, Carya spp., Quercus spp., Liriodendron tulipifera, Liquidambar styraciflua, Acer spp.), bottomland forest (Pinus taeda, Liriodendron tulipifera, Liquidambar styraciflua, Acer rubrum, Prunus serotina, Fagus grandifolia, Juglans nigra, Magnolia macrophylla, Asarum caudatum, Vitis rotundifolia, fern spp), loblolly/shortleaf pine forest (Vaccinium spp, Liatris pilosa, Solidago spp, Parthenium integrifolium, Aster solidagineus, Sericocarpus asteroides, Quercus marilandica, Diospyros virginiana), north-
facing deciduous forest and mixed pine/hardwood forest (*Cornus florida*, *Carya spp.*, *Quercus spp.*, *Acer spp.*, *Pinus spp.*). Most of the plant communities are successional forest types and are not classified as “natural” due to the past human land uses which have in turn caused a high volume of invasive species (White et al., 2003).

**2.2.6 Wildlife**

*All information for this section was taken from the North Carolina Museum of Art’s website: www.ncartmuseum.org.*

Each of the above plant communities supports important plant species as well as animal species. The prairie is home to many bird species such as Eastern Bluebird (*Sialia sialis*), Purple Martin (*Progne subis*), Northern Flicker (*Colaptes auratus*), Gray Catbird (*Dumetella carolenensis*), and Carolina Chickadee (*Poecile carolenensis*). The prairie is also home to many insects such as Garden Webworm (*Achyrarantalis*), Black Swallowtail (*Papilio polyxenes*), Monarch Butterfly (*Danaus plexippus*)—hosted by milkweed, Large Milkweed Bug (*Oncopeltus fasciatus*)—also hosted by milkweed, and Large Milkweed Bug (*Oncopeltus fasciatus*).

The pond, House Creek and its tributary are home to many insect species such as Black-winged Damselfly (*Calopterix maculata*), Bluet (*Enallagma species*), Common Checkered Skipper (*Pyrgus communis*), Common Buckeye (*Junonia coenia*), and Widow Skimmer (*Libellula luctuosa*). The woodland area supports an array of bird species as well as insect species. Some insect species that live in the woodland are Eastern Tiger Swallowtail (*Papilio glaucus*), Silver-spotted Skipper (*Epargyreus clarus*), Red-spotted Purple (*Lemenitis arthemis*), Luna Moth (*Actias luna*), Chinese Mantid (*Tenodera*
aridifolia), Tawny Emperor (*Asterocampa clyton*), and Locust Borer (*Megacyllene robiniae*).

All of these plant communities support a variety of mammals as well. There is a den of grey foxes which live on the bank of House Creek. Opossums, raccoons, white-tailed deer, and grey squirrels have also been seen within the park. Plant communities should not only be maintained to encourage the health of plant species, but attention should also be paid to the animal species which exist within the Park.

### 2.2.7 Exotic, Invasive Plants

Exotic plants are those that have been introduced, either intentionally or by accident, into areas outside their native range. Exotic plant species often out-compete native species because they are aggressive in their growth habits, produce more seeds that last longer in the soil, or have no natural predators or diseases in the ecosystem that they are invading. Some of these exotic plant species have severely affected the natural resources of the Park. The Museum Park's long-range goal is to control and/or eliminate those exotic species that present the greatest threats to the native flora.

Due to the past land uses at the Park, exotic invasive species are prevalent on this site. The exotic invasive species which exist in the Park are *Ailanthus altissima* (tree of heaven), *Albizia julibrissin* (silk tree), *Aliaria petiolata* (garlic mustard), *Ampelopsis brevipedunculata* (porcelainberry), *Hedera helix* (English ivy), *Elaeagnus angustifolia* (Russian olive), *Lespedeza latifolium* (Chinese lespedeza), *Ligustrum sinense* (Chinese privet), *Lolium arundinaceum* (tall fescue), *Lonicera japonica* (Japanese honeysuckle), *Mahonia bealei* (Oregon grape), *Microstegium vimineum* (Japanese stiltgrass), *Pueraria
*montana var. lobata* (kudzu), *Pyrus calleryana* (callery pear or Bradford pear), *Rosa multiflora* (multiflora rose). In addition to exotic invasive species, *Rubus argutus* (blackberry), a native species, is invading both the prairie and woodland. *Toxicodendron radicans* (poison ivy), also a native species, is an issue throughout the Park when located around the pedestrian trails.

### 2.2.8 Disease and Infestations

Currently, no diseases or infestations have been identified in the Park. A plant health screening should be done throughout the Park with periodic monitoring.

### 2.2.9 Endangered and Threatened Species

There has been no endangered or threatened species identified in the Park. An inventory of the plant communities should be conducted.

### 2.3 Cultural Resources

#### 2.3.1 Art (see Figures 1.4-1.19)

All information for this section was taken from the North Carolina Museum of Art’s website: www.ncartmuseum.org.
Figure 1.4: Sculpture and Trail Locations
1) *PICTURE THIS*, 1995:

Picture this was created by Barbara Kruger, Henry Smith-Miller, Laurie Hawkinson, and Nicholas Quennell. It is the largest sculpture in North Carolina and is a series of small sculptures that, from a bird’s eye view, spells “PICTURE THIS.” The individual sculptures that form the larger include:

P- cast iron retaining wall covered with phrases beginning with “please”

I- map of North Carolina with sixty highway historical markers

C- sand box with red concrete curb

T- blacktop surface with highway lines

U- depression in earth, covered with *Liriope spp.*

R- rows of chain link fence, covered in vines

E- concrete block walls, covered with aluminum plaques with quotes

T- painted areas of seating and roof of theater

H- sections of stage floor and roof of theater

I- concrete slab inset inscribed with “To be rather than to seem”

S- curving line formed with boulders

*Figure 1.5: PICTURE THIS*
2) *Gyre*, 1999:

*Gyre* was designed by Thomas Sayre, an American artist born in 1950. *Gyre* is built out of concrete, colored with iron oxide and reinforced with steel. This sculpture was a gift of Artsplosure, City of Raleigh, 1999 commissioned in conjunction with Artsplosure’s Millenium Celebration Arts Education Initiative with Enloe Senior High School of Wake County. Principal funding provided by the City of Raleigh, WRAL-TV5/MIX 101.5 FM, Glaxo Wellcome, AT&T, Carolina Power & Light Company, SAS Institute, and Time Warner Cable. Additional funding provided by United Arts Council of Raleigh and Wake County, North Carolina Arts Council, and the Mary Duke Biddle Foundation.

This monumental sculpture was created on site using a method of earth casting developed by the artist, Thomas Sayre. A backhoe dug out three elliptical shapes in the ground. Then a mixture of concrete and iron oxide was poured directly into the dirt trenches, which were inlaid with steel bars for reinforcement. After allowing the concrete to cure for a month, a crane lifted each curved concrete form up and out of its earth mold, and then positioned and lowered it into place. The variegated surface of the sculptural forms is a result of the iron oxide used to color the concrete and the dirt embedded in its surface from the earth casting. With a direct, physical connection to its site, the work appears to have sprung up like a natural formation rooted in the landscape.

The title of the sculpture, *Gyre*, refers to both a circular or spiraling motion--gyration--and shape, like a vortex or tornado. The work captures this sense of motion in forms that appear as if they could easily spiral endlessly into the distance, rolling down the hill and across the fields, escaping their earthbound constraints.
Figure 1.6: Gyre

3) Wind Machine, 2002:

*Wind Machine* was designed by Vollis Simpson, an American born artist born in 1919. This sculpture is made of steel and other media. It was purchased with funds from the William R. Roberson, Jr. and Frances M. Roberson Endowed Fund for North Carolina Art, 2002.

Simpson’s multi-colored whirligig or wind machine consists of forty separate movable elements—fans, blades, propellers, wheels, and more—enabling it to “take flight” with even the slightest breeze.

A self-taught artist, Simpson started creating monumental, kinetic sculptures out of found objects when he retired in 1985 in a rural community in eastern North Carolina. After a lifetime of designing and building heavy equipment for moving houses and running his own repair shop, Simpson had the skills and tools necessary for building his technically complex wind machines.
Recycling discarded parts from cars, trucks, bicycles, farm machinery, street lights, and highways signs, Simpson’s whirligigs transform cast-off everyday objects and industrial materials into whimsical, dancing, spinning wind machines whose sole purpose is its fantastic visual impact.

Figure 1.7: Wind Machine

4) Cloud Chamber for the Trees and Sky, 2003:

Chris Drury creates sculptures in the landscape that are intimately intertwined with the natural world. One of a recent series of works, *Cloud Chamber* has an ageless, primal quality, like an ancient ruin or natural formation. This shelter operates as an oversized camera obscura or a pinhole camera. A small aperture in the roof projects an inverted image of the sky and surrounding trees onto the floor and walls of the chamber, an effect that seems to pull the sky down to the viewer. Inside, your perspective is turned upside down. Instead of looking up at the sky, trees, or clouds, you will look down on them from above. *Cloud Chamber* is open every day, 7:30 a.m. to 5 p.m. To protect the chamber, it will be closed during inclement weather.

![Cloud Chamber](image)

**Figure 1.8: Cloud Chamber**

5) *Crossroads/Trickster*, 2005:

Martha Jackson-Jarvis, an American artist born in 1952, designed *Crossroads* out of brick, steel, mortar, glass tile, and stone. It stands 20 feet high, and is two feet in diameter.
Commissioned by the North Carolina Museum of Art with funds from Wachovia Bank and a North Carolina Department of Transportation Enhancement Grant.

Martha Jackson-Jarvis’s vibrantly colored mosaic sculptures incorporate natural and man-made materials, resulting in beautifully detailed and extremely tactile works that often reference African and African American culture and draw upon personal experiences as well as history, religion, mythology, folklore, and artistic traditions.

The artist was commissioned to create a sculpture, *Crossroads/Trickster I*, to mark the intersection of two trails in the Museum Park. Standing at a prominent site where the paved House Creek Greenway meets the natural-surface Woodland Trail, the tower-like sculpture leads visitors into the wooded areas of the Park and to *Cloud Chamber for the Trees and Sky*. Located at the threshold between field and forest, the work of art emphasizes a point of transition in experience for the Park visitor—from public to private, man-made to natural, open to enclosed. The sculpture, a tall sentinel form, combines brightly colored Italian glass tiles, orange and red carnelian stones, and shattered bricks (recycled form the Polk Youth Correctional Facility, located on this property from 1920 to 1993) to create a densely patterned, textured mosaic surface.
6) *To see Jennie smile*, 2006:

Steven Siegel, an American born in 1953, designed *To see Jennie smile* out of newspaper and logs. Steven Siegel’s temporary sculptures consist of multiple layers of materials culled from the castoffs of contemporary culture. Encapsulating the clash between nature and culture, Siegel’s works push viewers to think about contemporary consumer culture, the depletion of natural resources, and the resulting mountains of debris and recycled materials.

*To see Jennie smile* is composed of several tons of unused newspapers donated by *The News & Observer*, representing two weeks of leftovers. The artist prepared the form by
removing the tops of a pair of trees, which were sectioned into small logs to form a base. The structure is anchored inside around the trunks of the trees. The paper, exposed to the elements in the forest along the Woodland Trail, is predicted to last for about 10 years.

Figure 1.10: To See Jennie Smile

7) Lowe’s Park Pavilion, 2007:

Mike Cindric and Vincent Petrarca designed the Pavilion, which is located on the edge of a stand of trees, just off the Museum Trail and looking out over the prairie. This sculptural pavilion offers visitors a sheltered place to rest and provides space for park educational programs.

The Lowe’s Pavilion for the North Carolina Museum of Art Park is made possible by the Lowe’s Charitable and Educational Foundation.
Constructed of steel, wood, and aluminum, the Pavilion provides vistas to the surrounding landscape and other artworks. The perforated, metallic skin of the pavilion changes with the time of day and the quality of light–reflecting its natural surroundings and taking on the colors of the trees, grass and sky, or completely disappearing into a moiré pattern of light and shadow. Designed and built specifically for this site, the “art-as-shelter” project blends into its natural surroundings.

![Figure 1.11: Pavilion](image)

8) Collapse I, 2000:

Ledelle Moe, a South African artist born in 1971, designed Collapse I. It is made of concrete, construction mesh, and steel. Moe, a longtime resident of the mid-Atlantic region, grew up in Durban, South Africa, and relocated to the United States in 1994. The artist’s large-scale, concrete and steel sculptures depend on weighty materials to anchor them, both physically and conceptually.
While Moe’s work is intimately informed by South African history, the distance of time and space afforded by her American residency frames her work within larger and regional contexts. These two large-scale human figure sculptures constructed of welded steel bars, construction mesh and concrete were added to the Park in the summer of 2007.

*Collapse I* lies on an exposed site along the crest of a hill, cradled by a stand of trees. Thus situated, visitors may approach it from various angles, each offering a distinct perspective on its voluminous form. Viewed at full length, the comfortable curve of the reclining figure is in line with the surrounding landscape.

![Figure 1.12: Collapse I](image)

9) *Untitled*, 2007:

Ledelle Moe, a South African artist born in 1971 designed *Untitled*, a large form constructed out of concrete, construction mesh, and steel. *Untitled* is set in an intimate location along the Woodland Trail, nestled between the trees.
10) *Invasive*, 2008:  

*Invasive* was designed by Steed Taylor, an American artist born in 1959. *Invasive* was created using high-gloss latex paint.

Steed Taylor’s temporary “road tattoos” are painted on sidewalks, trails, and streets and eventually disappear as the paint is worn away by weather and traffic. With the help of 45 community volunteers, the artist painted a road tattoo over 1,000 feet in length on the paved trails of the Museum Park. The design for *Invasive* is based on eighteenth-century European floral fabric patterns and contemporary tattoo designs. Before the final pattern was painted, names of local invasive flora were written within the outlines of the design and then painted over, a symbolic act of containment.

*Invasive* is part of a series of site-specific art projects, Art Has No Boundaries, commissioned by the NCMA to encourage visitors of all ages and physical abilities to actively explore the Museum Park. The series is part of the Active Community and Neighborhood grant program funded by the John Rex Endowment through the Physical Activity and Nutrition Branch of the N.C. Division of Public Health.
Jim Gallucci, an American artist born in 1951 designed *Whisper Bench*. It is made of painted steel and was purchased by the volunteers of the North Carolina Museum of Art in honor of dedicated service by volunteers and in memory of Museum staff member Emily S. Rosen (1958–2007).

Based in Greensboro, North Carolina, Jim Gallucci uses painted steel and architectural forms to create interactive works of art. Located on either side of a trail, the two sections of *Whisper Bench* are linked by a hidden sound pipe that allows visitors to whisper messages back and forth while sitting on opposite sides of the path.
Mission was designed by Workingman Collective: Tom Ashcraft, Janis Goodman, Peter Winant. It is made of fifteen painted wood birdhouses and aluminum signs.

This installation includes 15 birdhouses and related signage to provide a habitat for the three species of songbirds hardest hit by the West Nile virus—the eastern bluebird, Carolina chickadee, and downy woodpecker. Mission addresses issues of habitat, attraction, inventory, environment, and migration specific to this region. It also speaks to a broader social context and human impact on the natural world.

Mission is part of an ongoing series of site-specific art projects, Art Has No Boundaries, commissioned by the NCMA to encourage visitors of all ages and physical abilities to actively explore the Museum Park. The series is part of the Active Community
and Neighborhood grant program funded by the John Rex Endowment through the Physical Activity and Nutrition Branch of the N.C. Division of Public Health.

Figure 1.16: Mission

2.3.2 Museum

The Museum’s permanent collection of more than 5,000 pieces, spanning from ancient Egypt to present, is currently housed in the 165,000-square-foot East Building. In April 2010, the permanent collection will be relocated to the new 127,000 square-foot West Building, which is surrounded by sculpture courts and landscaped gardens. The East Building will become a center for education and temporary exhibitions. The administrative areas, the library, art storage, and collection management will remain in the East Building.
2.3.3 Structures

1) Benches, Bicycle Racks and Sign Frames, 2005:

   Artist Alvin Frega, an American born in 1956 has designed and created a unique series of art-in-service elements for the Museum Park, including benches, bicycle racks, and a structural signage system, incorporating metal bars and other found materials that he salvaged and recycled during the demolition of the former prison that once occupied this site. These structures are made of wrought iron and steel. Major funding for this project was provided by the North Carolina Department of Transportation Enhancement Program and the North Carolina Department of Environment and Natural Resources Adopt-A-Trail Grant Program.

   From 1920 to 1993, the Polk Youth Correctional Facility was located on this property. The site has a long history that includes military encampments during the Civil War and World War I. The prison finally closed in 1993 and the buildings were removed in 2003. Standing in as markers or historical artifacts for buildings and people that no longer occupy the site, Frega’s functional artworks both preserve and re-tell the story of a site laden with memories and layers of history.
Figure 1.17: Benches

2) Reedy Creek Pedestrian Bridge:

The longest pedestrian bridge in North Carolina (660 feet) spans the I-440 Beltline between the Museum Park and Meredith College. It is constructed in three 220 foot long sections, each a “bow-string” steel structure, set onto concrete “bents” or upright supports that were made with form liners in the pattern of stonework. The finials topping each of the bent columns are stainless steel and are designed to be lit with blue LED lights from within. The bridge joins sections of the Greenway Trail constructed by the NC State Department of Transportation, with assistance from the City of Raleigh.
3) Museum Park Theater:

The Joseph M. Bryan, Jr. Theater in the Museum Park is part of a larger work of art incorporating the monumental words “PICTURE THIS”, designed by a team of artists. The theater was originally conceived by the artist team as a means of bringing activity and community to the Museum’s landscape. During the warmer months, it hosts a variety of live musical performances and film screenings.
4) Power Plant and Tower:

Until 2000, this circular brick tower served as a smokestack for the power plant of the former Polk Youth Center prison. Most of the prison buildings have been torn down, but the Museum kept the tower because it is in a sense, a monument on the horizon. The power tower documents part of the history of the Museum Park lands. It is also an interesting and dramatic shape in the landscape, not unlike some of the works of art created for the Park. The Museum is considering what an artist might add to the tower to further illustrate the connection between art and architecture.

2.4 Visitor Experiences and Resources

2.4.1 Trails

1) Background:

The original trail system began with an early Master Plan by Dan Gottlieb and Amaechi Okigbo. The current trail system was designed in coordination with NCMA, NCSU, and RPRD. In 2006, Lappas & Havener, PA Landscape Architects were hired to work with NCMA and the Partnership for Art and Ecology to develop a Master Plan for the Park consisting of an integrated trail system while upholding the Park’s vision and goals. The Master Plan has been completed (see Appendix A). The new Master Plan keeps with the overall management of Park experience zones (described in detail in Appendix A).
2) Trail Descriptions and Maps (see Figure 1.4):

There are three entrances to the Park’s trails. Two are from opposite ends of the Museum parking and one from Meredith College via the Reedy Creek Pedestrian Bridge. The Park currently has five trails.

a. Prairie Trail:

The Prairie Trail crosses through a former pasture that is being restored as a Piedmont prairie. This 4/10 of a mile gravel trail leaves the Museum Trail, crosses House Creek, and connects to the House Creek Greenway through a section of forest bottomland. The trail is for foot traffic only, and no bikes or dogs are allowed.

b. Woodland Trail:

The Woodland Trail lies within the Park’s nature refuge zone. It is an uneven, 4/10 of a mile, mulched trail for foot traffic only. The path currently has two access points off the House Creek Greenway: one near Martha Jackson-Jarvis’s sculpture Crossroads and the other by Steven Siegel’s work, To See Jennie Smile. The Woodland Trail makes a loop and passes by Cloud Chamber for the Trees and Sky, an oversized pinhole camera structure by British environmental artist Chris Drury (Figure 1.3) and Ledelle Moe’s Untitled. Eventually, the Crossroads access point will lead to only the Ramble Trail and a spur.

c. House Creek Greenway:

The House Creek Greenway is a mile long paved trail beginning at the Reedy Creek Pedestrian Bridge (the longest pedestrian bridge in North Carolina). The trail winds through woodlands and across House Creek then up to Blue Ridge Road. Along the way, visitors discover monumental works of art that are unique in North Carolina. Several prominent
pieces of artwork are located in the prairie along the greenway, including Ledelle Moe’s *Collapse I* and *Wind Machine*. Created by local artist, Vollis Simpson, *Wind Machine* is a whirligig made of forty separate movable recycled elements. *Gyre* is three large rings created by Thomas Sayre. Also included in this section of the Park is the *Joseph M. Bryan, Jr. Theater* which doubles as the largest work of art in North Carolina, *PICTURE THIS*.

d. Museum Trail:
The Museum Trail is a paved trail 4/10 of a mile in length connecting Museum parking with the House Creek Greenway. This area includes a pond (Figure III.D.2.d.) frequently used for educational programs and research. The pond functions as a storm water retention and filtration system and is currently being modified to accommodate the additional runoff from the new gallery building and area’s expansion.

e. Ramble Trail:
The Ramble Trail is a crushed stone trail that loops around the center of the Park, and runs along the boundary between the woodlands and prairie. One-third of a mile of the Ramble Trail has been constructed (approximately 25%) and connects the Greenway to the Prairie Trail. The Ramble Trail is for foot-traffic only.

3) Context Within Regional Trail and Greenway System (see Figure 1.20):

The House Creek Greenway is a one-mile paved trail connecting the Museum Park to the larger Capital Area Greenway System. The House Creek Greenway received National Recreation Trail designation by the National Park Service in 2006. This designation came about in spring 2006 through work conducted by the Partnership for Art and Ecology. The public access greenway begins at the western terminus of the Reedy Creek Pedestrian...
Bridge and extends to the edge of the NCMA property at Blue Ridge Road. The trail corridor is defined as a twenty foot width, which includes the paved trail surface of ten feet and a shoulder on each side of five feet.

The Greenway crosses the Raleigh Beltline via the Reedy Creek Pedestrian Bridge and continues eastward through the campus of Meredith College to the Hillsborough Street and the N.C. State area. To the west the Greenway leads to Blue Ridge Road and connects to Umstead State Park via the Reedy Creek Greenway.
Figure 1.20: Greenway Connection
4) Planned trails:

In addition to completing the Ramble Trail, the master plan proposes a paved trail to be constructed that takes visitors directly from the Museum entrance to the heart of the Park.

5) Trail Counters Data (Table 1.1):

In October 2006, a RS 501 Remote Sensor Portable Traffic Counter was installed along House Creek Greenway near the pedestrian bridge. Currently, the trail counter is inoperable and needs to be either repaired or replaced. However, data were collected previously and are as follows:

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6) Interpretive Services: signs, maps, materials, integration with state signage and plan

### 2.4.2 Surveys

Park visitor surveys are valuable resources used to guide park development and identify relevant management objectives. The following surveys have been used in the development of the Museum Park’s objectives.
1) United States Forest Service Public Area Recreation Visitors Survey

In 1987 the United States Forest Service was contracted to conduct a Public Area Recreation Visitors Survey (PARVS) for the North Carolina State Parks System. The survey was designed to identify visitor socio-economic characteristics and economic contributions to the state's economy. The Museum Park was not one of the eight park units involved in the survey, but the general information concerning state park visitors is useful in assessing visitation trends at the Museum Park.

Why do people visit state park units? The convenient location was cited by 31 percent of the respondents; 25 percent thought other areas were too crowded; 21 percent liked the quality facilities; 8 percent wanted to try a new area; 7 percent enjoyed the scenic beauty; and 6 percent came to see the attraction.

More than one third of state park visitors come from within a 30-mile radius (37 percent), while 17 percent come from 30 to 60 miles away. Survey respondents indicated that the parks were their sole destination 86 percent of the time. While many visitors come from nearby, the average one-way distance traveled was 139 miles. Approximately 25 percent of state park visitors come from out of state. Visitors averaged 4.1 trips per year to North Carolina state parks.

Seventy-eight percent of those surveyed indicated that they were return visitors. The average number of return trips per year was six. Sixty-one percent of visitors statewide came with family members, 16 percent with friends, and 7 percent with both family and friends. Ten percent of visitors came alone. Visitors also came in small numbers in organized groups and multiple families.
PARVS data indicates that 16.8 percent of groups surveyed used more than one car, and that the average number of persons per car was 3.0. The average age of the park visitor was 38.2 years. Since over 18 percent of visitors are under the age of 13, a demand exists for children's programs and facilities. Approximately 12 percent of visitors are 56 and older. This older segment of the general population will be increasing, and as it does, demand for improved quality, accessibility, and safety should increase.

2) NCMA Park Visitors Study Survey (Hollenbaugh 2007):

The NCMA Art Park Visitors Study Survey was conducted in October and November 2006. During this time, the Museum had a blockbuster exhibit, *Monet in Normandy*, which may have skewed some of the results as noted. The follow summarizes the findings in the thesis *Revenue-Increasing for the North Carolina Museum of Art: An Audience Assessment of an Art & Nature Park* by Amanda Hollenbaugh, 2007.

a. Demographic Characteristics:

The Park Visitor Study surveyed a total of 218 groups, where a group is defined as one individual or more. Out of these 218 samples, 72% of the samples had a group size larger than one individual. The average group size among respondents was almost three persons. Seventy percent (70%) of all the sampled groups did not have any young children or teens in their groups, and had approximately one to three individuals per group. Twenty-one percent (21%) of the samples had children less than 11 years and a group size range of three to five individuals. Two percent (2%) of the full sample was made up of unaccompanied teenagers, 11 to 18 years old.
b. Age and Gender Distribution:

The majority of visitors are between the ages of 41 and 60 and the Park is more visited by women (56%).

c. Home Zip Code:

Fifty-one percent (51%) of sampled visitors were from Raleigh and 84.5% from the greater Triangle region. The seemingly high percentage of non-local residents (15.5%) is attributed to the Monet in Normandy exhibition.

d. Ethnicity:

Of the surveyed Park visitors, 89% were Caucasian, 4% Hispanic, 2% African American, and 2% Asian.

e. Income:

The majority of Park visitors had an income greater than $57,284, the 2005 median household income for Wake County.

f. Reasons for Park Visitation:

The largest percentage of Park users came specifically to use the Park. Only 7% of visitors came as a result of visiting the Museum’s permanent collection, where as 16% came because of the Monet in Normandy blockbuster exhibition. This sold-out event had strict viewing times, resulting in an overflow from the Museum.

g. Frequency of Use:

The largest portion of the visitor sample consisted of yearly visitors (30%), followed by first-time visitors (26%), monthly visitors (23%), and weekly visitors (20%).
Monet in Normandy blockbuster exhibition also skewed these numbers since many exhibit visitors were first-time Park visitors.

h. Park Visit Duration:

The general visitor spends an average of one hour and 36 minutes in the Park. The standard deviation calculated is one hour and nine minutes.

i. Desired amenities in the Park:

Visitors are interested in the installation of more artwork and general amenities such as water fountains and toilets.

j. Park Activity:

Most Museum Park visitors prefer recreational activities, followed closely by the art.

k. Interest, Awareness, and Participation in Park Offerings:

Data on participation patterns can help the NCMA understand how and when the visitors use programs and services. Concerts and movies were the Park activities with the most interest, awareness and participation, followed by self-guided tours, children summer camps, and festivals.

l. Discovery Source:

Most visitors found out about the Park through recommendations or by seeing the Park. Museum visitor studies demonstrate that word-of-mouth is one of the most significant channels for influencing people to visit museums, and therefore, adult reference groups have a significant influence on convincing people to visit museums (Kotler, 117). Park media sources make-up 29% of the discovery sources.
3) Art Has No Boundaries Surveys (Cosco 2009):

As part of the Art Has No Boundaries project, NCMA is working with the Center for Universal Design (CUD) and the Natural Learning Initiative (NLI), College of Design, NC State University to conduct a universal design assessment of the Museum Park trail system with a focus on senior citizens, individuals with disabilities, and families with children.

ONLINE SURVEY

Following is a summary of the results from the online survey that Museum members were invited to complete during the end of spring 2008. A total of 884 members in the database responded to the online survey. Of the respondents, 98.8% agreed to participate in the survey, and 1.2% did not agree. The composition of the respondents was made up mostly by the 81.8% with Individual memberships.

a. Gender:

The gender makeup of the respondents was 73.9% female and 21.3% male with 4.9% skipping this question.

b. Age:

The age groups ranged from the highest percent of respondents being 29% 56-65 year olds, followed by 22.3% 46-55 year olds, then 17.4% 66-75 year olds, 13.7% 36-45 year olds, 6.4% 26-35 year olds, 5.3% 75+, and the least from the 1.0% 18-25 year olds.
c. Ethnicity:

The composition of the ethnicity of the respondents was led by the 90.3% White population, with a distant 1.7% Other, 1.1% Hispanic, 1.1% Asian, 0.9% African American, and 4.9% skipped the question.

d. Household Size:

The number of people living in the household was led by the 50.8% with 2 people, then 25.6% with 1 person, followed by the 8.4% with 3 people, 7.4% with 4 people, then least represented in the 2.1% with 5 people, 0.5% with 6 people, 0.2% with 7 people, 0.1% with 8 people, 0.1% with more than 8 people, 4.9% skipped this question.

e. Children in household:

Most respondents (76.5%) had no children in the household, while 18.7% had children, and 4.9% skipped question.

f. Zip Code:

The majority of the survey participants were from a zip code within a 10 mile radius of the Museum. Ten percent (10%) of the survey participants were from the Museum’s zip code – 27612. Less than 1% of members were from distant zip codes.

g. Travel and Origin:

The majority of Park users travel to the Park in a car and come from home.

h. Trail Users:

Park trail users make up 43.7% of the respondents, 51.4% are not trail users, and 5% skipped this question.
i. Reasons for Not Using Trails:

Of the respondents who answered this question who do not use the park trails, 35% say it is too far from home, 26.9% think there is a lack of information about the trails, 23.1% had other reasons, 7.9% don’t have time, 4.1% claimed a health condition, and 2.9% had no interest. Respondents claimed that more trail information, more Park programming, and design would encourage the use of the park trails.

j. Frequency of Use:

The majority of respondents had been to the Park at least a few times in the past year. Only 2% of respondents had not been to the park at all in the past 12 months. 43% had been one or two times. 25% had used it 3 to 5 times, 14% used it 6 to 10 times, 10% had used it 11 to 25 times, 3% had used it 26 to 50 times, 1% had used it between 50 and 100, and 1% had visited it over 100 times.

k. Motivation:

Respondent’s motivation to use the trail included 17.7% for exercise, 16.8% went for nature appreciation, 15.8% went for art appreciation, 14% for relaxation, 3% for pet walking, 1.7% for other reasons, and 31% skipped this question. Eighty-three percent (83%) of Park users visited the Park with friends or family.

l. Trail Activities:

Respondents’ primary activity on the trail included 34.5% walking and hiking, 7% biking, 2.9% jogging and running, 1.2% other, 0.2% rollerblading and skating, and 54.3% skipped this question.
m. Disabilities:

The disabilities mentioned by respondents fall into the following categories 72.3% had none, 7.2% had physical disabilities, 4.8% hearing, 1.3% sight, 0.3% cognitive, 0.1% psychological, 2.9% listed other, and 11.0% skipped this question.

n. Assistive devices:

The use of assistive devices mentioned were 78.8% with none, 3.4% with hearing aid, 3.0% with cane, 0.5% walker, 0.5% with wheelchair, 2.6% listed other, and 11.1% skipped this question.

o. Suggestions:

The suggestions for changes to the trails fell into several categories.

- 12% of suggestions related to signage. Respondents requested mileage signs, clearer and more directional signs (especially on the secondary trails), and they requested that signs be updated (for instance when a road is not closed but a “road closed” sign is in front of it).

- 9% were about bikes. From the pedestrian point of view, respondents requested separating bikes from pedestrians, educating bikers to be more considerate and responsible when encountering strollers and pedestrians. From the biker point of view respondents requested more bike-accessible trails and clearer signage on where bikes are and are not permitted.

- 7% about art. Respondents requested more and “better” art, interactive artwork for children, and artwork more related to nature.

- 7% of respondents requested easily accessible and port-a-potty bathrooms.
- 7% about design. Respondents requested more and better access points, connections between the trails and to other exterior greenways, more secondary trails, and a more definite surface treatment to see the trail clearly.
- 7% about furnishings. Respondents requested more benches, picnic tables, and trashcans.
- 5% about maintenance. Respondents requested removing gravel from the trails, sweeping silt off, and overall surface of the trail upkeep.
- 5% about security. Respondents requested adding emergency call boxes, video surveillance cameras, and security guards in golf carts.
- 5% of respondents requested drinking fountains.
- 4% of respondents requested that the hours the park is open be extended, both earlier and later.

INTERCEPT SURVEY

Following is a summary from the survey conducted with 75 interviews conducted at three trail entrances (44 at the overflow parking entrance, 14 at pond entrance and 17 at bridge entrance) (Cosco 2009). 504 people were counted in 289 observations (111 observations from bridge, 141 from the overflow parking and 37 from pond area).

a. Gender:

   Females made up most of the visitors surveyed at 61%, while 36% were male and 3% were not applicable.
b. Age:

1% of the respondents were less than 15 years old, 8% were between 16-25, 27% were between the ages of 26-35, 18% were between 36-45, 24% were between 46-55, 14% were between 56-65, 5% were between 66-75, 1% were older than 75, and 2% claimed not applicable.

c. Ethnicity:

85% of the respondents were White non-Hispanic, 5% were Asian, 4% were African-American, 2% were Hispanic, 1% were another ethnicity, and 4% claimed not applicable.

d. Museum Membership:

76% of the respondents were not members, 24% were members, and 4% claimed not applicable.

e. Household Size:

Most of the participants (46%) were from a 2 person household, 18% had 1 person, 10% had 3 people, 10% had 4 people, 6% had 5 people, 2% had 6, 2% claimed not applicable, while 7, 8, 9, and 10 were each less than 1% of the respondents. 52% of the respondents reported having no children under the age of 18, while 24% of respondents have children, and 24% claimed not applicable. From the 24% of the respondents with children, 53% had children between the ages of six and twelve, 23% had children between zero and five, and 23% had children between thirteen and eighteen.
f. Zip Code:

The majority of the surveyed participants were from local zip codes, within a 10 mile radius of the Park. Calculated using intersecting streets closest to their home, 19% live less than 2 miles away from the Museum. Most of the participants (36%) live within 2 to 4 miles away, 17% are 4 to 6 miles away, 10% live 6 to 10 miles away, and 19% live more than 10 miles away.

g. Travel and Origin:

The majority of the visitors (75%) came to walk the trails from home, 15% came from work, 7% from other places and 1% from the Museum. Most of the survey participants used a private car to access trails (67%), 12% used their bike to get to the trails, 11% were carpooling, 5% walked or hiked, 2% run, 1% used public transport and 1% skated or rollerbladed.

h. Frequency of Use:

13% of survey participants had never used the trail before. In the last twelve months 28% of respondents had used it 1 to 5 times, 16% had used it 6-10 times, 13% had used it 11-25 times, 9% had used it 26-50 times, 9% had used it 50-100 times, 5% had used it between 100 and 200 times, 4% had used it between 200 and 300 times, and 1% had used it more than 300 times.

i. Motivation:

29% of the survey participants used exercise as a motivation for the trail use, 26% were motivated by nature, 19% were motivated by art installations, 18% were motivated by
relaxation, 5% are be motivated to walk the trails by their dog/pet, 2% use trails as an access to the Museum, and 1% use the trails as transportation.

j. Trail Activities:

Most of the participants (61%) were walking or hiking the trails, 22% were biking on the trails, and 15% were jogging or running.

k. Number of parties accompanying the respondent:

54% of the respondents came to walk the trail alone, 31% were accompanied by adults, 6% were accompanied by children, and 6% were accompanied by both children and adults.

l. Assistive Devices:

88% of the respondents did not have need of assistive devices, 5% claimed not applicable, 2% used hearing aids, 1% used a cane, 1% used a walker, 1% used a wheelchair, and 1% claimed other.

m. Signage:

The overall rating for signage on primary trails was 4.0, on a scale of 1 to 5 (with 5 being the highest score). The overall rating for signage on secondary trails was 4.1.

n. Accessibility:

The average general accessibility rating for primary trails on a scale of 1 to 5 (with 5 being the highest score) was 4.6. The art accessibility rating was 4.7. The average general accessibility rating for secondary trails was 4.5. The art accessibility rating was 4.6.
o. Suggestions:

The most requested improvements include finishing the construction (10%), adding a drinking fountain (9%), improving maintenance (9%), and adding bathrooms (8%).

Other common mentions were regarding the bike trails, artwork, adding more seating, adding mileage markers, and improving signage.

2.4.3 Recreation

The Park offers opportunities for many recreation activities. There is a one mile, paved greenway which connects to the larger City of Raleigh Greenway System that allows for running, walking, and biking. In addition, there is just over one mile of non-paved walking/running trails. The trail system throughout the Park is a good place to walk a leashed dog or push a stroller. There is a large grass field in the Lawn Zone that lends itself to picnicking, throwing a Frisbee or ball, and relaxation. This area also provides a good location for seasonal events such as the Summer Solstice Event.

2.4.4 Tours and Programs

The Museum Park is an important provider of environmental education for public and private schools, summer camps, youth and adult groups and clubs, and the general public. The Museum provides guided educational tours through the Park to introduce visitors to the art and natural areas along the trails. School programs are curriculum-oriented, active, hands-on explorations for groups of up to 30 at a time. Longer visits can be related thematically and include indoor art gallery programs on these subjects:

- Environmental Art (Walk around, over, under and inside the art.)
• Water (Test for pollutants, search for salamanders and design a pond for best management practices.)

• Ecosystems (Discover species adaptations in birds, trees, ferns or wildflowers of forest, field or stream habitats.)

The Museum provides teachers with a PowerPoint Program that introduces the Park. There is also the opportunity for self-guided tours for which the Museum provides a booklet of information about the Park. There is also educational signage throughout the Park which marks points of interest such as art, plants, animals, and ecology. Families are invited to take a tree tour, get to know North Carolina sculptors, play a game of Bird Bingo, read a Dr. Seuss story by the pond, and be a poet with the Museum provided Park Backpacks.

2.4.5 Visual Resources

The Park is divided into four different major landscapes, woodland, prairie, lawn, and contemporary landscape (see Appendix A) (Lappas & Havener 2006). The trail system in the Park moves visitors through these different landscapes allowing for a variety of views. The woodland, which is comprised of large trees and an understory of shrubs, is shaded and cool. Within the woodland, there are also two creeks that add to the visual interest of the Park. The prairie is made of tall grasses and wildflowers and allows for activities such as bird watching. The lawn which stretches from the prairie to the Museum is manicured and maintained as are the contemporary gardens around the Museum. Because the prairie and the lawn contain low vegetation, they allow for views across the Park and into the woodland area.
The elevation changes throughout the Park give visitors different views of the landscape and sculptures. *Gyre* and *Wind Machine* can be viewed from the highest point in the Park, to the southwest, and also from the Museum and parking lot. The sculptures become not only visual destinations but also structures that draw people into the Park. Another benefit of the sculptures is to add visual landmarks. *Crossroads* marks the entry point between the prairie and woodland trail.

### 2.4.6 Interpretive Services

1) There are 7 Park Brochures: 4 art, 1 for park donations, 1 large map, 1 brochure map.

2) There are 58 Signs as of summer 2007- not including city signage (locations shown on Figures 1.21 and 1.22):

   a) 10 art identification signs.

   b) 5 rules, regulations, and map.

   c) 2 map.

   d) 2 caution.

   e) 29 education/interpretive signage.
Figure 1.21: Sign Locations
2.5 Park Administrative Resources

2.5.1 Built Structures

1) Engineer’s Building and Barn Storage:

The 7,200-square-foot Engineers Building houses the HVAC system and electric generators for the Museum’s East Building. The barns are used by DOA for storage and house supplies and equipment including grass seed, turf builder, weed eaters, chain saws and a gator.

2) The Polk Building currently is used for storage of the John Deere lawnmowers and equipment. All the equipment is owned by the Museum and used by DOA. During the
expansion project, the Polk building has also been used as office space for the contractors. There are no other future plans for this 12,000-square-foot building.

3) The grey warehouse (also known as the computer warehouse) on Blue Ridge Road is 10,000 square feet, and is currently being used for Museum storage. There are no other future plans for this building; however, the views overlooking the Park have stirred some desires to convert it into a visitor facility for Park users.

4) The Park Building was transferred from NCSU Veterinary School to the Museum management in 2007. The park staff uses this 2,560-square-foot structure to store Park equipment and tools, and future plans include converting it to the Park Department’s headquarters. The Museum is responsible for paying the utilities of the Park Building.

2.5.2 Lawn and Greenway Care Agreements

1) DOA:

Museum Park and Operations staff work with DOA to properly manage the grounds. (See Section 4.5 for further details.) DOA is responsible for mowing all the grassy areas on site, including the top edge of the prairie, the areas around the Pavilion and Gyre, the Museum Trail sides, the pond, the John Deere Green, the amphitheater and its surrounding grass, and the first five feet off of Blue Ridge Road. DOA also uses weed eaters to maintain the grass in the parking lots, along the entry driveway, and the front sidewalks. DOA is to spay pesticide and herbicide as needed. As of 2008, the Park Department took over trimming the tree limbs in these areas.
Park staff can call DOA to arrange the use of their dump truck or other equipment (e.g. backhoe, Bobcat). DOA will send the equipment along with staff to assist in the project and haul any debris to the designated dump site.

2) City of Raleigh and the Department of Transportation:

DOT maintains the 20-foot corridor on which the House Creek Greenway Trail traverses. Within the greenway corridor, DOT is responsible for litter and debris removal, trail surface cleaning, mowing, application of herbicide, bridge inspection and minor repairs, trail signage repair and replacement, tree maintenance, vandalism, and emergency storm response. See the Memorandum of Understanding between the Department of Cultural Resources and the City of Raleigh in Appendix C for further details.

2.5.3 Easement

The Museum Park contains two easements. One is a Progress Energy power line and the other is a City of Raleigh sewer line (see Figure 1.21). The power line easement is located on the southeastern side of the Museum along the prairie edge, running north to south. The sewer line is along the south side of the property running east to west along House Creek. The pipe eventually runs under Wade Avenue and I-440.

Progress Energy maintains the gravel road under the power line including the culvert at House Creek. The City of Raleigh currently is responsible for mowing and repairing the sewer easement.
Figure 1.23: Easements
2.5.4 Laws/Rules

1) Park Rules and Regulations:

Alcoholic beverages are not allowed in the park or on Museum property except as permitted by the Special Events Coordinator and in compliance with existing Alcohol Beverage Control laws and permits.

Persons bringing pets or other animals into the park shall keep them under confinement or direct control. Leads on leashes used to control animals shall not be more than six feet long. Patrons shall not permit a pet or other animal to remain unattended or create a disturbance or hazard.

Patrons engaged in disruptive, destructive, or hazardous behavior may be warned to cease such conduct or may be instructed to leave the park if the behavior is egregious in the discretion of the security guard, park attendant, or police officer.

Patrons shall preserve the peace and quiet enjoyment of the park by observing all ordinances and state laws governing noise and amplified sound.

Patrons shall not use offensive language, make unreasonable noise, discharge fireworks or weapons, or engage in offensive gestures or conduct that would constitute disorderly conduct under local ordinances or North Carolina law.
Weapons, including firearms of all types, bows, pellet guns, BB guns, or any other device capable of projecting an object that may cause personal injury are prohibited from the park except in the possession of a certified law enforcement officer.

Parking is allowed only in designated areas. No parking is allowed on roadsides or grass areas without direct permission of appropriate park or Museum staff.

Open fires are not allowed.

Overnight camping is not allowed.

No swimming by person or animal is allowed in any pond or other body of water in the park.

Go-carts, mini bikes, all terrain vehicles (ATV), motorized trail bikes, mopeds, or other vehicles that are not solely self-propelled are prohibited.

Bicycles are allowed, but bicyclists must yield to pedestrians at all times. Bicyclists yield to joggers; joggers yield to walkers.

Hitting golf balls is prohibited on park property.
Patrons who fail to follow any of the aforementioned rules of conduct will be asked to leave the park. Failure to leave the park may result in the patron being formally trespassed from the property and could result in the arrest of the patron.

2) Pet Control:

Pet-related regulation for the Museum Park will be consistent with the Animal Control Ordinance of Wake County. Applicable statutes regarding feces collection and leash laws are as follows:

Sec. 12-3001. DIVISION OF ANIMAL CONTROL CREATED; COMPOSITION; RESPONSIBILITY.

The presence of animals at large, stray animals, nuisance animals, and diseased animals within the corporate limits of the City is hereby declared to be a public nuisance. Such animals are a threat to the health of the community and to the safety of persons and property alike. In order to abate and control this nuisance, there is hereby created within the Police Department of the City an animal control division, to be constituted and composed of such sworn officers of the Police Department as the Council and the City Manager may determine. (Code 1959 , §4-1)

Sec. 12-3011. DOGS AT LARGE; DEFECATION ON STREETS AND PRIVATE PROPERTY.

(a) It shall be unlawful for the owner of any dog to allow such animal to be at large in the City or on any City property.
(b) It shall be unlawful for any person owning, harboring, keeping, or in charge of any dog to fail to remove feces deposited by the dog on any street, sidewalk, park or other publicly owned area.

(c) It shall be unlawful for any person owning, harboring, keeping, or in charge of any dog to fail to remove feces deposited by the dog on any private property unless the owner of the property has given permission allowing such use of the property.

(Code 1959, §4-8; Ord. No. 1979-184, 8-21-79; Ord. No. 1982-941, §2, 7-20-82; Ord. No. 1984-307, §2, 3-20-84)

**Sec. 6-65. Cats and dogs at large.**

It is unlawful for the owner of any cat or dog to allow such animal to be at large in the town or on any town property.

(Code 1982, § 4-14; Ord. No. 01-022, § 1, 11-8-2001)

**Sec. 6-3. Definitions.**

Animal under restraint or under restraint means any animal confined within a vehicle; any animal confined, by means of a secure enclosure or an electronic enclosure, within the real property limits of its owner; or any animal secured by leash or lead, cage, bridle or similar physical restraint sufficient to allow the animal to be controlled. Electronic leashes or training collars do not constitute restraint.

At large means any animal found off of the property of its owner and not under restraint or any animal previously determined to be dangerous or potentially dangerous that is not under restraint when off the property of its owner, or is not confined to a secure
enclosure while on the property of its owner. Any animal off the owner's property and on an electronic leash or training collar shall be considered at large.

2.5.5 Access, Traffic (Hwy)

The Park is accessible from Blue Ridge Road by two separate entrances. It is bound by I-440 and Wade Ave, which eventually becomes I-40. I-440, the beltline, runs around the perimeter of Raleigh. The beltline connects to both highway 1 and 64. I-40 takes you to Chapel Hill/ Durham and I-85. Blue Ridge Road dead ends into highway 70 which takes you to Durham.

2.5.6 Facilities

Table 1.3 Park Facilities

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking</td>
<td>1027 (including 445 overflow parking spaces)</td>
</tr>
<tr>
<td>Handicap Parking</td>
<td>24 (6 in Blue Ridge lot, 5 in staff lot, and 13 required in main lot)</td>
</tr>
<tr>
<td>Bus Parking</td>
<td>10</td>
</tr>
<tr>
<td>Museum Toilets/Water Closets</td>
<td>38 male, 61 female</td>
</tr>
<tr>
<td>Amphitheater Toilets</td>
<td>9 female, 4 male + 5 urinals</td>
</tr>
<tr>
<td>Picnic Tables</td>
<td>6 projected for the future</td>
</tr>
<tr>
<td>Benches</td>
<td>5 currently with 5 more projected for the future</td>
</tr>
<tr>
<td>Trash Cans</td>
<td>5</td>
</tr>
<tr>
<td>Recycling Containers</td>
<td>7 projected for the future</td>
</tr>
<tr>
<td>Signs</td>
<td>58</td>
</tr>
<tr>
<td>Pet Waste Stations</td>
<td>3 currently with 1 more projected for the future</td>
</tr>
<tr>
<td>Bridges</td>
<td>4</td>
</tr>
<tr>
<td>Bike Racks</td>
<td>2 currently with 2 more projected for the future</td>
</tr>
<tr>
<td>Spigot</td>
<td>0</td>
</tr>
<tr>
<td>Entrance Kiosk</td>
<td>3 projected for the future</td>
</tr>
</tbody>
</table>
Tables for picnicking sit in the grove of trees beyond the Museum parking lot, near the beginning of the paved Museum Trail. This area is available for lunch or snacks and may be used by individuals, families, and school group visitors. The picnic tables cannot be reserved—they are available on a first-come, first-served basis. They are frequently used by school groups at lunch time Tuesdays through Thursdays.

**2.5.7 Public Facilities and Services:**

1) Fire Department:  Station 14 (engine and rescue)

2) Police Patrol:  Capitol City Police

3) Emergency Aid:  Wake County EMS System and Rex Hospital

4) Potable water:  Falls Lake Reservoir (located within the City of Raleigh and utilizes Raleigh utilities)

5) Sewage:  Neuse River Wastewater Treatment Plant (located within the City of Raleigh and utilizes Raleigh utilities)

6) Solid Waste:  Collected by the City of Raleigh, transported to the South Wake Municipal Solid Waste Landfill (located within the City of Raleigh and utilizes Raleigh utilities)
2.5.8 Service Roads

Figure 1.24: Service Roads
3. OBJECTIVES AND IMPLEMENTATION ISSUES

3.1 Overview

This section outlines the key objectives in the management of natural, cultural, visitor, and administrative resources of the Museum Park. The issues related to achieving these objectives are identified based on current conditions.

3.2 Natural Resources

3.2.1 Objectives

The natural resource objectives of the Museum Park are to protect and preserve the natural environments of the Park, and restore historical ecosystems that are indigenous to North Carolina. The Museum Park is to be responsibly managed as a preserved natural space that is a living laboratory for research.

3.2.2 Issues

1) A natural resource inventory is necessary to properly identify all of the issues pertaining to natural resource management.

2) Invasive species are threatening native habitats throughout the Park.

3) Unleashed dogs disturb the habitats.

4) Off-trail recreation can cause damage to the sensitive habitats and further erosion problems.
3.3 Cultural Resource

3.3.1 Objectives

The Museum Park strives to be a venue for artists to create temporary and permanent works of art integrated into the Park’s landscape and expanding our visitors’ perceptions of both art and nature.

3.3.2 Issues

1) Works of art exposed to natural elements require ongoing maintenance.

2) Structures must be treated and maintained properly.

3) The coordination of maintenance can be difficult in a large institution, when the involved parties have other consistent duties outside of the Park.

4) Although art-in-service projects support the core objective, they are not maintained by the Conservation Department and can deplete Park resources.

5) Limited staff limits the development of programming in the Park.

3.4 Visitor Experiences and Resources

3.4.1 Objectives

The Museum Park visitor resource objectives are to:

1) Maintain and develop an attractive, well maintained place that attracts new audiences to the Museum by encouraging encounters with art through recreation and entertainment.

2) Provide recreational opportunities that minimally impact the environment.

3) Provide educational opportunities that promote environmental stewardship.

4) Provide accessible, user-friendly trails.
5) Develop and implement an education plan for the Park under the Museum’s education department.

6) Create a resource for education through expanded partnerships with educational, cultural, and environmental agencies and institutions.

7) Increase opportunities available to traditionally underserved populations.

8) Create opportunities for public participation in land restoration and management.

9) Expand community development and reach new audiences by providing a unique opportunity for interaction and participation in nature, recreation, and culture.

10) Increase the Museum’s total attendance by reaching a more diverse constituency, and encourage repeat visitation with a variety of trails, changing art, and new programs.

11) Inform and stimulate dialogue about the relationships between art, public space, landscape design, and the natural environment.

12) Improve visitor experiences by providing a clearly marked trail system and providing information on trail length, time requirements, and accessibility.

13) Provide welcome stations at the three Park entry points.

3.4.2 Issues

1) Trails need to be user-friendly and accessible to all visitors.

2) Trail maintenance must be coordinated with DOA and DOT.

3) Visitors create unplanned spurs in usage. Additional trails need to be constructed to improve circulation.

4) Multi-use trails can have visitor conflicts when the trail space is not properly shared.

5) Large groups can overwhelm the capacity in sensitive areas.
6) As the site is being developed, signage and brochures must be updated frequently.
7) Users have requested potable water and restroom facilities to be available in the Park, both costly.
8) Proper maintenance of a large space is difficult with limited staff.
9) Unleashed dogs and owners who do not clean up their dog’s excrement negatively affect other visitors’ experiences.
10) Visitors need to be educated so that they minimize their environmental impact and their impacts on other users’ experiences.
11) Current resources have limited the development of educational programs.
12) Community development and public participation programs are limited by Park staff resources.
13) Clear demarcation of Park grounds to help guide the visitors’ experiences, which could be solved by adding entry stations at each Park entry point.
14) Careful planning and development is required to preserve the Park’s visual resources.

3.5 Park Administrative Resources

3.5.1 Objectives

The Park’s administrative objectives are to establish a cohesive framework within which to operate and ecologically maintaining the Park for visitors, recreation, and informal art viewing.

3.5.2 Issues

1) The maintenance of the site is a cooperative effort with other agencies. Co-management issues must be addressed frequently.
2) More staff is needed to properly manage the site.

3) There are limited funds for operation and the State currently does not contribute to Park operation costs (excluding salaries).

4) Funding is difficult to obtain for both operational assistance and development.

5) Volunteer inquiries and participation is high; however, more assistance is needed to organize, train, and manage the volunteer groups.

6) The number of groups interested in using the Park for educational purposes is growing, and the current Park staff cannot accommodate all of the interested parties.

7) The Park closes at sunset, and trespassing and vandalism occasionally occur after closing.

8) The Park is lacking certain facilities that would enhance user experiences.

9) Enforcement of laws and visitor education is a cooperative effort between State Capital Police, Museum Security, and Park staff.

10) The Park Building along the service road should be properly fitted for operational use.

11) The grey warehouse should be used as an income-generating venue for the Park.

12) Bathrooms are available in the amphitheater, but they are currently only opened upon request, such as during large volunteer events, outdoor concerts and movies.
4. MANAGEMENT PLAN IMPLEMENTATION

4.1 Management Plan Overview

The management plan has been developed as a guide to aid the Park in meeting its stated objectives. This section contains recommendations for the management of the Park’s natural, cultural, visitor, and administrative resources.

4.1.1 Park Experience Zones (see Appendix A)

This section builds on the Recreation Plan developed by Moore and Justice (2007).

1) Purpose:

The Museum Park is designed to provide visitors an alternative environment in which to view art, encouraging the viewer to contemplate art’s relationship to the natural environment. This experience is in stark contrast to viewing art in a built environment. So that the natural environment’s characteristics have the most profound impact on the viewer’s experience, the Park must be carefully planned and managed. To best accomplish this, the development and management of the Museum Park will be guided by distinct setting zones.

The plan envisions three zones characteristic of different points along a continuum, from the built environment to the completely natural. This approach is based, in part, on the Recreation Opportunity Spectrum (ROS), a widely used and accepted public lands planning and management framework (Drivers 1978).

2) Background:

In order to appreciate the zones that guide the development and management of the Museum Park, it is helpful to understand the basics of the ROS. Organizations such as the USDA Forest Service and Bureau of Land Management have used the ROS framework for over two
decades to offer recreation opportunities that best fit the purposes of their land areas and to balance recreation uses with other uses of those lands (Drivers 1987). The ROS framework considers different attributes of the recreation setting that affect visitors’ experiences. These attributes are grouped into three categories: Physical, Social, and Managerial (Drivers 1987).

Due to the unique purposes of the Museum Park, we will add a fourth category: Artistic.

The Physical category encompasses the entire biophysical environment—everything from flora/fauna to topography to recreation facilities (Drivers 1987). The Social category is comprised of aspects related to visitors and their use (Drivers 1987). The Managerial category consists of the Park rules and regulations as well as security, staff, maintenance, and equipment (Drivers 1987). Lastly, the Cultural category includes the art installations and projects located in the Park (Drivers 1987). This includes aesthetic considerations, what feelings art encounters brings about in a visitor, and how it draws visitors into the natural environment.

3) Goals:

The Museum Park offers a wide variety of experience opportunities. Some of these are recreational in the traditional sense and others are not. It is therefore critical to consider each of the four categories of attributes for each park zone. The zones will be used to guide Park development and management while facilitating the goals of the Museum Park. These goals include:

a. To restore and develop the site as a natural resource.

b. To integrate works of art into the landscape.
c. To create a laboratory for new projects exploring relationships among the visual arts, architecture, landscape, and visitors.

Developing and managing the Park in accordance with the proposed zones will help accomplish these goals by:

d. Providing a context to guide the physical, managerial, social, and artistic settings including future development, allowable activities, management strategies, art installations, etc.

e. Allowing visitors to select the most appropriate setting to guide their experiences they wish to have.

f. Increasing the diversity of nature and art-oriented experiences available at the Park, thereby maximizing visitor satisfaction and the overall benefits that the Park generates for the community.

4) Setting Zones (see Appendix A):

The three setting zones in the Museum Park are:

- The Active Use Zone
- The Reflective Zone
- The Nature Refuge Zone

As suggested by the names, the Active Use zone will be the most developed and the Nature Refuge zone the most natural and least developed. Each of the three zones will be described below in terms of the categories of setting attributes introduced above (i.e. physical, social, managerial, and artistic).
a. Active Use Zone:

Active Use zones will be the most modified areas of the Park. They will contain facilities that encourage and enable considerable visitor use and travel, as well as the most varied experiences. The primary aim of these areas is to provide a wide variety of opportunities for a large number of people to experience art in a natural outdoor area. Another important aim of the Active Use areas is to draw traditional Museum users into the Park and to draw people who currently do not visit the Museum into the Park in hopes that the art they experience there will motivate them to visit the Museum at some point as well. Although this is an important objective of the entire Park, it is a particular emphasis of Active Use zones because they will be the most accessible, most heavily used, and the closest in proximity to the Museum itself. In terms of specific attributes, the following will be most consistent with the Active Use zones of the Park:

i. Physical Attributes:

Trails surfaced in pavement, concrete, or other hard materials make the areas easily accessible to the largest numbers of visitors of all levels of fitness and abilities; maintained / manicured lawns and gardens; facilities that provide comfort (e.g., benches, the pavilion) and opportunities for viewing, enjoying and appreciating the area. Specific areas of the Park within this zone include the pond, John Deere Green (festival lawn), amphitheater, Museum Green Trail, House Creek Greenway, and the Reedy Creek Pedestrian Bridge as well as the garden areas and future courtyards near the Museum buildings. Materials used and scales of facilities should still be consistent with a natural area.
ii. Social Attributes:

Use is concentrated in this zone due to the amphitheater, gardens, a high density of art installations, and the paved trails. The variety of things that visitors are doing will also be the most diverse in these areas.

iii. Managerial Attributes:

Park management presence will be more obvious in Active Use zones than in the other two. It will be more common to see staff members and security personnel here. Signs explaining Park rules and other managerial information will be located in these zones whenever possible. Gators and other motorized vehicles may be used to patrol these areas of the Park, but will stay primarily on the paved trails.

iv. Artistic Attributes:

Art projects and installations within this zone may be created with a variety of materials, natural and non-natural. The installations should evoke feelings of connection to nature and surrounding community. Density of art installations in this zone may be high relative to the other areas of the Park. Art installations in the Active Use zones currently include: *PICTURE THIS* by Barbara Kruger, Henry Smith-Miller, Laurie Hawkinson, and Nicholas Quennell; *Wind Machine* by Vollis Simpson; *Gyre* by Thomas Sayre; Benches, bicycle racks, and sign supports by Al Frega; *Crossroads* by Martha Jackson-Jarvis; *Wind Machine* by Vollis Simpson; *Collapse I* by Ledelle Moe.; *Invasive* by Steed Taylor.
b. Reflective Zone:

Reflective zones are less modified and more natural than Active Use zones. Human presence and influence is much less common and more subdued here than in Active Use zones. The primary aim of the Reflective zones is to draw park users from the Active Use areas into a more natural setting for more nature-oriented experiences. These areas are designed and managed to allow visitors to reflect more on their natural surroundings and their place in the varying environments of the Park. Reflective zones and their art installations should encourage feelings of mystery, discovery, and a connection between the built and natural environments as well as personal reflection on these themes. The following attributes will be most consistent with the Reflective zones of the Park:

i. Physical Attributes:

Trails with natural surfaces (e.g. crushed limestone, wood chips) are the only recreational facilities seen in the Reflective Zone, although benches may be available occasionally as needed. The trails have close proximity to flora, are deeper within the Park, and are quieter. Specific areas of the Park within this zone include the Woodland Trail, Prairie Trail, and the Upper and Lower Prairie. Other impacted areas within this zone should be restored.

ii. Social Attributes:

Levels of use in this zone are lower than in the Active Use zones, and there is less variety in terms of human activities as well. Visitors use the Woodland Trail to access the current art installations; art and environmental education activities may occur as well.
iii. Managerial Attributes:

Park management presence is less obvious here. There is signage related to wayfinding and art installations. Gators and other motorized vehicles should be used in Reflective zones only in emergencies and bicycles are prohibited.

iv. Artistic Attributes:

Art projects and installations within this zone may be created to evoke feelings of connection to, or comment on nature and a sense of place in the natural world. Park visitors should feel the art draws them away from the built environment and into the natural world through creative use of shapes, colors, sounds, textures, etc. Art installations in the Reflective zones may be placed on the periphery of the zone where it meets the Nature Refuge zone so as to draw the visitors’ attention and awareness into the Nature Refuge zone without physically drawing the visitors into Refuge areas. Density of art installations in the Reflective zones should be relatively limited in number and installations should be more widely separated from one another than in Active Use areas. Art installations in this zone already include: To see Jennie smile by Steven Siegel, and Cloud Chamber for the Trees and Sky by Chris Drury, and Untitled by Ledelle Moe.

c. Nature Refuge Zone:

Nature Refuge zones are undeveloped and generally off limits to recreation use. Their primary purpose is to provide space for natural processes to take place unhindered by the activity of humans. Healthy vibrant ecosystems should be maintained and, as necessary, restored in these special areas. These zones are critical to the health of the
Park ecosystem and should be managed with this in mind. Park visitors should be made aware of this philosophy and approach through creative, low impact educational materials and programs.

i. Physical Attributes:

Nature reigns supreme in the Nature Refuge areas of the Park. These zones are havens for animals and native plant species; and no development (including trails) is appropriate here. There may be sensitive habitat, rare or endangered species, fragile stream banks, restoration areas, etc. Specific areas of the Nature Refuge zone include most streambeds and banks and the steep banks at the edge of the Park near I-440.

ii. Social Attributes:

Visitors should feel appreciation for these zones, but from a distance. Because of their ecological significance and fragile nature, human use will generally not be permitted. However, these areas will typically be pointed out to visitors and interpreted for them through signs, artists’ interventions and other educational efforts so they understand and better appreciate these areas and their surroundings. Very light use for museum-guided education purposes is appropriate in some parts of the Nature Refuge zone. Other appropriate reasons for people to enter these zones include flora/fauna inventory, soil/water testing, and other scientific research when approved and monitored by appropriate Museum staff.

iii. Managerial Attributes:

The only managerial presence in these areas will be related to ecosystem restoration and protection. Motorized equipment and vehicles are prohibited.
iv. Artistic Attributes:

Art will almost never be installed in Nature Refuge areas, although carefully conceived art interventions at carefully selected sites along the edges of the Reflective Zone can serve to pull people’s attention to the Refuge area. Art installations might be considered within the Nature Refuge if they contribute to the primitive natural character of the area and enhance those experiences that can be enjoyed from outside the Refuge looking in. In such cases, installations may be created with the intent of creating virtually no impact on the natural environment.

4.2 Natural Resources Management

4.2.1 Resource Management Program

Natural resources are managed by allowing natural environments to evolve through natural processes with minimal influence from human activities. However, there are times when intervention is necessary to maintain the ecological integrity of the Park. The Division's stewardship goal, adopted by the Museum Park, is to manage the natural and cultural resources of the parks in a systematic, consistent, and professional manner that places resource protection above exploitation. Stewardship may include prescribed burns, exotic plant management, planting guidelines, and nuisance animal management. Resources are available on the web at: http://www.ncparks.gov/About/natural_resources_stewardship.php

4.2.2 Exotic Species

Exotic plants are those that have been introduced, either intentionally or by accident, into areas outside their native range. Exotic plant species often out-compete native species because they are aggressive in their growth habits, produce more seeds that last longer in the
soil, or have no natural predators or diseases in the ecosystem that they are invading. Some of these exotic plant species can severely affect the natural resources of the parks. The Division's long-range goal is to control and/or eliminate those exotic species that present the greatest threats to the native flora.

To address this problem, the division has produced exotic plant guidelines to provide technical information for the successful control of invasive exotic plant species. These guidelines cover the control of invasive, exotic plant species currently found in the park. In addition, Appendix C, contains the Monitoring Report for recording exotic species found within the Park.

1) Goals:

- Reverse the trend of degradation caused by invasion.
- Minimize the negative alteration of natural communities.

2) Objectives:

- Identify and eradicate invasive exotic species form the Museum Park.
- Prevent further invasive by exotic species.

3) Priorities:

- Prevent new infestations.
- Target the existing problems that are the fastest growing and spreading.
- Target species that are the most disruptive to natural ecosystems.
- Monitor for new threats and stopping them before the new species becomes established.
4) Control Methods:

Physical Control- prescribed burns, mowing, restoration of hydrological function, cutting, pulling, girdling, and other methods that physically remove or weaken the invasive species, promoting successful regeneration of native species. Due to the location of the Museum Park Preserve, burning is not an option at this time. Though, in the future, it would be beneficial to introduce a fire regime into at least the prairie. Mowing can be used to supplement burning in controlling the invasive species within the prairie. Cutting and girdling should be used in areas where mowing is not an option or in sensitive areas where control is on a species basis. Hand pulling should only be used on young shoots in small patches due to the disturbance to the soil composition.

a. Biological Control:

Biological control uses the natural enemies and competition of a species to control its population. In all cases, the predators should be host specific to avoid in negative impacts on non-targeted species. This method should only be performed under strong regulation and supervision by the USDA or a research institution.

b. Chemical Control:

Pesticides should only be used in severe cases. Herbicides should be used to control large populations of invasive plant species. This is the most cost effective method of control with the greatest results. All herbicides should be used in accordance to the label.
4.2.3 Planting Guidelines

It is advised to use only native plants for landscaping and restoration projects. The purpose of this is to showcase the natural diversity of plants found in North Carolina and to avoid the inadvertent introduction of invasive, exotic plant species to the parks. In addition, all seed and nursery stock should come from a local source.

1) Goals:
   - Improve and enlarge habitat for native plants and animals.
   - Reintroduce site specific native vegetation.

2) Objectives:
   - Restore natural biodiversity.
   - Promote conservation awareness and education.
   - Enhance plant communities with an appropriate density and composition of plant species.
   - Plant native seed and plants of local origin.

3) Seed and Plant Sources:
   - Ernst Seed Company
   - Mellowmarsh
   - Self collected seeds from local sites

4) Site Preparation:

   Information in this section came from Bonnie Appleton and Susan French, Virginia Tech, 2009.
Dig shallow planting holes two to three times as wide as the root ball. Wide, shallow holes encourage horizontal root growth that trees and shrubs naturally produce.

In well-drained soil, dig holes as deep as the root ball. In poorly-drained heavy clay soil, dig holes one to two inches shallower than the root ball. Cover the exposed root ball top with mulch.

Don’t dig holes deeper than root balls or put loose soil beneath roots because loose soil will compact over time, leaving trees and shrubs planted too deep. Widen holes near the soil surface where most root growth occurs. Score walls of machine-dug (auger, backhoe) holes to prevent glazing.

Backfill holes with existing unamended soil. Do not incorporate organic matter such as peat moss into backfill for individual planting holes. Differences in soil pore sizes will be created causing problems with water movement and root growth between the root ball, planting hole, and surrounding soil.

Backfill half the soil, then water thoroughly to settle out air pockets. Finish backfilling, then water again. Cover any exposed root ball tops with mulch.

Incorporate slow-release granular fertilizers into backfill soil to provide nitrogen, or if a soil test indicates a need for phosphorus or potassium. Avoid using fast-release agronomic fertilizers that can dehydrate tree roots. Use no more than 1# actual nitrogen per 1,000 ft. of planting hole surface. (Example - if using 18-6-12 with a 5’ diameter hole, incorporate 0.3 oz. per planting hole.)
5) Tree and Shrub Preparation:

Information in this section came from Bonnie Appleton and Susan French, Virginia Tech, 2009.

Closely inspect the wrapping around root balls of B&B (baled and burlapped) trees and shrubs. Growers use many synthetic materials, as well as burlap treated to retard degradation, to wrap root balls. Many of these materials will not degrade. To ensure root growth into surrounding soil, remove pinning nails or rope lacing, then cut away or drop the wrapping material to the bottom of the planting hole, backfilling over it.

Wire baskets used to protect root balls degrade very slowly underground. Remove the top 8-12 inches of wire to keep equipment from getting caught in wire loops, and surface roots from girdling.

Remove all rope, whether jute or nylon, from trunks. Again, degradation is slow or nonexistent, and ropes can girdle trunks and roots.

Remove plastic containers from container-grown trees and shrubs. For plants in fiber pots, break away the top or remove the pot entirely. Many fiber pots are coated to extend their shelf life, but this slows degradation below ground and retards root extension.

If roots are circling around the root ball exterior, cut through the roots in a few places. Cutting helps prevent circling roots from eventually girdling the trunk. Select trees grown in containers with vertical ribs or a copper treatment on the interior container wall. These container modifications and treatments minimize circling root formation.
6) Tree Care Post Planting:

*Information in this section came from Bonnie Appleton and Susan French, Virginia Tech, 2009.*

Remove tags and labels from trees and shrubs to prevent girdling branches and trunks.

Good follow-up watering helps promote root growth. Drip irrigation systems and water reservoir devices can facilitate watering.

Mulch, but don’t over mulch newly planted trees and shrubs. Two to three inches of mulch is best - less if a fine material, more if coarse. Use either organic mulches (shredded or chunk pine bark, pine straw, composts) or inorganic mulches (volcanic and river rocks).

Keep mulch from touching tree trunks and shrub stems. This prevents disease and rodent problems if using organic mulches, and bark abrasion if using inorganic mulches.

Don’t use black plastic beneath mulch around trees and shrubs because it blocks air and water exchange. For added weed control, use landscape fabrics that resist weed root penetration. Apply only one to two inches of mulch atop fabrics to prevent weeds from growing in the mulch.

Only stake trees with large crowns, or those situated on windy sites or where people may push them over. Stake for a maximum of one year. Allow trees a slight amount of flex rather than holding them rigidly in place. Use guying or attaching material that won’t damage the bark. To prevent trunk girdling, remove all guying material after one year.

Most trees should not have their trunks wrapped. Wrapping often increases insect, disease, and water damage to trunks. Thin-barked trees planted in spring or summer into hot
or paved areas may benefit from wrapping if a white wrap is used. To avoid trunk girdling, do not attach wraps with wire, nylon rope, plastic ties, or electrical tape. If wraps must be used, remove within one year.

For protection against animal or equipment damage, install guards to protect the trunk. Be sure the guards are loose-fitting and permit air circulation.

Figure 1.25: Planting Guideline

(Bonnie Lee Appleton, Extension Specialist and Susan French, Extension Technician, AREC, Hampton Roads; Virginia Tech, 2009)
4.2.4 Scientific Research

It is recommended that Museum Park management decisions be based on up-to-date, scientifically sound information. To accomplish this goal, it is essential that the Museum staff continue to work with universities and other research based institutions to provide pertinent information. In order to standardize the process, a formal proposal must first be completed by the researcher and then accepted by Museum staff in order to conduct any research on the Museum grounds. This form is provided as an Appendix C, section 7.3: Scientific Research. It is pertinent that the Museum Park Manager receive a copy of the completed research. This should be enforced with a signed contract.

Research plans are needed and the Resource Management Program has identified the following as research priorities: 1) baseline inventories of each park's resources; 2) long-term monitoring studies and 3) long-term cooperative research agreements to ensure continued research.

1) Baseline Inventories of Park Resources:

The Museum Park has a need for a standardized, systematic inventory of the park's plant and animal species; soils, water and air quality; and natural communities. High priority needs include complete zoological and botanical inventories, vegetation and habitat type mapping, the location and condition of rare species, and the location and condition of cultural resources.

a. Long-term Monitoring Studies:

By periodically updating a park's baseline inventory information, these repeated measurements of important biological indicators provide the most objective method with
which to: 1) define the present and future conditions of a park's natural resources; 2) detect or predict changes in the condition of a park's natural resources; and 3) diagnose abnormal conditions in time to develop effective mitigation measures. Used in combination with inventory data, these studies can provide scientifically credible parameters on which to base management decisions.

b. Long-term Cooperative Research Agreements:

The development of long-term cooperative research agreements will be essential to monitoring the Museum Park’s natural resources. Through the Partnership for Art and Ecology, professors and students at NCSU having specialized expertise in a variety of fields can work to coordinate appropriate research projects within the Park. These collaborations would be intended to produce a scientifically sound basis for planning, development and management decisions.

4.2.5 Management Philosophy

Before this area was donated to the NC Museum of Art, it was occupied by Polk Correctional Institution followed by the NC State Veterinarian School. In the past, many of the sites were farmed or grazed which left the land degraded. Due to the long history of human induced disturbance, there is not a known time period for this site to use as a trajectory. Therefore, Park staff should focus on restoring these areas to provide a variety of high quality natural areas that represent the North Carolina Piedmont.

An ecosystem management approach should be used to manage the Museum. This is a holistic method to not only maintain healthy ecological conditions to ensure plant, animal, ecosystem viability but to address the relationship between humans and the environment.
The park is designed to encourage visitors to experience art and ecology through recreation, entertainment, and research in different environments. The Museum Park is composed of three distinct environmental zones based on their experiential qualities. The park transitions from a built zone in the northwest corner of the park to an expansive lawn and prairie in the center which flows into the woodland zone that stretches to the south and east boundaries of the park. Throughout the prairie and woodland zones, restoration efforts will substitute naturally occurring processes to enhance the natural communities. These restored ecosystems will also provide a space and inspiration for artistic expression while maintaining the outdoor environment. Disturbance to these communities may happen with art installation, learning workshops, scientific research, etc. Efforts should be made to rebuild these sites when needed. However, access to the most ecologically sensitive areas within the park, such as steep slopes and creeks, should be restricted to only research and maintenance.

Due to the past uses of the Park, the heavy disturbance and abandonment of the old fields caused exotic species to quickly invade the area. Due to this, the park is currently heavily infested with exotic invasive species. Unfortunately, the eradication of all exotic species is too costly and infeasible. At this point, some species such as kudzu and Japanese stiltgrass, are beyond eradication, but measures should be taken to contain the invasion within the already invaded area. Priorities should be given to species were elimination is feasible. In addition, some exotic species are currently not a threat to ecological function, but others cause harm to important natural processes and should be a primary focus of management.
Given the extensive problem with exotic species, the most important management strategy for the park is exotic species invasion prevention. Exotic species can inhabit both high quality areas as well as recently disturbed sites. There are four main methods of preventing new infestations; 1) monitor sites on a regular basis, 2) only plant native species, 3) minimize disturbance and 4) educate surrounding neighbors about exotic species and encourage them to plant natives. A monitoring schedule for all management sections in the park should be developed. At the very least, all sites should be inventoried and infestations recorded on an annual basis. In addition, once exotic species are found, measures should be taken to control the species before the species spreads. The second preventative measure should the planting of native species. The park should preferably only plant species native to the North Carolina Piedmont from a local seed stock as to receive the most prolific genetic varieties for this region. Thirdly, there should be minimal disturbance to the land when practicing restoration or construction. With the increase of space and light, exotic invasive species tend to be the pioneer. Therefore, the minimum amount of bare land should be exposed during such events as restoration efforts and art installations. Lastly, and most importantly, visitors and neighbors should be educated on the harms of exotic species. Educational workshops and materials should be developed to help educate people on this issue. Programs should be set up to encourage native landscaping. This could be accomplished in conjunction with the City of Raleigh or other organization.

Principles:

1) Always plant native, local species that are appropriate for each site
2) Always encourage naturally occurring native species
3) Sustainable practices should be used throughout the park preserve

4) Promote the park as a living laboratory for scientific research

5) When possible utilize volunteers for restoration and maintenance

Exceptions:

1) Native plants such as blackberry and poison ivy may be removed to improve visitor experience

4.2.6 Management Zones

The following management zones have not been properly inventoried for either natives or exotic invasive species. Therefore, the management prescriptions are basic guides and not complete. There are other potential exotic invasive species within these areas such as Tree-of-heaven (*Ailanthus altissima*), Silk tree (*Albizia julibrissin*), Garlic mustard (*Alliaria petiolata*), Porcelainberry (*Ampelopsis brevipedunculata*), Chinese lespedeza (*Lespedeza cuneata*), and Wisterias, exotic (*Wisteria floribunda* and *sinensis*). The management of these species should be addressed when found within the landscape.


1) Priority One: (to be accomplished in next 1-5 years)

   Zone 1: Prairie

   Zone 5: Sewer Easement
Zone 9: Woodland

Zone 16: Woodland within Lawn

2) Priority Two: (to be accomplished in next 5-7 years)

Zone 3: Tributary/ North-facing Slope

Zone 6: Sewer Easement to I-40

Zone 8: West Side of House Creek

Zone 10: Opening in Woodland

Zone 11: Pinetum

3) Priority Three: (to be accomplished in next 7-10 years)

Zone 2: Tributary

Zone 4: House Creek

Zone 7: Sewer Line to Pedestrian Bridge

Zone 12: Southwestern Woodland

Zone 13: Wade Avenue

Zone 14: Old Prison Site

Zone 15: Park Maintenance Facilities
4.2.7 Priority One Management Zones

1) Zone 1: Prairie (see Figure 1.27)

a. Goals:

- Eradicate invasive species.
- Maintain control of blackberry and callery pear.
- Maintain as a piedmont prairie.

b. Actions:

- Mow and spray blackberries and callery pear on a yearly cycle for 5 years, then continue control on a 3 year cycle.
- Remove fescue and other invasive herbaceous vegetation.
- Reseed with a native seed mix of 50-70 species of prairie grasses and forbs from a local seed source.
- Monitor on a yearly basis.

c. Management:

Meredith Woods Subdivision Encroachment:

To help control the encroachment by Meredith Woods Subdivision homeowners, delineate a clear boundary between the Park boundary and the subdivision. This could be accomplished with fencing or planting. This edge needs to be well designed and executed due to its proximity to homes and Museum.
Old Trail:

Remove the old trail located on the southern end of the prairie (Figure 25). See section 4.2.7.1d for specifications on trail removal. In addition, move the sign which is located along this closed trail to a different location.

Prairie Conversion and Maintenance:

Year One

January- Mow the prairie with a Bushhog. Spot treat callery pear by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

March-May- Spot treat callery pear by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

Year Two

January-February- Either foliar apply triclopyr (Garlon 3A®) at a rate of one gal/acre with a gooseneck attachment on a tractor, or use the Brown Brush Monitor and mow and then apply triclopyr (Garlon 3A®) at a rate of one gallon/acre. If foliar sprayed, mow the prairie at minimum of one month after herbicide application.

March-May- Spot treat callery pear and blackberry by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).
Year Three

January-February- Either foliar apply triclopyr (Garlon 3A®) at a rate of one gal/acre with a gooseneck attachment on a tractor, or use the Brown Brush Monitor and mow and then apply triclopyr (Garlon 3A®) at a rate of one gallon/acre. If foliar sprayed, mow the prairie at minimum of one month after herbicide application.

March-April- Spray or mow and spray the prairie with imazapic (Plateau®) on 6” high tall fescue. Use 4 oz of Plateau® plus 1 quart of methylated seed oil (MSO) per acre. If blackberries have started to re-sprout, use a mixture of imazapic and glyphosate (4-12 oz of Plateau®, 1 quart of Roundup, and 1 quart of MSO per acre or Journey®). Only use glyphosate if native warm season grasses (NWSG) have yet to emerge. If NWSG have emerged, spot treat blackberry and callery pear by foliar or stump spray with glyphosate (Roundup®) or triclopyr (Garlon 3A®).

Plant prairie seed mix of 40-70 species consisting of 60-70% graminoids and 30-40% forbs (dependent on availability of Ernst Seeds- NC Piedmont Ecotype) with a Truax, Nesbitt, or Tye Native Seed Drill. Plant seeds 1/4 - 1/2” deep. On average use 10-15lbs of PLS per acre. (See Appendix D)

May-October- If cool season grasses, such as tall fescue, start to take over, mow prairie just above the height of the NWSG.
October-December- If needed, spot treat callery pear and blackberry by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

*Year Four*

January-February- Mow the prairie to a height of 6 inches.

March-April- If cool season grasses begin to emerge, spray the prairie with imazapic (Plateau®) on 6" high tall fescue. Use 4 oz of Plateau® plus 1 quart of methylated seed oil (MSO) per acre. Replant bare areas with a prairie seed mix of 40-70 species consisting of 60-70% graminoids and 30-40% forbs (dependent on availability of Ernst Seeds- NC Piedmont Ecotype) by broadcasting or Native Seed Drill (for large areas).

October-December- If needed, spot treat callery pear and blackberry by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

d. Trail Conversion:
To convert old trails to prairie, first rip the soil with a ripper plow to a depth of 8-10 inches. This will increase soil drainage by increasing the amount of micropores. It will also loosen the soil to allow for root penetration. Immediately after ripping, plant the trail with the native prairie mix using a native seed drill as described in the previous sections. After seeding, continue to treat this area as part of the prairie and follow the above prescriptions.
Zone 1a) Alley of Trees

According to the surveys conducted by Cosco 2009, shade is needed throughout the park to accommodate a more diverse group of users. Plant an alley of deciduous trees through the prairie along the House Creek Greenway for addition shade. Plant only native site appropriate tree species. Follow the planting guidelines in section “4.2.3 Planting Guidelines.”
Figure 1.27: Zone 1: Prairie
2) **Zone 5: Sewer Easement** (see Figure 1.28)

a. Goals:
   - Eradicate fescue and other exotic grasses.
   - Maintain as a wet piedmont prairie.

b. Actions:
   - Develop an invasive species removal regime.
   - Seed easement with a native wet prairie seed mix from a local seed source.
   - Mow easement on a yearly basis.

c. Management:

   The sewer easement is typically mowed by the city of Raleigh on a three-year cycle. We recommend the Museum Park staff take over the full management, including mowing, of the sewer easement in order to promote native warm season grasses.

   Due to the wetness of the easement, use only walk behind or hand held equipment for management efforts. Supervised volunteers could convert and maintain the sewer easement, not including the application of herbicide.

**Drainpipe:** (see Figure 26)

The drainpipe which is located under House Creek Greenway at the sewer easement is a hazard due to the adjacency of a steep slope and acute bend in House Creek Greenway. The drainpipe currently drains into a depression of rock which is then fed into another pipe just a few feet from the other pipe. These two pipes should be connected and the depression filled in with soil. Ultimately, the City of Raleigh should realign this section of greenway.
**Conversion Plan:**

*Year One - 2008/2009*

December-February- Plant wet species plugs along the edge of the 30’ easement. Use shrub and herb species which can handle being mowed on occasion.

March-April- Spray imazapic (Plateau®) at a rate of 4 oz/acre to kill cool season grasses planted in the easement.

Using volunteers, broadcast native, wet warm season grasses, see plant list, throughout the easement with a walk behind seeder. To ensure proper coverage, two passes at right angles to each other should be made with the spreader. On average, plant 40 seeds per square foot.

If hand broadcasting, on average, it takes 10 people about 3 hours to seed 40 acres. That is one person for about 45 minutes per acre. Once the seeds are cast, incorporate them into the soil at a very shallow depth using a rake. After the seeds are incorporated into the soil at the appropriate depth, firm down the soil with a walk behind roller filled with water to ensure proper seed to soil contact.

September-October-

Using volunteers, broadcast native, wet warm season grasses, see plant list, throughout the easement with a walk behind seeder. To ensure proper coverage, two passes at right angles to each other should be made with the spreader. On average, plant 40 seeds per square foot.

If hand broadcasting, on average, it takes 10 people about 3 hours to seed 40 acres. That is
one person for about 45 minutes per acre. Once the seeds are cast, incorporate them into the soil at a very shallow depth using a rake. After the seeds are incorporated into the soil at the appropriate depth, firm down the soil with a walk behind roller filled with water to ensure proper seed to soil contact.

*Year Two* 2009/2010

December-February- Plant wet plant species plugs along the edge of the 30’ easement. Use shrubs and herbs species which can handle being mowed.

March-April- Spot treat cool season grasses with imazapic (Plateau®) at a rate of 4 oz/acre.

September-October-

Using volunteers, broadcast native, wet warm season grasses, see plant list, in bare spots throughout the easement using a walk behind seeder. To ensure proper coverage, two passes at right angles to each other should be made with the spreader. On average, plant 40 seeds per square foot. If hand broadcasting, on average, it takes 10 people about 3 hours to seed 40 acres. That is one person for about 45 minutes per acre. Once the seeds are cast, incorporate them into the soil at a very shallow depth using a rake. After the seeds are incorporated into the soil at the appropriate depth, firm down the soil with a walk behind roller filled with water to ensure proper seed to soil contact.
Maintenance Plan:

Mow the easement on a three-year cycle. Only mow when the easement is dry enough to not damage the soil structure or the vegetation. Ideally, the area would be mowed late winter after seed fall. This timing may need to be adjusted to correlate with drier soil.

In either the spring or the fall, replant bare spots with native, wet warm season grasses. Always use a walk behind or hand held seeder to broadcast the seeds. Follow the seeding technique explained in the Conversion Plan.

If cool season grasses emerge, spot treat them with imazapic (Plateau®) at a rate of 4 oz/acre in March or April.

Continue to plant wet shrub and tree species plugs along the edge of the easement in late winter. Some species can be mowed along with the grasses, see plant list. To reduce the “edge effect” along the easement, thin or mow, depending on the species, the trees and shrubs to allow for views into the wooded areas. These vistas should be selected to ensure visual interested along the trail. Special attention should be paid to the wooded areas along the creek. Limit and in some cases prohibit access to the creek, except for maintenance, by planting vegetation barriers. Some vistas overlooking the creek could be added if access is blocked.
Figure 1.28: Zone 5: Sewer Easement
3) **Zone 9: Woodland** (see Figure 1.29)

a. Goals:
   - Eradicate invasive species.
   - Protect the tulip poplar and loblolly pine.
   - Maintain safe walking trails.

b. Actions:
   - Develop an invasive species removal regime.
   - Move trail away from the root system of the champion tree.
   - Build a bridge where trail crosses drainage area.
   - Remove hazardous vegetation from trail edge.

c. Management:

   *First, remove the following exotic species from this area:* *Hedera helix* (English ivy) on tree trunks, *Ligustrum sinesis* (Chinese privet), *Rubus argutus* (blackberry- native), *Lonicera japonica* (Japanese honeysuckle), *Nandina domestica* (heavenly bamboo) starting west of cloud chamber, *Vinca spp* (periwinkle) around and on top of cloud chamber, *Liriope spp* (monkey grass), *Mahonia belaei* (Oregon grape), *Toxicodendron radicans* (poison ivy-native), *Microstegium venium* (Japanese stiltgrass) around untitled sculpture, and *Elaeagnus umbellate* (autumn olive).

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used.
Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

  Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English Ivy.

  Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy. Only treat poison ivy along the trail edge where it could potential harm park users.

  When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.
- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.
• *Rosa multiflora* (multiflora rose):

  Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution of glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be effective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

• *Pyrus calleryana* (callery pear), *Mahonia bealei* (Oregon grape), and *Rubus argutus* (blackberry):

  Between March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

• *Liriope spp.* (monkey grass) and *Vinca spp.* (periwinkle):

  These species are in small amounts in this area and should be hand pulled.

**Large Trees:**

Currently, the Woodland Trail is too close to the roots of a very large *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tulip poplar). The trail should be moved to at least outside of the drip line of these trees’ canopies.

**Trail Placement:**

Place trails in non-sensitive areas, away from steep slopes, and out of drainage ways within the woodland.
Figure 1.29: Zone 9: Woodland
4) Zone 16: Woodland within Lawn (see Figure 1.30)

a. Goals:

- Eradicate invasive species.
- Develop bird watching area.
- Maintain trail edges.

b. Actions:

- Develop an invasive species removal regime.
- Plant native plant species to attract birds.
- Clear trail edges of gravel and plant.
- Reface hills along trails and reseed.

c. Management:

**Exotic Species Removal:**

The exotic invasive species which exist in this area are *Hedera helix* (English ivy) and *Toxicodendron radicans* (poison ivy-native), *Elaeagnus umbellata* (autumn olive), *Ligustrum sinensis* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), *Pyrus calleryana* (Callery/Bradford Pear), *Rubus argutus* (blackberry-native) and *Lolium arundinaceum* (tall fescue) on sides of trail.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

  Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided
control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy.

When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.

When treating poison ivy, take precaution and close down section of trail in which work is being done. Also, long sleeves, long pants, gloves, and a mask should be worn to protect workers from the poisonous sap. This should not be done with volunteers.

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used. Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

  A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4- D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.
• *Ligustrum sinense* (Chinese Privet):

Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, for better absorption by plant.

Seedlings and saplings can be hand-pulled. When hand-pulling, care should be given to reduce soil disturbance.

• *Lonicera japonica* (Japanese Honey Suckle):

Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second
growing season, as plants can recover from herbicide application. Repeat treatments will be necessary to maintain control of this species.

- *Pyrus calleryana* (callery pear) and *Rubus argutus* (blackberry):
  
  March-May - Spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®). Repeated applications will be needed for both blackberry and callery pear.

- *Lolium arundinaceum* (tall fescue):
  
  March-April - Spray sides of the trail with Imazapic (Plateau®) on 6” fescue. Use 4 oz of Plateau® plus 1 quart of methylated seed oil (MSO) per acre. If area is a mixture of fescue and woody exotic species, use a mixture of imazapic and glyphosate (4 oz of Plateau®, 1 quart of Roundup®, and 1 quart of MSO per acre or Journey®).

**Bird watching area:**

Plant some native flowering and fruiting shrubs where invasive species have been removed. In addition, add bird houses and feeders throughout this area. This should be done as a sculpture project.

**Trail Edge:**

Remove or cover gravel and rocks along the Museum Trail near entrance to Park. This area should represent the Park by providing a beautiful entrance. The trail edges could be lined with wildflowers or native grasses. In addition, resurface the hills which have been damaged by mowers. It may be necessary to re-grade these slopes as a preventative measure. After resurfacing or re-grading, seed lawn with the standard grass seed mix.
Figure 1.30: Zone 16: Woodland within Lawn
4.2.8 Priority Two Management Zones

1) Zone 3: Tributary/North-facing Slope (see Figure 1.31)

a. Goals:

- Eradicate invasive species.
- Develop a transition zone between the prairie and woodland.
- Maintain native species.
- Increase native species biodiversity.
- Improve health of stream.
- Protect large persimmon tree.

b. Actions:

- Develop an invasive species removal regime.
- Allow for pine species regeneration within transition zone.
- Plant native species from a local seed/plant source.
- Shade stream with native canopy tree species.
- Promote growth of Arundinaria within floodplain.

c. Management:

Exotic Species Removal:

The exotic invasive species which exist in this area are *Hedera helix* (English ivy) and *Toxicodendron radicans* (poison ivy-native) on trunks of trees, *Elaeagnus umbellate* (Autumn olive), *Rosa multiflora* (multiflora rose), *Ligustrum sinensis* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), *Mahonia bealei* (Oregon grape), *Pyrus calleryana* (Callery/Bradford Pear), *Lagistomia indica* (crape myrtle- currently not
invasive), *Rubus argutus* (blackberry-native) and *Lolium arundinaceum* (tall fescue) on sides of trail.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

  Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy.

  When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.

  When treating poison ivy, take precaution and close down section of trail in which work is being done. Also, long sleeves, long pants, gloves, and a mask should be worn to protect workers from the poisonous sap. This should not be done with volunteers.

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used. Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.
A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, for better absorption by plant.
Seedlings and saplings can be hand-pulled. When hand-pulling, care should be given to reduce soil disturbance.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application. Repeat treatments will be necessary to maintain control of this species.

- *Rosa multiflora* (multiflora rose):

  Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

- *Pyrus calleryana* (callery pear), *Mahonia bealei* (Oregon grape), and *Lagistromia indica* (crepe myrtle) and *Rubus argutus* (blackberry):

  March-May- Spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®). Repeated applications will be needed for both blackberry and callery pear.
• *Lolium arundinaceum* (tall fescue):

March-April- Spray sides of the trail with Imazapic (Plateau®) on 6” fescue. Use 4 oz of Plateau® plus 1 quart of methylated seed oil (MSO) per acre. If area is a mixture of fescue and woodly exotic species, use a mixture of imazapic and glyphosate (4 oz of Plateau®, 1 quart of Roundup®, and 1 quart of MSO per acre or Journey®).

3a) Transition

The transition zone between the prairie and the woodland should be managed as an early successional forest. This zone should represent the natural trend of succession from grassland to forest. The primary species within this zone should be *Pinus spp*. Care should be given to control exotic invasive species within this area. Thin pine species when necessary to maintain control of volunteer species.

3b) North Side of Tributary

Spot treat exotic invasive species on the north facing slope. Use herbicides specified for aquatic use such as Veteran 720® at a rate of 2 to 3 gallons per acre or labeled rates of glyphosate formulated in the products Accord® and Rodeo®. Care should be given not to harm the array of native species established on the slope. If necessary, plant native species that already exist on the slope in areas where invasive species have been removed. Planting should be done in late winter or spring depending on the dormancy of the species. Planting and spot treating should be done by Museum Park staff due to the sensitivity of the area. An inventory of both native and exotic species needs to be conducted to best manage this area.

In addition to basic exotic species removal, the persimmon in the floodplain needs to be protected. In order to do this, cut the poison ivy off the truck of the tree and treat the stump.
This area contains nice sized trees which provide a cool shaded place for relaxation. This area should be considered for an extension of the trail or a seating area. If this happens, remove poison ivy from area and place trail outside the drip line of the persimmon tree.

3c) South Side of Tributary

Remove invasive species from the floodplain by a cut application or basal bark application to minimize herbicide runoff. Use Veteran 720® at a rate of 2 to 3 gallons per acre or labeled rates of glyphosate formulated in the products Accord® and Rodeo®. Only where absolutely necessary, foliar spray the invasive species with the same solutions. Take care not to harm the natural stands of Arundinaria gigantica. Once the exotic invasive have been removed, replant area with species listed in Appendix D. Priority should be given to the further establishment of Arundinaria gigantica. Where shade is needed, plant native, local, and site appropriate hardwood species listed in Appendix D.
Management Zone 3: Tributary/North-facing Slope

Figure 1.31: Zone 3: Tributary/ North-facing Slope
2) **Zone 6: Sewer Easement to I-40** (see Figure 1.32)

a. Goals:
   
   - Eradicate invasive species.
   
   - Control litter.

b. Actions:
   
   - Develop an invasive species removal regime.
   
   - Develop a schedule of volunteer clean-up days.

6a) **Floodplain**

**Exotic Species Removal:**

Manage *Microstegium vimineum* (Japanese stiltgrass) for three years due to the long seed viability in the soil. Once the infestation is under control, seed or interplant area with shade tolerant, wet area species.

In Central North Carolina, Japanese stiltgrass begins to form inflorescences in mid-September. Therefore, the management program must be implemented before this time to ensure that viable seeds will not contribute to the seed bank.

Currently, ecology students from North Carolina State University have set up experimental plots within the floodplain to control Japanese stiltgrass. This is an ongoing project led by Dr. Nick Haddad, Dr. Thomas Wentworth, and Dr. Jenny Campbell. This area should remain as a research area to assist students in the understanding of restoration ecology.
**Year One**

May-August-
Weed whack Japanese stiltgrass to height of six inches. Spray area, using a backpack sprayer, with fenoxaprop-P, imazapic, or sethoxydim. If using fenoxaprop-P or sethoxydim, spray area twice (four weeks apart) at half or full-labeled rates. To increase native plant cover and species richness use selective treatments or hand-pulling of Japanese stiltgrass.

**Year Two and Three**
Repeat procedure for Year One.

**Year Four and Five**
December-February-
Using volunteers, hand broadcast native, wet, shade tolerant, warm season grasses and forbs, see plant list, throughout the area previously taken over by Japanese stiltgrass. On average, there should be 40 seeds per square foot. If hand broadcasting, on average, it takes 10 people about 3 hours to seed 40 acres. That is one person for about 45 minutes per acre. Once the seeds are cast, incorporate them into the soil at a very shallow depth using a rake. After the seeds are incorporated into the soil at the appropriate depth, firm down the soil with a walk behind roller filled with water or by foot to ensure proper seed to soil contact.
May-August-

Spot treat Japanese stilt grass with fenoxaprop-P, imazapic, or sethoxydim. It may be necessary to spot treat stiltgrass on an annual basis. Some hand-pulling can be done if utilizing volunteers.

**Trail and Sculpture Addition:** (see Figure 1.30)

The trail which runs along the sewer line needs an area of interest. The best location for a sculpture perhaps, is within the floodplain near the bowl shaped slope. Curve the trail into the floodplain and commission an artist to design a sculpture for this area which adds interest but discourages people from accessing the steep slope. The slope is a sensitive area with a good display of native species and should be viewed but yet protected.

**6b) Steep Slope**

**Exotic Species Removal:**

The exotic invasive species which exist in this area are *Elaeagnus umbellata* (autumn olive), *Hedera helix* (English ivy), *Rosa multiflora* (multiflora rose), *Ligustrum sinensis* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), *Pyrus calleryana* (callery pear), and *Rubus argutus* (blackberry-native). First remove exotic invasive species from this area. In addition, plant native tree species along I-440, where space allows, to add an extra sound barrier. The trash along the beltline should also be cleaned up. Monitor and clean up the litter in this area on a monthly basis.

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating
materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used. Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Hedera helix* (English Ivy):

Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weed eater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D.

When English ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.
- *Ligustrum sinense* (Chinese Privet):

Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.
• *Rosa multiflora* (multiflora rose):

Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

• *Pyrus calleryana* (callery pear) and *Rubus argutus* (blackberry):

Between March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).
Figure 1.32: Zone 6: Sewer Easement to I-40
3) **Zone 8: West side of House Creek** (see Figure 1.33)

a. Goals:
   - Eradicate invasive species.
   - Stabilize House Creek.
   - Protect large yellow poplar.
   - Improve health of stream.

b. Actions:
   - Develop an invasive species removal regime.
   - Build a retention pond.
   - Plant native canopy trees along stream and retention pond.

c. Management:

   The stability of House Creek has been compromised by the small size of the culvert under I-440. Due to the force of water being pushed through this creek, the banks of the channel have been eroded. To limit further bank erosion a retention pond with a dam should be constructed to hold water upstream to slow the flow of water and decrease the force on the channel downstream. This could be an opportunity for a commissioned art installation and be a destination point for the Museum Park.

   The sewer line which runs the length of the creek will act as a limiting factor for the pond. Care must be given to stay outside of the easement as to cause no harm to the pipe. A carefully engineered retention pond should be designed and built to maximize control of peak water flow, not harm the existing sewer line, and fit with the high aesthetic standards of the Museum Park.
In addition to the pond installation, the exotic invasive species need to be kept under control. Kudzu has taken over this area and should be controlled. Unfortunately, eradication of kudzu may be impossible. To control kudzu near a stream, use either Veteran 720® at a rate of 2 to 3 gallons per acre or labeled rates of glyphosate formulated in the products Accord® and Rodeo®. A handgun nozzle on a tractor sprayer can be used to apply these products. Several successive broadcast applications plus spot applications will likely be required to achieve complete control. Late summer to fall applications is best due to the active translocation of nutrients into the root system.

Much care should be given to protect the health of the yellow poplar within this area indicated on the map (Figure 31). Herbicides should not be sprayed directly on this tree. The kudzu climbing up the tree needs be cut near the base and painted with glyphosate. This process should be repeated until all kudzu is under control.

Volunteers can be used to hand pull the kudzu from the south side of House Creek Greenway. Follow up with an application of glyphosate on the remaining vines. Volunteers should not be used to pull kudzu on the north side of the Greenway due to the steep slope.

Once the exotic invasive species are under control, shrubs and trees should be planted around the pond, up the bank to I-440, and along House Creek to shade the water way. Only plant native, site appropriate trees and shrubs from a local seed stock. A list of appropriate potential plant species are listed in Appendix D. Protect the stand of Arundinaria gigantea that exists within the floodplain of House Creek. In addition, promote further spread of this species by allowing for adequate space and replanting.
In addition to the floodplain area, kudzu should be removed from the west side of House Creek Greenway. This is a good location to utilize volunteers due to the gentle slope and manageable exotic species invasion. After volunteers have removed the kudzu, Park staff should follow up with an application of glyphosate herbicide. In this same area, the bench which is currently located too far off the trails edge needs to be moved closer to the trail. It is advised to place the bench on the west side of the trail across from the large yellow poplar. Once the kudzu has been removed from the tree, this area becomes a focal point of great interest due to the grandeur of this specimen.
Figure 1.33: Zone 8: West side of House Creek
4) Zone 10: Opening in Woodland

a. Goals:

- Eradicate invasive species.
- Maintain area for native bird species.

b. Actions:

- Develop an invasive species removal regime.
- Plant native fruiting species to improve bird habitat.
- Maintain an open tree canopy for maximum light exposure.

c. Management:

This woodland zone has a more open canopy which has allowed for species such as persimmon to persist. Therefore protect the persimmons and southern red cedar on this site by clearing the exotic invasive species out of this area. Follow this by planting native woodland species listed in Appendix D in the gaps to reduce the chance of reinvasion. This area should remain open and sunny to allow the persimmons to flower and fruit. Only low growing species and some replacement persimmons should be planted to keep the canopy cover open. Plant native plant species which attract birds due to the current bird watching installation within this area.

Due to the heavy invasion of exotic species, aggressive remove must take place. Multiple treatments may be necessary to keep the exotic species under control. Follow the treatment prescriptions for each species listed below. After treatment, plant woodland species in areas where there is a threat of reinvasion.
• *Elaeagnus umbellata* (autumn olive):

One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used. Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

• *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy. Only treat poison ivy along the trail edge where it could potential harm park users.

When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by
hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.

- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be
the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.

- *Microstegium vimineum* (Japanese stiltgrass):

  During May to August, weed whack Japanese stiltgrass to height of six inches. Spray area, using a backpack sprayer, with fenoaprop-P, imazapic, or sethoxydim. Spray the area twice (four weeks apart) at half or full-labeled rates. This process must be repeated for a minimum of three consecutive years in order to eliminate the persistent seed bank. If native species do not begin to establish themselves naturally, selectively plant native species in areas where needed.

- *Rosa multiflora* (multiflora rose):

  Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

- *Pyrus calleryana* (callery pear), *Mahonia bealei* (Oregon grape), and *Rubus argutus* (blackberry):

  Between the months of March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).
5) Zone 11: Pinetum

a. Goals:

- Eradicate invasive species.
- Establish a mixed shortleaf pine.

b. Actions:

- Develop an invasive species removal regime.
- Thin loblolly pine.
- Plant native xeric forbs in understory.
- Plant shortleaf pine saplings.

c. Management:

**Exotic Species Removal:**

The main priorities within the Pinetum are invasive species control and regeneration of shortleaf pine. There is minimal exotic species invasion within this area. Therefore, attention should be paid to get rid of the infestation before the problem gets out of control. Evaluate the control of invasive species annually. Keep records on all treated areas with reports of success. Retreat exotic invasive species as they emerge or re-sprout. The main exotic species on the site are *Elaeagnus umbellata* (autumn olive), *Ligustrum sinense* (Chinese Privet), and *Lonicera japonica* (Japanese Honey Suckle).

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used.
Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled
stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.

**Regeneration of Shortleaf Pine Forest:**

The Pinetum is a good example of a *Pinus taeda/Pinus echinata* (loblolly pine/shortleaf pine) secondary successional forest. Care should be given to encourage the growth of *Pinus echinata* (shortleaf pine) and the understory xeric forbs because loblolly pine is taking over this area. If left unmanaged, loblolly pine would more than likely become the dominate species and eventually outcompete all shortleaf pine.

Select *Pinus taeda* should be felled to encourage the regeneration of *Pinus echinata*. If necessary, plant *Pinus echinata* saplings. This could be accomplished by utilizing the NCSU Forestry Club or the NC Forest Service. Either organization could hold a training day and felled the marked trees. The NCSU Forestry Club could then use the cut wood to raise money for their organization.

Thin the understory *Pinus taeda* saplings and plant xeric forbs. Do this step after the exotic invasive species are under control. Conduct a site inventory of the existing forbs in the area. Collect plant species’ seeds in the autumn and plant seeds in early spring by broadcasting or planting starts (see Appendix D).
4.2.9 Priority Three Management Zones

1) Zone 2: Tributary

a. Goals:

   - Eradicate invasive species.
   - Maintain health of stream.
   - Promote native species.
   - Site potential trails.

b. Actions:

   - Develop an invasive species removal regime.
   - Shade stream with native canopy tree species.
   - Stabilize stream channel.
   - Plant native species from a local seed source.
   - Identify ecologically sensitive areas.

c. Management:

   Invasive species in this area are *Microstegium vimineum* (Japanese stiltgrass), *Rubus argutus* (blackberry), and *Ligustrum sinensis* (Chinese privet). Further inventories should be conducted to determine the extent of the invasion and to determine all the species of interest both native and exotic. Exotic invasive species should be removed from this zone using an application of aquatic approved herbicide such as Veteran 720® at a rate of 2 to 3 gallons per acre or labeled rates of glyphosate formulated in the products Accord® and Rodeo®. For small woody species, a cut stump method should be used to minimize herbicide runoff into the creek. For large woody species, a basal bark method should be used. Apply application
in autumn. Only use a foliar spray method on small herbaceous species when necessary. Apply foliar applications in late autumn when plants are in leaf or in early spring while native species are dormant. Monitor invasive species on a yearly basis and apply additional treatments when necessary.

To protect the health of the stream, the length of the creek should be shaded with hardwood species. Plant native, local, site appropriate species along the stream bank. Appropriate potential species are listed in Appendix D. Follow the planting guidelines in section “4.2.3 Planting Guidelines.” In addition, encourage the spread of native species which exist on this site, such as *Arundinaria gigantea*. This could be accomplished as a volunteer effort.

Currently, there is no trail access along this length of the tributary but the Museum Master Plan (see Appendix D) identifies trail placement along the length of the creek. This trail is part of the future “Ramble.” Therefore, proper trail placement in this area should be determined and documented. First identify any natural features of interested that need to be protected. The trail should not be placed where these features are put in danger, such as the roots of large trees. Care should be given to not place the trail on steep slopes or on any other location in which erosion would become an issue. Second, the trail should be designed to provide vistas of interest and to make important connections to other trails or lead to future installations. For any future trail construction, follow the directions specified in section “4.3.3 Trails.” In addition, the trail location should be examined by a building professional before construction.
2) **Zone 4: House Creek** (see Figure 1.34)

a. Goals:

   - Eradicate invasive species.
   - Develop trails.
   - Increase native species biodiversity.
   - Improve health of stream.

b. Actions:

   - Develop an invasive species removal regime.
   - Remove hazardous vegetation along trails.
   - Shade stream with native canopy trees.
   - Plant native species from a local seed source.
   - Build retention pond.
   - Build bridge over creek at access road.
   - Replace existing culvert with a larger one.

c. Management:

**Exotic Species Removal:**

Exotic invasive species should be removed from this zone using an application of aquatic approved herbicide such as Veteran 720® at a rate of 2 to 3 gallons per acre or labeled rates of glyphosate formulated in the products Accord® and Rodeo®. For small woody species, a cut stump method should be used to minimize herbicide runoff into the creek. For large woody species, a basal bark method should be used. Apply herbicide in autumn. Only use a foliar spray method on small herbaceous species when necessary. Apply foliar application
in late autumn when plants are in leaf or in early spring while native species are dormant. Monitor area on a yearly basis for success of exotic invasive species removal and apply additional treatments when necessary.

**Stream Health:**

In addition to the removal of invasive species, the health of the trees along the creek should be assessed and hazardous trees removed. Walk the length of the stream and flag dangerous trees for removal. Close the trails near the hazardous trees while trees are being cut down and removed.

To protect the health of the stream, shade the length of the creek with hardwood tree species. Only plant native, local, site appropriate species along the stream bank. Appropriate potential species are listed in Appendix D. In addition, the native species which exist on this site should be used and encouraged to spread, such as *Arundinaria gigantea*. This could be done as a volunteer effort.

At the northeastern reach of House Creek by the Meredith Woods Subdivision, there are severe erosion issues. The bank that leads up to the housing development is severely eroded and the neighbors that are affected should be notified. Ultimately, the bank needs to be cut back, into the yards of the neighbors, in order to create stabilization. This may not be an option but should be discussed with the appropriate people. Otherwise, the bank will continue to erode and the homeowners will continue to lose land. In addition, the culvert that leads under Wade Ave in this same area is too small and should be replaced with a larger pipe. Address both of these issues with the City of Raleigh. In addition, the culvert under the power line easement access needs to be replaced with a bridge by Progress Energy.
or the City of Raleigh (up to debate and further investigation). The road will continue to wash out at the location if a culvert remains.

Near the power line easement, between the Prairie Trail and the creek, is a priority area. First, remove the trash from this area. Then, remove the exotic invasive species from the floodplain to House Creek by the bridge. After these species are removed, plant native, local, site appropriate species back in the area. This can be done as a volunteer effort.

At the Southeastern end of this zone where House Creek Greenway and House Creek meet, the stream bank should be hardened due to the proximity to the trail. This area is indicated on the map (see Figure 32). Once the bank has been modified, plant native, local, site appropriate species along the edge. Jewelweed is very common in the area and therefore should be planted back along the creek’s banks. In addition, plant hardwood trees along this edge to shade the stream.

**Trail Removal:**

Remove the trail in Figure 1.32 by first ripping the soil and replanting it with native species (Appendix D). In addition, move the sign which is next to this old trail to a location where it will be seen.
Figure 1.34: Zone 4: House Creek
3) **Zone 7: Sewer Line to Pedestrian Bridge** (see Figure 1.35)

a. Goals:

- Eradicate invasive species.
- Maintain dogwood forest.
- Realign House Creek Greenway.

b. Actions:

- Develop an invasive species removal regime.
- Plant native dogwood species.
- Removal competing tree species.

c. Management:

**Exotic Species Removal:**

Remove exotic invasive species from this area as follows. The invasive species which exist in this area are *Hedera helix* and *Toxicodendron radicans*, *Rosa multiflora*, *Ligustrum sinensis*, *Lonicera japonica*, *Mahonia bealei*, *Pyrus calleryana*, and *Rubus argutus*.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

  Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy.
Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy. Only treat poison ivy along the trail edge where it could potential harm park users.

When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.

- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled
stump, to hold the herbicide in for better absorption by plan. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.

- *Rosa multiflora* (multiflora rose):

  Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

- *Pyrus calleryana* (callery pear), *Mahonia bealei* (Oregon grape), and *Rubus argutus* (blackberry):

  Between March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

**Dogwood Forest:** (see Figure 1.35)

Remove the exotic invasive species from this area. In addition, assess the health of the dogwoods. Watch for signs of dogwood anthracnose. If outbreak occurs, contact Wake County Extension.
After exotic species have been removed, selectively felled trees species which inhibit the growth of the dogwoods. The cherry and tulip poplar trees should be the first species to be cut down. Other species should then be assessed. To maintain this area as a dogwood dominated forest, plant *Cornus florida* (flowering dogwood) saplings from a local source in clearings throughout the area. Be sure to plant saplings near specimens that are nearing 15-20 years of age. Planting specifications are outlined in section “4.2.4 Planting Guidelines.” If understory becomes overrun by *Pinus taeda* (loblolly pine), remove saplings by pulling, if small, or cutting and painting the stump with a 50% solution of glyphosate.

Once the dogwood forest is in good health, site a sculpture within this zone to draw people’s attention to this area. The dogwood forest is close to an entrance into the Park and should be representative of the Park’s mission of the collaboration of art and ecology.
Figure 1.35: Zone 7: Sewer Line to Pedestrian Bridge
4) **Zone 12: Southwest Woodland** (see Figure 1.36)

a. Goals:
   - Eradicate invasive species.
   - Expand Park.
   - Address Slope Issues.

b. Actions:
   - Develop an invasive species removal regime.
   - Identify ecologically sensitive areas.
   - Mark potential trail and sculpture locations.
   - Site trails and sculptures.

c. Management:

**Exotic Species Removal:**

This area is a great representation of a mixed hardwood/pine forest. The first step in this area is to remove the exotic invasive species. Plant native species in areas where exotic invasive species have been removed. Due to the heavy invasion of exotic species, aggressive removal must take place. Multiple treatments may be necessary to keep the exotic species under control. Follow the treatment prescriptions for each species listed below.

After treatment, plant woodland species in areas where there is a threat of reinvasion.

- *Elaeagnus umbellata* (autumn olive):

  One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used.
Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy. Only treat poison ivy along the trail edge where it could potential harm park users.

When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.
• **Ligustrum sinense** (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and 75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

  Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

• **Lonicera japonica** (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.
Microstegium vimineum (Japanese stiltgrass):

During May to August, weed whack Japanese stiltgrass to height of six inches. Spray area, using a backpack sprayer, with fenoxaprop-P, imazapic, or sethoxydim. Spray the area twice (four weeks apart) at half or full-labeled rates. This process must be repeated for a minimum of three consecutive years in order to eliminate the persistent seed bank. If native species do not begin to establish themselves naturally, selectively plant native species in areas where needed.

Rosa multiflora (multiflora rose):

Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

Pyrus calleryana (callery pear) and Rubus argutus (blackberry):

Between the months of March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

Park Expansion:

Currently, this area has little activity. It is a good place for Park expansion. It has no trails, but has the potential of being a good location for art installations. The placement of these installations and access to the art should be accessed. To determine placement, the sensitive areas should be identified and all development should stay out of these areas. Otherwise, the
location of the art installations should be decided by the artist in conjunction with NCMA staff.

**Slope Issue:**

The slope indicated in Figure 34 is too steep. It has eroded away and currently is void of vegetation. To address this issue, either re-grade the slope and replant with native vegetation or build a wall to hold back the earth along the trail’s edge.
Figure 1.36: Zone 12: Southwest Woodland
5) Zone 13: Roadside

a. Goals:
   - Eradicate invasive species.
   - Remove litter.

b. Actions:
   - Develop an invasive species removal regime.
   - Organize volunteer clean up days.
   - Monitor for litter.

c. Management:

Exotic Species Removal:

This zone acts as a sound and visual buffer to Wade Ave. To provide the best buffer, first remove the invasive plant species. In addition, where gaps in the tree canopy exist, plant native tree species listed in Appendix D.

- *Elaeagnus umbellata* (autumn olive):

   One method of application is to cut the plant off at the main stem and paint the herbicide on the stump in late August or early September when plant is actively translocating materials to the roots. A 10-20% solution of Glyphosate is effective and commonly used. Foliar applications may be adequate for small patches; the recommended dilution of glyphosate in this case is a 1-2% solution.

   A March dormant season basal applications (stem injections) of triclopyr alone or in combination with 2,4-D provided excellent control of autumn olive at very low concentrations (down to 1% triclopyr in diesel oil). The lowest concentrations of triclopyr
and all treatments with the 2,4-D/triclopyr combinations provided slower kills than higher concentrations of triclopyr alone, but only one of the treatment plants were expected to survive.

- *Hedera helix* (English Ivy) and *Toxicodendron radicans* (Poison Ivy):

  Due to the leathery leaves of English ivy, spray applications of herbicide have limiting effects. However, some studies have shown that repeated applications of glyphosate (25% solution) provided good control. Cutting (using a nylon cord weedeater to cut to the stem surface just before treatment) followed by a 25% solution of glyphosate also provided control of English ivy. Excellent control of *H. helix* that had been cut and then sprayed was achieved with a 2% solution of 2,4-D. Similar results can be achieved with poison ivy. Only treat poison ivy along the trail edge where it could potential harm park users.

  When English ivy or poison ivy is growing up trees, cut the vine at waist height and loosen the vine around the limbs and remove the roots. If the root cannot be removed by hand, strip the bark and notch the exposed section of the vine. Paint on an undiluted herbicide such as a 25% solution of glyphosate.

- *Ligustrum sinense* (Chinese Privet):

  Small shrubs or thickets should be treated while plants are in leaf in early spring or late autumn by wetting the leaves with triclopyr or glyphosate using a backpack sprayer with a low pressure and coarse spray pattern. Apply a 2% solution of glyphosate or triclopyr and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves.

  Tall shrubs can be treated using a basal bark or a cut stump application throughout the year as long as the ground is not frozen. If basal bark, apply a mixture of 25% triclopyr and
75% horticultural oil to the basal parts of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

Large stems may be cut and immediately treated with triclopyr, or glyphosate. Immediately after cutting stems at or near ground level, apply a 25% solution of glyphosate and water or triclopyr and water to the cut stump, being careful to cover the entire surface. Effectiveness of the herbicide is increased if holes are cut in the top of the freshly felled stump, to hold the herbicide in for better absorption by plant. Seedlings and saplings can be hand-pulled.

- *Lonicera japonica* (Japanese Honey Suckle):

  Treat Japanese honey suckle in early spring or late autumn when many native species are dormant. A foliar application of 1.5% glyphosate shortly after the first frost appears to be the most effective treatment. Treated plants should be re-examined at the end of the second growing season, as plants can recover from herbicide application.

- *Microstegium vimineum* (Japanese stiltgrass):

  During May to August, weed whack Japanese stiltgrass to height of six inches. Spray area, using a backpack sprayer, with fenoxaprop-P, imazapic, or sethoxydim. Spray the area twice (four weeks apart) at half or full-labeled rates. This process must be repeated for a minimum of three consecutive years in order to eliminate the persistent seed bank. If native species do not begin to establish themselves naturally, selectively plant native species in areas where needed.
- *Rosa multiflora* (multiflora rose):

  Multiflora rose must be treated for at least two consecutive growing seasons for maximum control. The most effective treatments on small shrubs is a foliar application in the spring with 2% solution if glyphosate or 2,4-D and picloram. Fall application has not been found to be effective. A cut stem or basal bark application can be affective on larger shrubs when treated immediately after cutting with either a 50% solution of glyphosate or triclopyr.

- *Pyrus calleryana* (callery pear) and *Rubus argutus* (blackberry):

  Between the months of March and May, spot treat the above species by foliar spray or cut stump application with triclopyr (Garlon 3A®) or a 50% solution of glyphosate (Roundup®).

**Trash Removal:**

Due to the location of this zone, trash is an issue. Remove and monitor this area for garbage on a monthly basis. It may be necessary to schedule volunteer clean up actions or contact the City of Raleigh to provide this service.

6) **Zone 14: Old Prison Site** (see Figure 1.37)

a. Goals:

- Eradicate invasive species.
- Reforest degraded areas.
- Designate parking areas.
- Design open landscape.
- Protect existing native tree species.
b. Actions:

- Develop an invasive species removal regime.
- Plant native tree species.
- Organize a volunteer reforestation effort.
- Develop a yearly mowing schedule.

c. Management

14a) **Overflow parking area 1:**

Maintain this area as a mowed grass field for potential overflow parking. Protect the trees within this zone by keeping cars off of their root system. Keep the parking spaces outside of at least the drip line of the trees’ canopies.

Landscape the stretch of land along Blue Ridge Road using native plant species. Currently, there is an issue of ownership within this area. Further investigation of this issue is needed. However, this project has the potential for being a North Carolina State University Landscape Architecture project and then followed up by a volunteer planting effort. Otherwise, this area should be designed by a landscape designer/architect and work contracted out. In either case, it is necessary to plant the vegetation in such a way to create vistas into the park.

14b) **Overflow parking area 2:**

This area is currently used by the construction crew for the new Museum building. It is a large dirt filled area with good access that has already been flattened. Therefore, this area has the potential of being converted into an overflow parking area for the Museum. The parking area should be maintained as a grass field rather than a gravel lot to maintain
the aesthetics of the Park. To accomplish this, reseed this area with a grass mixture of predominately native grasses after the construction for the new building is complete. Define the road accesses into this area and pave with gravel or other pervious surface.

14c) Lawn/Landscaped Area:

Maintain the existing trees within this area. Leave the understory low to allow for views into the park from Blue Ridge Road. Use the native grasses and forbs listed in Appendix D. This area should be designed by a landscape architect to create an open landscape of vistas into the Park from Blue Ridge Road. This plot of land delineates the start of the Museum property and should be well designed to represent the aesthetic quality of the Museum Park.

14d) Reforestation Area 1:

Reforest this area which borders the parking area, the prairie, and stream corridor. See section “4.2.3 Planting Guidelines” for planting details and Appendix D for plant lists. The first step in the reforestation process should be to kill the existing exotic invasive species. In addition, the fescue and other non-native grass species should be treated with imazapic. After exotic invasive species are under control, plant native species from local seed sources. First plant tree saplings or larger specimens to create a well balanced forest density. Once tree species begin to get larger, it may be necessary to thin areas where there is too much competition between species. Some shrub species can also be planted throughout this zone to create an understory. Forbs will more than likely come into the area as volunteers from the neighboring prairie. The reforestation could be done as a volunteer effort or contracted out.
14e) Reforestation Area 2:

First define the access roads into the park maintenance facility and pave with a pervious surface such as gravel. Once roads are installed, remove all remaining structures from this site. Before reforestation can take place, some soil preparation work may be necessary. Remove the graveled areas in this zone by scrapping the surface using an earth scraper. Add top soil to fill the depressions left by the machinery.

Secondly, this area should be reforested. See section “4.2.3 Planting Guidelines” for planting details and Appendix D for plant lists. The first step in the reforestation process should be to kill the existing exotic invasive species. In addition, the fescue and other non-native grass species should be treated with imazapic. After exotic invasive species are under control, plant native species from local seed sources. First plant tree saplings or larger specimens to create a well balanced forest density. Once tree species begin to get larger, it may be necessary to thin areas where there is too much competition between species. Some shrub species can also be planted throughout this zone to create an understory. Forbs will more than likely come into the area as volunteers from the neighboring prairie. The reforestation could be done as a volunteer effort or contracted out.
Figure 1.37: Zone 14: Old Prison Site
7) **Zone 15: Park Maintenance Facilities**

a. Goals:

- Eradicate invasive species.
- Maintain area as park maintenance facility.

b. Actions:

- Develop an invasive species removal regime.
- Remove all existing unnecessary equipment, materials, and structures.
- Develop a facilities plan.
- Create a native plant nursery.

c. Management:

Keep this area off limits to park visitors. Vehicle traffic should only be for park staff. Manage this zone as a park maintenance facility. The first step is to determine the needs of the Park staff. Once this is decided, clear the area of all unnecessary materials and structures. Base the layout of the area on what is to take place in this zone. Locate an area for a plant nursery that maximizes sun exposure. Some shade structures may need to be constructed to allow for all types of species. In addition, other needs may arise from the nursery operation such as a planting area, a soil pile, and a container storage area. All of these areas should be well defined. Other requirements of this site such as the mulch storage area for the City of Raleigh should also be well defined.

To minimize the further spread of exotic invasive species throughout the park, treat the invasive species within the area with glyphosate. Establish a regular herbicide spray regime to eliminate exotic species. It may be necessary to treat this area on a biyearly or
more bases. Because the concrete is in poor shape, treat the cracks, as well as the natural areas surrounding this developed zone.

4.2.10 Pricing Estimates (Tables 1.4-1.11)

Pricing estimates are general guidelines or best guesses not exact costs. These should only be used as a baseline price for restoration efforts. The following estimates are for priority one zones and general exotic species removal. Each zone has a contracted and an in-house cost estimate on a per acre basis. The contracted estimates are from Carolina Silvics and are not site specific. For a more exact price, a site visit would be required. In-house estimates are relying on volunteers and/or staff to conduct all work. Though these costs are much lower, time and salaries are not taken into account in the estimates provided here.

1) Prairie Restoration:

Table 1.4 Prairie Restoration Contracted Cost Estimates

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbicide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals application</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td></td>
<td>$ 50.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td><strong>Permanent Seeding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>site prep and application</td>
<td>$ 500.00</td>
<td>$ 500.00</td>
</tr>
<tr>
<td>seed</td>
<td>$ 500.00</td>
<td>$ 1,000.00</td>
</tr>
<tr>
<td><strong>Total per acre</strong></td>
<td>$ 1,075.00</td>
<td>$ 1,600.00</td>
</tr>
<tr>
<td><strong>Total Cost (20 acres)</strong></td>
<td>$ 21,500.00</td>
<td>$ 32,000.00</td>
</tr>
</tbody>
</table>
Table 1.5 Prairie Restoration In-house Cost Estimate

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbicide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>application</td>
<td>$ 50.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>equipment rental</td>
<td>$ -</td>
<td>$ 10.00</td>
</tr>
<tr>
<td>fuel</td>
<td>$ 1.50</td>
<td>$ 3.00</td>
</tr>
</tbody>
</table>

| **Site Prep**       |                    |                     |
| mowing/bush hog     | $ -                | $ -                 |
| fuel                | $ 1.50             | $ 3.00              |

| **Seeding**         |                    |                     |
| native seed drill   | $ -                | $ 5.00              |
| fuel                | $ 1.50             | $ 3.00              |
| seed                | $ 500.00           | $ 1,000.00          |

| **Total per acre**  | $ 529.50           | $ 1,074.00          |

**Total Cost (20 acres)**

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbicide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>application</td>
<td>$ 50.00</td>
<td>$ 50.00</td>
</tr>
</tbody>
</table>

| **Permanent Seeding**|                    |                     |
| site prep and       | $ 500.00           | $ 500.00            |
| application         |                    |                     |
| seed                | $ 500.00           | $ 1,000.00          |

| **Total per acre**  | $ 1,075.00         | $ 1,600.00          |

2) Sewer Line Easement Restoration:

Table 1.6 Sewer Line Easement Restoration Contracted Cost Estimate

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbicide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>application</td>
<td>$ 50.00</td>
<td>$ 50.00</td>
</tr>
</tbody>
</table>

| **Permanent Seeding**|                    |                     |
| site prep and       | $ 500.00           | $ 500.00            |
| application         |                    |                     |
| seed                | $ 500.00           | $ 1,000.00          |

| **Total per acre**  | $ 1,075.00         | $ 1,600.00          |
### Table 1.7 Sewer Line Easement Restoration In-house Cost Estimate

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Herbicide</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>backpack sprayer (owned)</td>
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<td>$ -</td>
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<tr>
<td><strong>Site Prep</strong></td>
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<td></td>
</tr>
<tr>
<td>mowing (owned)</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>fuel</td>
<td>$ 1.50</td>
<td>$ 3.00</td>
</tr>
<tr>
<td><strong>Seeding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>broadcast seeder</td>
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</tr>
<tr>
<td>seed</td>
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<tr>
<td><strong>Total per acre</strong></td>
<td>$ 527.50</td>
<td>$ 1,055.00</td>
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</tbody>
</table>

3) Woodland Exotic Species Removal:

### Table 1.8 Woodland Exotic Species Removal Contracted Cost Estimates

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exotic Species Removal</strong></td>
<td>$ 800.00</td>
<td>$ 1,000.00</td>
</tr>
<tr>
<td><strong>Total per acre</strong></td>
<td>$ 800.00</td>
<td>$ 1,000.00</td>
</tr>
</tbody>
</table>
### Table 1.9 Woodland Exotic Species Removal In-house Cost Estimates

<table>
<thead>
<tr>
<th></th>
<th>Low Cost/ per acre</th>
<th>High Cost/ per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exotic Species Removal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chemicals</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
</tr>
<tr>
<td>equipment</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Total per acre</td>
<td>$ 25.00</td>
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</table>
4) Reforestation:

**Table 1.10 Reforestation Contracted Cost Estimates**

<table>
<thead>
<tr>
<th></th>
<th>Per Stem Low Cost</th>
<th>Per Stem High Cost</th>
<th>340 stems/acre Low Cost</th>
<th>340 stems/acre High Cost</th>
<th>400 stems/acre Low Cost</th>
<th>400 stems/acre High Cost</th>
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</thead>
<tbody>
<tr>
<td><strong>Plant Stock and Planting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bare root</td>
<td>$ 0.80</td>
<td>$ 1.00</td>
<td>$ 272.00</td>
<td>$ 340.00</td>
<td>$ 320.00</td>
<td>$ 400.00</td>
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<tr>
<td>Tubeling</td>
<td>$ 2.00</td>
<td>$ 2.50</td>
<td>$ 680.00</td>
<td>$ 850.00</td>
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<td>$ 1,000.00</td>
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<tr>
<td>Gallon</td>
<td>$ 6.00</td>
<td>$ 9.00</td>
<td>$ 2,040.00</td>
<td>$ 3,060.00</td>
<td>$ 2,400.00</td>
<td>$ 3,600.00</td>
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<tr>
<td><strong>Exotic Species Removal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$ 800.00</td>
<td>$ 1,000.00</td>
<td>$ 800.00</td>
<td>$ 1,000.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dollar Total per acre</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>$ 3,792.00</td>
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</table>
Table 1.11 Reforestation In-house Cost Estimates

<table>
<thead>
<tr>
<th></th>
<th>Per Stem Low Cost</th>
<th>Per Stem High Cost</th>
<th>340 stems/acre Low Cost</th>
<th>340 stems/acre High Cost</th>
<th>400 stems/acre Low Cost</th>
<th>400 stems/acre High Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bare root</td>
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<td>$ 170.00</td>
<td>$ 255.00</td>
<td>$ 200.00</td>
<td>$ 300.00</td>
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<td>$ 700.00</td>
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<td>$ 3,100.00</td>
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<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td><strong>Exotic Species Removal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
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<td>$ 50.00</td>
<td>$ 25.00</td>
<td>$ 50.00</td>
<td></td>
<td></td>
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<tr>
<td><strong>Dollar Total per acre</strong></td>
<td>$ 2,575.00</td>
<td>$ 3,535.00</td>
<td>$ 3,025.00</td>
<td>$ 4,150.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Cultural Resources Management

4.3.1 Artist/Art Project Selection and Installation Process

The following steps will be taken when selecting an artist to create a work of art for the Museum Park:

1) Museum Curator of Contemporary Art proposes an artist for a Park project to the Curatorial Department, Director of Planning & Design, and Museum Director.

   Upon approval, the artist is invited for a site visit to NCMA and tours the Museum Park with the Curator of Contemporary Art and the Museum Park Manager. The artist is provided a packet of information about the Museum Park including brochures, site plans, the vision statement, and other relevant materials.

2) The artist submits a preliminary proposal for the project, including estimated costs and preferred site to the Curator of Contemporary Art.

3) The Curator of Contemporary Art, Museum Park Manager, and Director of Planning and Design discuss the artist’s proposal. Future maintenance costs must be factored into the decision process, and adequate maintenance funds and staff resources must be identified for all art-in-service pieces as they are not maintained by the Conservation Department. The proposal is approved or resubmitted to the artist with suggested changes.

4) The approved artist’s proposal is presented to the Partnership for Art and Ecology for a technical review of potential site impacts. Necessary final revisions are made to the proposal.

5) The artist’s final proposal is presented to the Museum Director and Curatorial Department for final approval.
6) The contract is negotiated between the artist and the Museum. The contract is prepared by the Curator of Contemporary Art.

7) Interim design review and revisions are required prior to installation, as specified in the contract.

8) Art will be examined by the Conservation Department and subject to the Museum’s collection’s policy. Installation and site plans will also be reviewed by the Conservation Department. A landscaping plan for the area surrounding the art must be agreed upon by Conservation, the Curator, Planning, and the Park Manager. This plan should include plans for upkeep of the landscape in close proximity to the art.

9) Fabrication, site preparation, and installation are scheduled and coordinated with Museum staff. Base construction is coordinated and executed by both the Registration Department and the Exhibition Design Department. Museum Park staff prepare the site for installation.

10) Installation and completion of work of art. Park staff are present during installation to make sure that the grounds are not damaged. Art installation costs are run through the Curatorial Department.

11) The artist’s talk and reception are scheduled.

12) NCMA and the Museum Park informative and marketing materials are updated including the website, brochures, and Park signage.

4.3.2 Conservation of Art

1) Gardens and Courtyards:
All work will be performed by artist. No maintenance by Conservation Department.

b. Auguste Rodin Sculptures in Cantor Court (Approximately 4)

After initial pretreatment by contract conservator, twice annual waxing done by Conservation Department.

c. *Flight Wind Reed*, Bill and Mary Buchen, 2003

No annual maintenance. Check for wear on joint parts.


Twice annual waxing done by Conservation Department

e. *Large Standing Figure: Knife Edge*, Henry Spencer Moore

Twice annual waxing done by Conservation Department


Twice annual polishing done by detailing company. Cost is approximately $525 per session ($1025 yearly) and budgeted by the Conservation Department.

g. Ursula von Rydingsvard

Re-seal with preservative according to artist's directions.

2) Museum Park:


General maintenance as required. Park staff sweeps daily.


No maintenance.

c. *Crossroads*, Martha Jarvis-Jackson, 2006
Check for broken/missing/loose bricks. Repair as needed according to artist's directions.

d.  
*Gyre*, Thomas Sayre. 1999

No maintenance. Check for damage at base from climbing.

e.  
*Invasive*, Steed Taylor, 2008

No maintenance.

f.  

No maintenance.

g.  
*To see Jennie smile*, Steven Siegel, 2006 (temporary)

No maintenance.

h.  
*Wind Machine*, Vollis Simpson, 2002

Ongoing maintenance: greasing of axle joint preformed by art handler (requires a mobile lift). Currently needs to be repainted at an approximate cost of $10,000.

3) Art-in-Service:

a.  
Benches, bike racks, and sign structures, Al Frega, 2005

Park staff wipes down steel with Penetrol as needed.

b.  
*Lowe’s Pavilion*, Mike Cindric and Vincent Petrarca, 2007

c.  
*PICTURE THIS*, Barbara Kruger, 1995 (permanent)

d.  
*Whisper Bench*, Jim Gallucci, 2008

Facilities will work with DOA staff to ensure that no mowing, application of herbicide or pesticide, or other lawn maintenance is outside a 10-foot zone of any piece of art.
4.4 Visitor Experience Management

4.4.1 Trails

1) Building New Trails:

There are four major phases when building new trails: visioning, planning, layout, and construction. The visioning stage of the processes is when the destinations are determined for the trails. The vision for the major trails has been outlined in the Museum Park Master Plan (2007) by Lappas and Havener, PA Landscape Architects. There may be a need for smaller ephemeral trails that are not outlined in the Master Plan. In this case, a clear vision of who, when, where, and why needs to be addressed.

Once the vision is reached, guidelines for trail establishment should be addressed. This step of the process can be accomplished by looking at aerial photographs and topographic maps of the area. The first step is to anticipate the potential problems in all sections of the trail and prevent these issues with careful design. Such issues are managing for pedestrians and cyclists, steepness of slope, and rest stops along the trail.

Once the potential problems have been addressed, the route of the trail should be planned to provide for maximum visitor experience and limited environmental impact. Environmental factors should be considered when planning trails. Changes in topography can be stimulating and interesting to visitors but care needs to be given to meet the standard grade requirements. Trails on steep slopes need to be avoided to control cyclist’s speed and to meet ADA requirements. Trails should be fit to the lay of the land and maintain subtle turns and undulations in grade steepness to maximize user experience.
One of the most important environmental factors to consider when planning a trail is soil characteristics. Soil samples should be taken and sent to the NC Department of Agriculture laboratory in all areas where trails are planned. If it is not appropriate to take soil samples, look at the vegetation for signs of soil characteristics. Characteristics such as soil compactness, wetness, texture, depth, and soil horizons must be considered when determining location of trail. These soil properties along with layout and trail use are the most important factors affecting erosion along the trail. With proper placement trail placement, erosion issues can be minimized. The chart below is a summary of soil indicators for evaluating proper trail installation (Demrow and Salisbury, *The Complete Guide to Trail Building and Maintenance*, 1998):
When planning the location of the trail, there should be appropriate buffer widths on each side of the trail to minimize environmental impact and provide for adequate water absorption from runoff. These widths should take into consideration the trail surface and grade. For instance, paved trails may shed more water than mulched trails. This area will provide a location for proper drainage structures and distance from environmental sensitive areas such as creek banks.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Conditions Posing Slight Limitations for Trail Installations</th>
<th>Conditions Posing Moderate Limitations for Trail Installations</th>
<th>Conditions Posing Severe Limitations for Trail Installations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Wetness</td>
<td>Depth to seasonal high water table 4 feet or more; well drained to moderately well drained</td>
<td>Depth to seasonal high water table 1 to 4 feet; excessively drained</td>
<td>Depth to seasonal high water table less than 1 foot poorly drained</td>
</tr>
<tr>
<td>Soil Texture</td>
<td>Particle mixture of sand, clay, silt, 20-50% of content gravel</td>
<td>High sand content; less than 50% but greater than 20% of content gravel</td>
<td>High clay content; no gravel</td>
</tr>
<tr>
<td>Soil Structure</td>
<td></td>
<td></td>
<td>Hardpans less than one foot from soil surface; peaty, muck soils</td>
</tr>
<tr>
<td>Soil Depth to Bedrock</td>
<td>Greater than 3 feet</td>
<td>1.5-3 feet</td>
<td>Less than 1.5 feet</td>
</tr>
<tr>
<td>Slope</td>
<td>0-5%</td>
<td>5-20%</td>
<td>Greater than 20%</td>
</tr>
</tbody>
</table>
Once the appropriate location has been determined based on soil and topography, the vegetation needs to be considered. The root systems of trees spread wide and should be avoided. Generally, the root system of a tree spreads as wide as or wider than the drip line of the canopy. Therefore, to avoid compaction and damage to the root system, trails should be placed outside of this drip line where possible. This is especially important for large trees, such as the Tulip Poplar (*Liriodendron tulipifera*) near the *Cloud Chamber for the Trees and Sky*. Other large trees should be identified throughout the Park and trails should be located at a safe distance from their root system.

The next phase of trail building is layout. This part of the design process is when you actually walk the area where a potential trail will be built and mark its path. Within this step, remember to avoid the root systems of large trees, steep slopes, and wet low lying areas. It is important to maximize the visitor experience by guiding the users through various types of plant communities and providing vistas of interest and ultimate destinations. Trails should not meander too much and on the other hand, long straight sections should be avoided. Consideration should be given to density of vegetation as well. Trails should have a variety of shade and sun and open and enclosed areas.

After the trail has been properly laid out, construction can begin. Appropriate permits should be obtained before the start of all projects. There are three parts to constructing a trail: brushing and clearing, duffing, and marking.

The first step to construction is brushing and clearing. Trails should be cleared so that all people can walk without touching limbs, trees, or brush. The width of the trail should already be determined based on location and use. The height of the trail should be
cleared to eight feet or as high as one can reach. The footing should be clear and the trail should be easy to follow because there is a clear line of sight. Once a clear path has been cut, the brush should be cleaned from the trail.

Start duffing after brushing is complete. Duffing is the preparation of the trail surface for traffic. It involves scrapping away organic materials such as leaves, roots, needles, etc. The first step of duffing is to mark your treadway edges with something such as string. Then scrap the treadway with a hazel hoe, mattock, or a fire rake. Dig down until you reach the mineral soil and scrap the organic matter off of the trail. Where necessary, use a root ax to cut large roots that may be a trip hazard. If the trail is on a side slope, cut and fill the trail to an even tread with a 2-3% slope on the downhill side to ensure proper drainage. After the trail surface has been prepared, lay the desired surface material.

During this phase of construction, drainage structures should be added where necessary. In some cases, only the slope of the trail will be needed to adequately shed water, but others may need ditches or pipes. These drainage structures should be determined based on slope, location, trail surface, and environmental factors such as soil type. A good rule of thumb for drainage ditches is a wide, flat-bottomed ditch, twelve to eighteen inches deep. The sides of the ditch should slope gently out and up. Specific instructions should be followed for manufactured structures. Sometimes it may be necessary to reroute water in locations where drainage is problematic. Water bars can be used in this case.

Water bars are used to divert water away from the treadway of the trail. The first step in constructing a water bar is to dig a trench at a 30 to 50 degree angle from the treadway. The trench should be deep enough so the top of the rocks will be flush with the
trail. A line of rocks or a log is then placed across the trail to stop the flow of water. The trench which is located just below the rock or log barrier, then carries the water away from the trail. This method of water diversion should not be used on trails which are to follow ADA compliance.

In situations where the trail must cross creeks or when the drainage issues are too problematic, bridges should be constructed. Bridges should meet ADA requirements and be built using proper standards.

Once the trail has been established, appropriate signage should be added to indicate trail name, length, difficulty level, user types, and any other pertinent information. These signs should be of standard design determined by the graphic design department at the Museum (see section 4.4.4 for details).

2) Maintaining Trails:

Trail maintenance consists of keeping the trail clear of debris, maintaining the proper width and height clearance, and addressing drainage issues. Debris can be a safety hazard and therefore should be cleared daily; debris could be anything from mud to down trees. When necessary, trail sections should be closed if the clearing would put a visitor in danger in any way. In addition to keeping the treadway clear, proper width and height clearance should be maintained. Please refer to the Building New Trails section for clearance requirements.

Assuring proper drainage is important in maintaining the quality of the trail. Water will inevitably follow the path of least resistance and move downhill. As water flows downhill it picks up speed and erodes the area within its path. To keep this from happening
within the treadway of the trail, drainage ditches or structures should be the lowest possible point and be the path of least resistance. This can be obtained by proper construction and keeping the structures clear of debris and sediment. To clean the drainage ditch, start on the high end and work your way down the slope. If there is an overflow ditch, make sure this area is kept wide and clear for proper drainage.

If sections of the trail continue to erode, it may be necessary to relocate the trail to a more appropriate location. If this is the case, reroute the trail using the guidelines outlined in the Building New Trails section. Replant the old trail using the guidelines in the Ephemeral Trails section.

3) Planting Trail Edges:

All trail edges should be planted for visual interest. The Prairie Trail, which is lined with a ditch for drainage, should be planted with native prairie wildflowers and grasses (see Appendix D for species lists). These plantings can be used to camouflage the depressional area.

Remove the gravel from the edge of House Creek Greenway and plant native wildflowers and grasses along the edge of the pavement for visual interest. Plants with large root systems, such as trees and shrubs need to be five feet from the edge of the trail as per the City of Raleigh requirements. All plantings should be appropriate for the site in which the trail is running through (see Appendix D for species list).

Native trees should be strategically placed along the Museum Trail to provide shade for visitors. In some areas, the prairie should be moved up to the trails edge for visual interest.
The Woodland Trail’s edge should also be enhanced with native flowering species. This should be done to look as natural as possible. There should not be any large concentrations of species but rather a random pattern across the forest floor and on the trail’s edges (see Appendix D for species list).

Where trail edges are impenetrable, first rip the soil with a ripper plow to a depth of 8-10 inches. This will increase soil drainage by increasing the amount of micropores. It will also loosen the soil to allow for root penetration. Immediately after ripping, plant the trail edge with a native seed mix or plugs. Where trail edges are easy to dig, ripping is not necessary. In this case, proceed with seeding or planting plugs.

4) Ephemeral Trails:

In some cases, temporary trails may need to be constructed in order to guide visitors to temporary sculptures or other sites of interest. Such ephemeral trails should always be mulched or surfaced with other biodegradable material and not paved or graveled. This will allow the area to be replanted after the life of the trail. These trails should meet the minimum width and height clearance to assure safety. The temporary trail should be constructed as specified in the Building New Trails section.

Once the trail is no longer needed, the area should be replanted and returned back to a “natural” state. Depending on the location of the trail, different techniques may be used to prepare the surface and replant the area. The types of equipment should be chosen based on site limitations and location. If needed, rip the soil along the trail’s treadway to loosen the soil bed. This should be done if the trail has become very compact and impenetrable. After ripping, either seed drill or broadcast the site with an appropriate seed mix or hand plant
plugs. Within the woodland, trees, shrubs, and forbs should be hand planted within the old trail to maintain a natural look. Seeding in this area would create an unnatural appearance due to the thick cover it may produce. The prairie on the other hand, should be reseeded with a native seed mix. After planting, the area should be monitored and reseeded or planted when necessary.

4.4.2 Recreation

Creating new trails and maintaining trails as outlined in section 4.4.1 will guide the Park in meeting the objective of providing recreational opportunities that minimally impact the environment.

When patrolling in a motor vehicle or gator, Park staff and security should always pull off the Museum Trail or Greenway for visitors using the trails. In addition to being courteous to Park users, a slow speed should be maintained and trail entrances should never be blocked.

4.4.3 Promotional Materials

Promotional materials for the Museum Park are created and distributed by the Marketing Department. Park staff should regularly review these materials to ensure they are current and correct. Brochures are updated annually (approximately), with the schedule to be set by the Graphic Design and Marketing team. Brochures and wayfinding must be integrated into an economical and useful set of materials for on-site and off campus uses.

Content for promotional materials is written and submitted by the Park staff with curatorial review as needed. When submitting a work order for promotional materials, allow time for editing, design, and final production. All park-related content must be reviewed

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and approved by the Park Manager and the Director of Planning and Design prior to printing and distribution. Brochures and maps are printed with Park Operation funds, unless a specific grant is in hand for the production of a brochure/map.

Web content should also be reviewed monthly to ensure its relevancy; report any updates to the Marketing Department using the Web Update form.

4.4.4 Signage

New signage and replacement signs are needed frequently as conditions change. The Exhibit and Graphic Design Departments oversee the visual unity of the indoor and outdoor Museum environment. These departments fabricate (or contract fabrication), install and repair signage, sign structures, brochure boxes and kiosks. Installation and location of signage should be coordinated with Park staff and the Director of Planning and Design to ensure proper siting and to minimize environmental impact. Concrete footings should be poured by the Exhibits or Facilities Departments; Park staff can assist if staff resources are available.

The Exhibit and Graphic Departments are responsible for the design and installation of temporary signs and signage structures for outdoor museum events and festivals, Park Theatre summer season, and temporary art installations.

Annual park signage needs, schedule and budgets should be discussed with Exhibits and Graphics in January of each year and approved by the Director of Museum Planning prior to the finalized budget each spring.


4.4.5 Programming

1) The Performing Arts Department is responsible for all of the outdoor amphitheater programming. They also plan all outdoor events and prepare all service contracts for such events, including Earth Day. Outdoor space usage should be coordinated with the Museum Park Manager.

2) The Park is a resource for educational programming and enriching learning opportunities. Due to the large maintenance demands and limited staff, the Park Department cannot manage outdoors educational programming. To maximally utilize this resource, a dedicated Park Educator is needed on staff. Reporting to the Director of Education, the educator would coordinate and manage Park programming and operate as a liaison between the two departments. Interpretative materials are organized and created by the Education Department, such as the Park backpacks.

4.4.6 Visual Resources

The Master Plan (Appendix A) should be referenced for future development to maintain the Park’s visual resources.

4.5 Park Administration Management

4.5.1 Park Staff Responsibilities

The Museum is responsible for all capital repairs, site furniture and structures, signage repairs and maintenance, art projects, vandalism and emergency storm response for land outside the 20-foot-wide corridor of the greenway. The Museum and the NC Department of Cultural Resources are responsible for the upkeep and repair of all other trails, including the Woodland and the Prairie Trails.
Table 1.13 Park Staff Tasks

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Description</th>
<th>Supplies &amp; Equipment</th>
<th>Frequency</th>
<th>Time Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail Maintenance</td>
<td>Clear trails of debris and loose impediments, e.g., remove rocks, fallen tree limbs</td>
<td>Work gloves, trash bags, broom, rakes, blower, shovels, chainsaw (if needed)</td>
<td>Daily</td>
<td>Daily- 1 hour to walk all trails; if heavier work is need, time will vary</td>
</tr>
<tr>
<td>Bridges</td>
<td>Sweep and treat wood</td>
<td>Work gloves, broom and blower</td>
<td>Sweep weekly; wood treatment as needed</td>
<td>During the walking of trails, 3 bridges 5 minutes each to sweep; wood treatment times will vary</td>
</tr>
<tr>
<td>Trail Maps and Brochures</td>
<td>Restock maps and brochures at each station/park entrance</td>
<td>Park maps and brochures</td>
<td>Daily as walking trails</td>
<td>Daily during the walking of trails, 5 minutes total</td>
</tr>
<tr>
<td>Signs</td>
<td>Clean/wipe down</td>
<td>Work gloves, cleaning solution, rag</td>
<td>Weekly as walking trails</td>
<td>One additional hour on trails</td>
</tr>
<tr>
<td>Iron work on Benches and Signs</td>
<td>Coat with Penetrol to protect iron</td>
<td>Work gloves, Penetrol and applicator</td>
<td>As necessary</td>
<td>Will vary depending on each sign/bench</td>
</tr>
<tr>
<td>Picnic Area</td>
<td>Empty trash cans and pick up litter; check picnic tables for safety</td>
<td>Work gloves, trash bags, possibly tools for table repair</td>
<td>Varies with time of year and amount of use</td>
<td>Daily during walking of trails; may add 15 minutes to walk; more time may be required if heavy and/or frequent use</td>
</tr>
<tr>
<td>Art</td>
<td>Inspect art for damage and vandalism</td>
<td>None needed</td>
<td>Daily as walking trails</td>
<td>Daily during the walking of trails</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Cloud Chamber</th>
<th>Inspect art for damage and vandalism; sweep out; wipe down walls and floor; paint as necessary</th>
<th>Broom, sponge, bucket, paint supplies</th>
<th>Sweep daily; wipe down biweekly; painting will be as needed (every 1-2 years)</th>
<th>5 minutes to sweep; 30 to wipe down; 2 hours to paint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pet Waste Station</td>
<td>Empty trash receptacles; stock pet waste bags; clean station</td>
<td>Keys to station, work gloves, pet waste bags, trash bags, cleaning solution, rag</td>
<td>Biweekly as walking trails</td>
<td>5 minutes per station; currently 3 stations</td>
</tr>
<tr>
<td>Trail Counter</td>
<td>Record counter number, date, and time; trim back shrubs and trees as necessary</td>
<td>Paper, pen; work gloves, plant cutters</td>
<td>Record data twice weekly; trim as necessary (2-4 X per year)</td>
<td>During the walking of trails (2 min); trimming growth should take 10 minutes or less</td>
</tr>
</tbody>
</table>

### 4.5.2 Security

The State Capitol Police Officer (SCPO) is responsible for responding to all emergency and non-emergency calls for service at the NC Museum of Art and the surrounding grounds. This includes but is not limited to fire alarm activation, intrusion alarm activation, medical assists, larcenies, requests for service, checkmates, and motor vehicle accidents.

During first shift (6:00 a.m. – 6:00 p.m.), the SCPO’s primary responsibility will be to provide law enforcement services to the Museum of Art and will also be responsible for patrolling State Capitol Police Zone # 3. Zone # 3 consists of the property located between Glenwood Ave. and all point west to left on Duraleigh Rd. to right on Reedy Creek Rd. to left on Trenton Rd. become Trinity Rd., right on E. Chatham St. to left on Maynard Rd. to
left on Walnut St. to left on Jones Franklin Rd. to right on I-440 to left on Gorman St. to right on Avent Ferry Rd. to right on Western Blvd. to left on Pullen to right on Hillsborough St. to left on Oberlin Rd. to right on Wade Ave. to left on Glenwood Ave. SCP officers permanently assigned to the Museum of Art are required to remain in Zone # 3 at all times. Only under exigent circumstances and with the expressed permission of the supervisor, will the officer be allowed to leave Zone # 3. SCPO’s are not authorized to begin checks of Zone #3 until after 8:00 a.m. each day.

The Cloud Chamber should be unlocked at 7:30 a.m. daily and should be secured at 5:00 p.m. During inclement weather, the Cloud Chamber will remain closed. SCPO must walk to the Cloud Chamber, as it is located on a secondary mulched trail.

The SCPO on duty patrols the Museum Park every two hours. Gators may only be used prudently, and the provided SCPO motor vehicle should function as the main mode of transport.

Security checks completed by the SCPO should be called in via the State Capitol Police 800 mhz 2-way portable radio and should be documented in CAD. Any damage or vandalism to the outdoor works of art should be reported to the Director of Security and a SCP incident report should be completed and filed. The NCMA Security Department will contact the Conservation and Curatorial Departments in the event of damage to works of art and return any recovered pieces to the appropriate department.

During non-operating hours, the SCPO on duty should remain on the Museum of Art property and make interior checks of the facility and exterior checks of the Museum grounds every two hours. All exterior checks should be coordinated with the Security
Guard on duty to ensure adequate security coverage inside the facility at all times. Prior to conducting a security check, the Officer should notify Access Control and should call SCP Communications Center via the State Capitol Police 800 mhz 2-way portable radio. All security checks should be documented in CAD.

The SCPO assigned to the Museum of Art during the 6:00 p.m. until 6:00 a.m. shift shall remain on the Museum property and is only authorized to leave the surrounding grounds for emergency situations and with the expressed permission of the SCP shift supervisor. Before leaving the property, it will be the responsibility of the SCPO to notify Museum Security. The SCPO is also required to notify Museum Security upon his return.

During those occasions when the Museum of Art is hosting a high profile exhibit, special events, or any function where law enforcement presence is deemed necessary, the SCPO will remain on the Museum of Art property and provide crowd control, traffic direction, or any law enforcement services that are needed.

Museum Security will patrol the Park as practical during opening hours on a gator or bike. All secondary and tertiary trails must be patrolled on foot; this includes the Prairie, Woodland and Ramble trails. Any problems should be reported to a Security Supervisor and the Park Manager.

Park Staff also patrol the grounds daily, and should report additional safety concerns and problems to a Security Supervisor for immediate assistance if required.
4.5.3 Volunteers

1) Volunteer Services:

   The Park Staff relies on volunteers to accomplish its goals and to sustain and manage the site. The Museum Park is represented on the Museum’s Volunteer Board by a Museum Park Service Committee Chair. This Chair serves a one-year term (May-April) that can be extended for two additional terms upon reelection. The Chair reports to the Museum Park Manager and the Board of Directors of the North Carolina Museum of Art Volunteer.

   The Museum Park Service Committee Chair is responsible for contacting new volunteers; informing the volunteer of the responsibilities and commitment required of Museum Park volunteers; ensuring that new volunteers meet with the Visitor Services Manager to complete a volunteer application as well as the required new volunteer orientation; scheduling sufficient volunteers to complete tasks; coordinating work days; and reporting the activities of the Museum Park volunteers to the Volunteer Board. It is also the responsibility of the Museum Park Service Committee Chair to identify potential leadership for the committee and mentor such volunteers to assume the duties of the Chair prior to the end of his/her current term.

   Information regarding volunteer opportunities and work days shall be forwarded to the Visitor Services Manager for posting and advertisement.

2) Volunteer Programs:

   Volunteers participate in workdays and assist with special projects. Regularly scheduled group workdays occur once a month, except for July and August and when
adverse weather conditions prohibit the activities. Park Staff and the Service Committee Chair are responsible for the coordination and supervision of the volunteers.

Additional community group workdays may be scheduled at the discretion of the Park Staff. These events may or may not include NCMA volunteers. Primarily the groups are from the community at large, e.g., Boy Scouts, corporate community outreach groups, and service organizations that volunteer to assist in completing specific projects. Such projects include but are not limited to trail work; mulching trails; planting trees, flowers, grasses, and shrubs; removing exotic invasive plant species; installing and de-installing artwork; and bluebird and purple martin colony monitoring. Although the Park Staff is responsible for the coordination and supervision of these events, they may require the assistance of the Service Committee Chair and/or the Visitor Services Manager for high-profile or larger groups.

Two lead volunteers and two substitute volunteers are needed to assist in handling the bluebird project. Additional volunteers are used to help monitor and evaluate the purple martin colonies. Park Staff is responsible for training these volunteers.

4.5.4 Visitor Services

Front Desk workers and all staff that interact with Museum visitors should be able to inform interested parties about the Park and its opportunities. Park-related materials should always be available at the front desk for visitors. Park Staff should update the Information Desk Manager and Visitor Services Manager with any new pertinent information.

Outdoor brochures and maps are stocked by the Park Staff. Information Desk materials are maintained by the Information Desk Manager. Park Staff is responsible for
working with other Museum departments in the development, procurement, and distribution of park-related materials. (See Marketing section)

4.5.5 Funding

1) Grants:

The Park Manager is responsible for updating the Grants Manager of financial and project needs. The Grant Manager alerts the Museum Park Manager and Director of Planning and Design of pertinent grant opportunities. The Park Manager is also responsible for researching funding opportunities.

Completing and filing grant applications and reports are an ongoing collaboration between Grants Manager and Museum Park Manager. Assistance is provided by Administrator in Planning Department as needed. The Park Manager is responsible for writing content and providing finance information; the Grants Manager reworks all content into the required format and submits to grantor agency. The Grants Manager is the point of contact for existing and potential donors, and the Park Manager is copied on all correspondence.

The grant reporting schedule is managed by the Grants Manager and distributed monthly. The Grants Manager determines whether or not to (re)apply for a grant based on project’s relevancy, the Park department’s needs, and schedule conflicts.

2) Naming Opportunities:

Naming opportunities support the maintenance and growth of the Museum Park and the Park Fund. Suggested naming opportunities of Park elements should be submitted in writing to the Park Manager with prior approval from the Development Director. Possible
opportunities are carefully reviewed for impacts and must have the final approval of the Executive Director, Director of Development and Director of Planning and Design. A plan for method of recognition and resources to implement recognition must be approved as well. A written decision will be returned within a maximum of one month.

The Museum Park will continue to grow and develop, resulting in new, unforeseen possibilities. If a suggested opportunity is denied, then it can be resubmitted after one year’s time.

The cost of reprinting brochures, maps and signage is significant; therefore, trails cannot be renamed without extraordinary reason after they are constructed and assigned a name by the Planning and Parks Departments. This will also ensure that frequent and new visitors can easily navigate the site. Trails can, however, be sponsored and supported by a donor. This information will be added to signs and electronic materials quarterly, and updated on maps and brochures when reprinting is necessary (approximately annually).

The Museum does not have the right to sell naming rights to City facilities, and therefore, naming rights of the Greenway must be submitted to the City Council directly. Since there are innumerable naming opportunities in the Park and policies discourage the naming of existing named trails, other naming opportunities should be pursued.

4.5.6 Maintenance Equipment

The Maintenance staff manages all equipment, including the gators, tractor, and tools. Only trained and certified staff can use and service Museum tools and equipment. Currently, Park staff is authorized to use and service the equipment. Park staff changes the oil and belt on their designated gator. Future staff that may be certified to use and service
equipment are designated landscape staff for the future gardens and courtyards. The Department of Administration staff (Facilities Services Division) is authorized to operate, service, or repair the Museum lawnmowers. DOA is responsible for fuel costs associated with their use. The NCMA is responsible for the costs associated with maintaining and repairing all NCMA leased/owned equipment.

Facilities, Park, and Security staff are jointly responsible for filling fuel cans and gators as needed. The fuel cans and truck are filled at a designated State fueling station using the appropriate fuel key. The truck gas key is not to be used for filling fuel cans. Key # 23 must be signed out from Security Access to fueling cans with gasoline or diesel fuel.

4.5.7 Built Zone Maintenance

1) Pesticide Control:
The Park Department contracts out pesticide control for both the amphitheater and the pavilion. Facilities manage pesticide control around the base of the building and along the main sidewalks; DOA is involved in pesticide application if needed.

2) Sidewalk Treatment:
Facilities also treat the main sidewalks with herbicides and salts them during icy conditions. Future sidewalks in the gardens and courtyards will be maintained by Park Staff with the assistance of Facilities as the landscape will be sensitive to herbicides and salt. The Department of Administration is responsible for salting and plowing parking lots during wintry weather.
4.5.8 **Housekeeping**

Trash receptacles in the Park and the Blue Ridge Parking lots are checked and emptied by housekeeping staff daily. Housekeeping, Park, Security, and Facilities staff are expected to pick up trash anywhere on site when they are on gators or walking around.

Housekeeping also supplies and empties trash receptacles during outdoor events and cleans up any remaining litter following an event in the Park and the amphitheater. All trash and debris must be picked up and removed by the following morning. The trash bins around the Park must also be checked and emptied the following morning as soon as possible, as they are generally full following an event.

Housekeeping staff cleans the amphitheater bathrooms and the amphitheater. Additional time and resources are required for cleaning following outdoor events. Housekeeping must be notified whenever the use of the amphitheater facilities is expected so that restrooms and the general area can be cleaned and prepared for use.

If trash receptacles are needed, requests should be submitted by email to the Housekeeping Supervisor, specifying the number of bins, the locations preferred, and the time the bins should be set up and removed.

4.5.9 **Photography**

Photo documentation requests should be sent to the Head of Photography electronically using the “Photographic Services Work Order,” which is located in the shared staff folder. If the Museum photographers are unavailable, then Park staff should attempt to take photographs with the Park Department’s camera.
4.5.10 Planning

The Director of Planning and Design also serves as the Park Director and is responsible for the long-term planning, general development, and improvements in the Park. The Director of Planning and Design also manages the Park Fund and its allocation to projects and operations. He is a member of the Partnership for Art and Ecology and represents the Park to senior staff and the Executive Director of the Museum.

The Planning Department administrator assists the Park Manager with day-to-day expense tracking, budget preparation, grants, communication, and as-needed assignments.
Appendices
5.1 APPENDIX A: Museum Park Master Plan

NCMA North Carolina Museum of Art

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PRELIMINARY COST ESTIMATE 23

Daniel P. Gottlieb, Director, Museum Planning & Design
Christina M. Herring, Museum Park Manager
Lawrence J. Wheeler, Director

The Partnership for Art and Ecology:
Dan Gottlieb - Director, Planning & Design - NCMA
Linda Dougherty - Chief Curator - NCAA
Christina Herring - Museum Park Manager - NCMA
Kathryn Asad - Planning Assistant - NCMA

Vic Lebovitz - Greenway Planner - City of Raleigh Parks and Recreation
Wayne Schindler - Superintendent - City of Raleigh Parks and Recreation

Ted Shear - Associate Professor, Forestry & Environmental Resources - NCSU
Roger Moore - Associate Professor, Parks, Recreation, and Tourism Management - NCSU
Dena Justice - Park Fellow (2007-2008) - NCSU

Funding for the North Carolina Museum of Art Park Master Plan was made possible by
Piedmont Natural Gas Foundation.

Master Plan developed by Lappas + Havener, P.A.;
Walter Havener, Anja Polvers, and Grayson Baur

NCMA is an agency of the North Carolina Department of Cultural Resources.

January 21, 2007
MUSEUM PARK VISION

The Museum Park is:

- a venue for regional, national, and international artists to create temporary and permanent works of art in response to the Park’s landscape.
- an accessible part of the Museum for guests to informally experience art.
- a community-gathering place that fosters dialogue about the relationships between art and public space; art and landscape design; art and the environment.
- an inviting, well-maintained space that attracts new audiences to the Museum by encouraging encounters with art through recreation and entertainment.
- preserved as open space and managed responsibly as a publicly accessible laboratory for art in an ecologically restored landscape.

Education Program

- Inform and stimulate dialogue about the relationships between art, public space, landscape design, and the natural environment.
- Create opportunities for public participation in land restoration and management.
- Create a resource for education through expanded partnerships with educational, cultural, and environmental agencies and institutions.
- Design programs about art and nature for participants with a variety of interests and abilities.

Audience Development

- Increase the Museum’s total attendance by reaching a more diverse constituency, and encourage repeat visitation with a variety of trails, changing art, and public programs.
- Expand community development and reach new audiences by providing a unique opportunity for interaction and participation in nature, recreation, and culture.

Environmental Preservation

- Study, protect, restore, and preserve the natural environments of the Park.
- Restore several historical ecosystems indigenous to North Carolina.

STRATEGIES

Art Program

- Integrate art into the Park’s natural areas and provide connections between art and nature by commissioning artists’ projects to expand the perception of both art and nature.
- Present the work of regional, national, and international contemporary artists in the informal Park environment.
- Provide opportunities for the creation of new work and experimental projects in the landscape, both temporary and permanent, including collaborations between artists, architects, landscape architects, and environmental scientists.
EXECUTIVE SUMMARY

The Museum Park is a unique yet underutilized resource for the North Carolina Museum of Art. As this writing, the Museum Expansion project is well underway; this project will greatly expand the built facilities of the Museum and allow it to reach a greater audience. At the same time, Museum leadership continues to consider how the 104 acres of rolling Piedmont prairies and woods that comprise the Museum’s total land holdings will better contribute to the mission and goals of the Museum.

The Museum Park Master Plan supports and extends the Museum’s goal of broadening and diversifying the Museum’s audience by creating an innovative destination for art, education, and recreation. By creating integrative public programs in art, education, and recreation in the Park, and through the restoration of the natural systems of the Park, the Museum of Art can become a national leader in art, education, and environmental stewardship.

The Master Plan presents a framework for future design and construction projects in the Museum Park, so that these projects can be coordinated toward a common set of goals.

The Plan defines general use areas, describes a circulation system, and advocates the general placement of other improvements such as gates, barriers, utilities, and entry signage. In doing so, it organizes the primary functions of the Park—art, education, and recreation—into a cohesive system that can be developed over time as funds become available.

The Museum Park Master Plan is built upon two primary concepts of circulation, or paths: the Clip and the Ramble. The Plan also proposes new gateway monuments at four entrances to the Park. These core elements connect the Museum to the Park and provide access to new art sites throughout the Park.

Other elements that provide settings for art, education, and recreation are built upon these core elements.
INTRODUCTION

At the same time that the North Carolina Museum of Art has undertaken a dramatic addition to its facilities on Blue Ridge Road with the new building designed by Thomas Phifer and Partners, Museum staff have been planning improvements within the greater site the Museum occupies. Some of these improvements are directly related to the Museum addition, such as the proposed stormwater treatment channel and pond designed to treat rainwater moving across the site, and the relocation of great quantities of fill generated by excavation. Other recent improvements in the 164-acre Museum Park include the House Creek Greenway, a signage program, new trails, a pavilion, and the placement of numerous sculptures such as Thomas Sayre’s Gymn and Martha Jackson-Jarvis’s Crossroads.

The North Carolina Museum of Art (NCMA) is rare among American museums in that it is surrounded by a large and varied landscape, and with this landscape comes great potential for the creation and display of art. Some museums, such as the Walker Center in Minneapolis, have adorning gardens for the display of sculpture. Other sites, such as Storm King in New York, offer pastoral settings for the display of large works that are not necessarily related to their site other than by their greatness of scale, and are not adjacent to museum facilities. By contrast, the NCMA has begun to take advantage of the Museum Park’s vast artistic potential in commissioning works that are not only sited in the Park, but that use the materials, themes, and ideas inherent in the site itself to produce new forms. The columnar sculpture Crossroads, for example, illustrates this principle in its reuse of materials from the old Polk Youth Center prison site, and in its use as a trail intersection marker in the Park. The Museum’s program for art in the Museum Park is based upon such relationships between art and the history and ecology of the site.

In addition to its program for such environmental art, the Museum has been pursuing management programs of environmental education and recreation management in the Park. In 2001, the Museum and the College of Natural Resources at North Carolina State University agreed to cooperate in restoring and managing the Museum property.

The goals of this Master Plan are:

- Create a Museum Park that enables artists to interpret the landscape and produce original, site-specific work.
- Create a network of trails that encourage increased visitor access to Museum programs, facilities, and resources in the Park.
- Restore the ecological function of the Park landscape.
- Define zones of use for the Museum Park landscape.
- Address immediate needs for Park facilities and improvements.
- Provide a plan for phased implementation of Museum Park improvements.

"...the NCMA has begun to take advantage of the Museum Park’s vast artistic potential in commissioning works that are not only sited in the Park, but that use the materials, themes, and ideas inherent in the site itself to produce new forms."
SITE ANALYSIS

CONTEXT

The Museum Park connects the North Carolina Museum of Art with Raleigh's regional Greenway system. Currently, the House Creek Greenway traverses the Park on its way from Meredith College and the I-440 Reedy Creek Pedestrian Bridge, to Umstead State Park, its ultimate destination in northwest Raleigh. Construction on the House Creek Greenway is scheduled to begin in summer 2007; this connection will link the Park to the Crabtree Valley Mall area, and is expected to increase use of the Reedy Creek Greenway, including the segment running through the Museum Park.
SITE FEATURES

The Museum Park lies between the existing Museum of Art building to the north, Blue Ridge Road to the west, and Wade Avenue Extension and I-440 on the south and east. The site comprises a variety of Piedmont soil and vegetation types, which are expressed in two broad categories of landscape: the prairie and the woods. Each of these facets occur in two broad swaths running west to east. Both of these broad categories contain several landscape types. The prairie is subdivided into lawn areas near the Museum, and old pasture and field areas further south. The woods contain areas of floodplain forest as well as north-facing slope forest, mesic (or medium-moisture) forest, and mixed pine/hardwood forest. House Creek and a tributary drain the site and flow in a northeasterly direction. The site’s overall elevation change is 150 feet from the site’s highest point of 495 feet above sea level to its lowest point at the House Creek culvert at about 335 feet above sea level.

A few characteristics of the site are human-induced but nonetheless significant. A Progress Energy transmission line runs atop towers along the northeast margin of the site. Noise from vehicular traffic in the adjacent I-440/Wade Avenue interchange can be heard throughout the whole site and becomes a dominating site element in the southeast corner.
EXISTING PARK USES

At present, the primary uses of the Museum Park are associated with the Greenway and other existing trails, and the places that those trails reach. The House Creek Greenway and the Museum Trail are the only paved trails in the Park and serve as a regional conduit for bicycle touring and running. They also offer a good surface for walkers, many of whom bring children in strollers. The Museum provides a location for some seasonal events such as the annual spring festival. Owing to the challenging topography of the parkland south of the Upper Prairie and the fact that most trails leading away from the Greenway are unpaved, many areas of the Park see relatively little use. The westerly third of the prairie area is currently divided from the Park by a fence that once contained grazing horses of the NC State College of Veterinary Medicine. This fence is scheduled to be removed by June 2006.

Most currently sited works of art in the Park have been placed in areas near the trails at locations chosen by the artists themselves. This freedom in selecting suitable art sites is expected to remain a primary feature of the Park’s art program.

A program of interpretive signage is now in place in the Museum Park. These signs occur at selected locations along trails to inform visitors of the flora, fauna, and ecological issues present in the Park.
CONNECTIONS

The Museum Park is composed of three distinct environmental zones based on their experiential qualities. In the northwest corner, the Museum and its ancillary buildings and parking lots comprise a built zone where outdoor spaces directly serve the Museum building function. Further south, a spacious lawn and fields stretch into the distance. These constitute a prairie zone where the defining characteristic is openness and vastness of scale. The third zone, the woodland zone, stretches from the prairie zone to the south and east boundaries of the Park.

To knit these zones together in a way that supports recreation, education, and the creation and display of art, the Master Plan proposes two new paved trails – the Clip and the Ramble.

The Clip is a direct Museum-to-Park trail, a ribbon of pavement that takes visitors directly from the Museum entrance area to the heart of the Park. The Clip also connects the Museum to future parking areas along Blue Ridge Road via the Museum Park.

The Ramble is a loop trail that runs mainly along the boundary between the woodland and prairie. New works of art will be sited in the vicinity of this trail and thereby easily accessible to all Park visitors.
LANDSCAPE ELEMENTS

The Master Plan proposes a series of new landscape elements to accentuate the existing characteristics of the Park landscape. At several points in the prairie zone, the Plan proposes sculpted earth forms on or near paths to allow visitors a commanding view of the surrounding open space and artworks. These belvederes will occur along the Clip Trail.

The boundary between the woodland zone and the prairie zone is currently a relatively straight line. The Plan proposes to modify this edge with plantings of additional deciduous trees in selected locations. The intent of this planting is to create smaller subspaces within the vastness of the large space and to promote a more varied woodland edge, thereby making the experience of walking along the Ramble a more diverse and interesting one.

Other elements proposed include new park entry markers at primary points along the Greenway and near the Museum, evergreen tree planting to frame and control views, and augmentation of existing clearings in the woodland zone to provide small open spaces in the midst of the woods.
LANDSCAPE SPACES

The Plan conceives of the Museum Park as a variety of outdoor spaces, each with its own purpose and character. Rather than being simply what is left over after the construction of buildings and parking lots, Park spaces should be deliberately formed with a diversity of scale. The formation of these spaces has already begun with the creation of the amphitheater, and is continuing with the garden designs for the Museum's expansion as well as the planning of the stormwater pond project, which proposes additional tree planting to frame views and define the stormwater pond area as an outdoor room.

The Master Plan proposes new tree planting to create subareas within the larger prairie zone, while the belvedere at the end of the Clip Trail provides definition to the Lower Prairie. Within the wooded area, the augmentation of small existing clearings will provide another type of space, and dense plantings near an existing pool in House Creek will form a grotto space.
TOPOGRAPHY

The Master Plan uses topography as a determining factor in the provision of several proposed features. A large area of new tree plantings to augment the existing woodland edge are proposed to occur along existing swales, or draws, in the terrain.

The well-defined north facing slope above the tributary to House Creek provides a cooler microclimate where species unique to that environment thrive. To protect this habitat, the Plan recommends removing some of the paths that traverse this area, while allowing views into the area from the north side of the tributary. Similar sensitive areas occur southeast of House Creek; these areas will remain undisturbed by paths, though artworks may be sited near them.

Topography can also be advantageous in providing security from vehicular intrusion into the Park. Particularly along the bordering freeways, existing steep slopes prevent vehicular access. The Park’s security program employs a strategy of similar slopes and earthworks to create a perimeter impervious to vehicle traffic (see Security).
ACTIVITY ZONES

Dr. Roger Moore of North Carolina State University’s Department of Parks, Recreation and Tourism Management has developed a conceptual framework that describes three zones of activity envisioned for the Park: the active, reflective, and nature refuge zones. According to this concept, different zones require different design responses based, respectively, on whether their overall character is one of brisk human activity, more contemplative activity in calm surroundings, or whether human activity is a rarity and non-human natural processes dominate. The Plan proposes that these zones be expressed in the Museum Park according to the diagram below. Thus, the east-west ridge where the Greenway runs is the divide between active and reflective, and nature refuge areas occur in the ravine and floodplain areas on both sides of the creek, as well as on north-facing slopes.
MASTER PLAN ELEMENTS

BELVEDERE EARTHWORK

Walking out from the Museum along the Clip Trail, visitors ascend a path that climbs toward the Greenway, and then leads off toward the prairie area. As the prairie falls away on either side of the trail, the trail maintains a constant elevation. At the end of this trail, visitors find themselves elevated above the surrounding prairie in the midst of the space. The earthwork that provides this experience of the prairie zone is a belvedere, a high point from which a “fair view” is obtained.

PARK ENTRY MARKERS

Gateways and entry features are important parts of almost every successful park in that they signify that one is entering a special precinct. The Plan recommends that each entry point to the Museum Park be marked with a memorable, conspicuous monument. Such features can be existing features, like the Polk Youth Center smokestack, or they can be artist-designed gateways or monuments.
LEARNING SPACES

To support the Museum’s future education programs, the Plan includes outdoor gathering areas, that function as learning spaces as well, where groups of up to thirty students can congregate amid informal seating for instruction and socializing.

These areas, placed on spur trails coming off the primary trails, will be furnished with native materials and planted with Piedmont woodland native plants. Durable materials such as rock and gravel will allow gathering and seating while preventing erosion associated with concentrated foot traffic.

GROTTO

In the vocabulary of Italian Renaissance gardens, a grotto is a quiet place apart from the rest of the garden - often a small cave characterized by shade, coolness, and proximity to a spring or a pool of water. Such places are often known only to those who make an effort to find them. The southeast corner of the Museum Park contains such a feature, at the downstream end of the House Creek culvert emerging from under the Wade Avenue Extension. This site is currently an opening in the forest covered in kudzu vines. As part of the removal of this invasive species from this part of the Park, new trees can be planted that will shade this area and create this “secret garden.” Stream restoration techniques will be employed to stabilize the existing pool downstream of the culvert. New tree cover will help lower water temperatures in the creek while providing visitors a welcome retreat from summer temperatures.
VEHICULAR AND SERVICE CIRCULATION

Vehicular access to the Museum Park will be limited to service and emergency vehicles only. As now, service vehicles will use the Greenway and the service road to the former NCSU College of Veterinary Medicine facility area, which will be repurposed as a maintenance facility for the Park. For the most part, service vehicles will not use the Clip or Ramble Trails, except for short stretches where these trails coincide with those named above. In the future, limited cart access to the Clip and Ramble Trails is an amenity that the Museum could offer patrons with limited mobility, such as the disabled and elderly.

SECURITY

Current 24-hour patrols of the Museum Park by Capitol Police will continue. In addition to this service, the Master Plan proposes another layer of security that focuses on keeping unauthorized vehicles out of the Park. At each pedestrian entry point, barriers such as bollards or gates will be placed in the trail, accompanied by a sign outlining Park rules. Between these points, the perimeter of the Park will be protected against vehicular access either by existing topographic conditions (steep banks along the freeway, for example) or by new measures constructed to produce the same effect. These new topographic barriers could be carefully designed trenches, earthen berms, or steep drop-offs designed to deter vehicular access while harmonizing with the Park landscape. Fences, where they occur, will be inconspicuous ornamental (welded) wire or one-inch mesh steel chain link, both black.
LOOPS

When the planned trail system is complete, it will offer visitors a choice of many routes that are suited to people of varying abilities and interests. By creating a series of concentric and intersecting loops, the Plan provides at least four distinct loop trails of varying length and elevation differences, with many variations available between them. Loop trails have been found to boost usage of park trails in City of Raleigh Parks as compared to one-way-and-back routes.
TRAIL SURFACES

In general, the Plan proposes to increase the amount of paved trails to make the Park available to a greater visitor population. The Museum Park trail system in the Master Plan is composed of a hierarchy of paved and non-paved trails, composed of a variety of surfaces. The Clip and the trail to the Museum from the new parking areas will be a high-quality hard-surface trail of variable width, approximately ten feet wide (the existing Greenway is ten feet wide). Materials available for this trail include colored aggregate asphalt, concrete, and unit pavers.

Other trails shown in color on the diagram below are six feet wide and will be paved with asphalt or other fixed material. Trails in wooded areas that are not paved will be composed of shredded wood mulch.
UTILITIES
Because the Ramble will afford access to the Park to a great number of visitors, and because this Plan cannot anticipate all the uses for this part of the Park, the Plan proposes the installation of electrical conduit along the Ramble as it is built. Some uses of this power that have been suggested include lighting for special events (the Park typically will remain closed at night), and power for generators for special events and potential future artwork. Special events associated with the limited use of the Park at night represent potential future revenue for the Museum.

LANDSCAPE REMOVALS
The Plan proposes the removal or relocation of several existing trails. When the new visitor parking area is built along Blue Ridge Road, the House Creek Greenway will be re-routed around the south side of that lot to lessen pedestrian and bicycle conflicts with vehicles near the Museum entry road. The construction of the Clip and Ramble Trails will replace the informal network of earthen and gravel trails that have been placed in the prairie zone over the years. These areas will be revegetated. In the woodland zone, trails leading across steep slopes will be rerouted to flatter areas to repair the erosion that has occurred there.

Of special significance, the Plan proposes to remove part of the existing paved loop formed by the Museum Trail. In its place, a belvedere will lead visitors into the midst of a restored prairie that sweeps up the hill toward the Museum building.
PRELIMINARY COST ESTIMATE

Because the Master Plan gives direction to a process that will take place over several years, paid for with funds from a variety of sources, with work performed by a variety of contractors and other groups, it is necessary to divide the proposed set of improvements into packages that can be released to designers and contractors as circumstances permit. The diagrams below divide these packages into two main categories. A brief description of each package item and its order-of-magnitude cost is given in the following sheets.

In general, Trail Projects will require hiring a contractor to perform work related to demolition, erosion control, paving, and site construction items such as retaining walls, bridges, and boardwalks. Revegetation Projects include work packages that deal with tree and shrub removal and planting, large-scale revegetation, grass and prairie seeding and planting, and invasive species control. These projects can be bid out to qualified landscape contractors or restoration specialists.

Alternatively, some revegetation projects could be incorporated into field work performed by faculty and students of the Department of Forestry and Environmental Resources at North Carolina State University.

TRAIL PROJECTS

REVEGETATION PROJECTS
## TRAIL PROJECTS

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<tr>
<th>Key</th>
<th>Improvement Name</th>
<th>Qty.</th>
<th>Unit</th>
<th>Unit cost</th>
<th>Subtotal</th>
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</tr>
<tr>
<td>T11</td>
<td>Greenway re-routing</td>
<td>18,000 SF</td>
<td>$0.50</td>
<td>$9,000</td>
<td>10' asphalt trail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Prep/Grading</td>
<td>18,000 SF</td>
<td>$2.80</td>
<td>$50,400</td>
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</tr>
<tr>
<td></td>
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<td>1 LS</td>
<td>$8,000</td>
<td>$8,000</td>
<td></td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
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<td></td>
<td><strong>$67,200</strong></td>
<td></td>
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</tr>
<tr>
<td>T12</td>
<td>Node 1 (deleted)</td>
<td>Small path and bridge to interpretive area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T13</td>
<td>Node 2</td>
<td>Small path and bridge to interpretive area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>1600 SF</td>
<td>$0.75</td>
<td>$1,200</td>
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<tr>
<td></td>
<td>Woodchip trail</td>
<td>1 LS</td>
<td>$2,000</td>
<td>$2,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bench</td>
<td>1 EA</td>
<td>$1,600</td>
<td>$1,600</td>
<td></td>
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<tr>
<td></td>
<td>Wood Bridge</td>
<td>1 EA</td>
<td>$8,000</td>
<td>$8,000</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
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<td></td>
<td><strong>$12,000</strong></td>
<td></td>
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<tr>
<td>T14</td>
<td>Node 3 (deleted)</td>
<td>Small path and bridge to interpretive area</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T15</td>
<td>Park Entries</td>
<td>Lanterns on east, west, north entries</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Gateway Elements</td>
<td>3 EA</td>
<td>$60,000</td>
<td>$180,000</td>
<td>Costs can vary greatly</td>
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<tr>
<td></td>
<td>Design</td>
<td>1 LS</td>
<td>$20,000</td>
<td>$20,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$200,000</strong></td>
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<tr>
<td>T16</td>
<td>Ramble West</td>
<td>10,000 LF</td>
<td>$12.00</td>
<td>$120,000</td>
<td>6' trail along forest edge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Prep/Grading</td>
<td>16,000 SF</td>
<td>$0.50</td>
<td>$8,000</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Woodchip trail -6' wide</td>
<td>6,000 SF</td>
<td>$2.80</td>
<td>$16,800</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>3 EA</td>
<td>$1,200</td>
<td>$3,600</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$34,400</strong></td>
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<tr>
<td>T17</td>
<td>Southwest Trail</td>
<td>400 LF</td>
<td>$12</td>
<td>$4,800</td>
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<td></td>
<td>Site Prep/Grading</td>
<td>8,000 SF</td>
<td>$0.50</td>
<td>$4,000</td>
<td></td>
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<tr>
<td></td>
<td>Gravel trail</td>
<td>6000 SF</td>
<td>$1.50</td>
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<td></td>
<td>Design</td>
<td>1 LS</td>
<td>$2.50</td>
<td>$2.50</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$15,500</strong></td>
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<tr>
<td>T18</td>
<td>Connector Trail</td>
<td>4,000 SF</td>
<td>$0.50</td>
<td>$2,000</td>
<td>6' trail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site Prep/Grading</td>
<td>1,800 SF</td>
<td>$2.00</td>
<td>$3,600</td>
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<tr>
<td></td>
<td>Woodchip trail</td>
<td>1 LS</td>
<td>$2,500</td>
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<tr>
<td></td>
<td>Design</td>
<td>1 LS</td>
<td>$10,000</td>
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<td></td>
<td><strong>Total</strong></td>
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<td></td>
<td><strong>$8,100</strong></td>
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<tr>
<td>T19</td>
<td>Woodland trails</td>
<td>Relocate existing trails</td>
<td></td>
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<tr>
<td></td>
<td>Site Prep/Grading</td>
<td>4,000 SF</td>
<td>$0.50</td>
<td>$2,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woodchip trail</td>
<td>1200 SF</td>
<td>$2.00</td>
<td>$2,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relocate bridge</td>
<td>1 LS</td>
<td>$4,000</td>
<td>$4,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>1 LS</td>
<td>$2,500</td>
<td>$2,500</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$10,900</strong></td>
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</table>

**Total Order of Magnitude Estimate for Trail Projects (2008 Dollars):** $1,072,064

PRELIMINARY COST ESTIMATION 24
## REVEGETATION PROJECTS

### Key Improvement Name | Qty. | Unit | Unit Cost | Subtotal | Description
--- | --- | --- | --- | --- | ---
R1 Trail Removal and revegetation in meadow  
Site Prep/Demo | 35000 SF | | $0.30 | $10,500 |  
Planting-small material | 35000 SF | | $0.25 | $8,750 |  
Seeding | 35000 SF | | $0.15 | $5,250 | | Item Total | $24,500 |
R2 Tree planting near pavilion  
Site Prep/Demo | 36000 SF | | $0.30 | $10,800 |  
Planting-small material | 36000 SF | | $0.25 | $9,000 | | Seeding | 36000 SF | | $0.15 | $5,250 | | Item Total | $24,500 |
R3 Reforestation near utility easement I  
Site Prep/Demo | 35000 SF | | $0.30 | $10,500 |  
Planting-small material | 35000 SF | | $0.25 | $8,750 |  
Seeding | 35000 SF | | $0.15 | $5,250 | | Item Total | $24,500 |
R4 Reforestation near utility easement II  
Site Prep/Demo | 55000 SF | | $0.30 | $16,500 |  
Planting-small material | 55000 SF | | $0.25 | $13,750 |  
Seeding | 55000 SF | | $0.15 | $8,250 | | Item Total | $38,500 |
R5 Meadow reforestation I  
Site Prep/Demo | 50000 SF | | $0.30 | $15,000 |  
Planting-small material | 50000 SF | | $0.25 | $12,500 |  
Seeding | 50000 SF | | $0.15 | $7,500 | | Item Total | $35,000 |
R6 Meadow reforestation II  
Site Prep/Demo | 50000 SF | | $0.30 | $15,000 |  
Planting-small material | 50000 SF | | $0.25 | $12,500 |  
Seeding | 50000 SF | | $0.15 | $7,500 | | Item Total | $35,000 |
R7 Meadow reforestation III  
Site Prep/Demo | 45000 SF | | $0.30 | $13,500 |  
Planting-small material | 45000 SF | | $0.25 | $11,250 |  
Seeding | 45000 SF | | $0.15 | $6,750 | | Item Total | $31,500 |

### Key Improvement Name | Qty. | Unit | Unit Cost | Subtotal | Description
--- | --- | --- | --- | --- | ---
R8 Cove plantings (deleted)  
Site Prep/Demo | | | | | Supplement with native plants

### Key Improvement Name | Qty. | Unit | Unit Cost | Subtotal | Description
--- | --- | --- | --- | --- | ---
R9 Invasive species removal  
Site Prep/Demo | 80000 SF | | $0.30 | $24,000 |  
Planting-small material | 80000 SF | | $0.35 | $28,000 | | Item Total | $42,000 |
R10 Pond development and grove planting  
Earthwork at outfall area | 1 LB | | $100,000 | $100,000 |  
Site Prep/Demo | 90000 SF | | $0.30 | $27,000 |  
Planting-small material | 90000 SF | | $0.25 | $22,500 |  
Planting-bias | 50 EA | | $150.00 | $7,500 | | Item Total | $157,500 |
R11 Clearing and pine grove planting  
Site Prep/Demo | 120000 SF | | $0.10 | $12,000 |  
Planting-small material | 120000 SF | | $0.20 | $24,000 | | Item Total | $36,000 |
R12 Lawn parking development  
Site Prep/Demo | 160000 SF | | $0.30 | $48,000 |  
Planting-small material | 160000 SF | | $0.25 | $40,000 |  
Seeding | 160000 SF | | $0.10 | $16,000 | | Item Total | $104,000 |

**Total Order of Magnitude Estimate for Reveg. Projects**  
(2007 Dollars) $583,800  
**COMBINED TOTAL Order of Magnitude Estimate for Trail and Revegetation Projects**  
(2007 Dollars) $1,768,420
5.2 APPENDIX B: Departmental Relations

This document is designed to codify the relationships and responsibilities of the Museum departments involved in the operations and maintenance of the Museum Park and the exterior of the campus. While each of these units functions separately, the expectation of team work in providing the required services is high.

CONSERVATION

The Conservation Department is responsible for the repair and maintenance of all works of art, accessioned or not, located outside the walls of the museum building complex. This would include art in roof top galleries, courtyard galleries, sculpture gardens, and in the Museum Park proper. Art-in-service projects and the Joseph M. Bryan, Jr. Theater are not included.

General Policy Points

- The Conservation Department (CD) is responsible for the maintenance and repair of the art and sculpture.
- Treatment approval and documentation is required subject to conservation/curatorial treatment policies in place for the permanent collection.
- The assistance of the Design, Registration, and Museum Park staff for maintenance and repair is expected on a case-by-case basis. The CD will make every effort to be considerate of departmental work policies and schedules, but in the event of the need for immediate services to prevent further damage to the art, flexibility is expected.
- The cost of materials associated with maintenance and repair of the art will be budgeted in the CD’s general operations budget. This includes expenses incurred by other assisting departments.
- The costs associated with a major restoration will be covered by restricted funds and not by the CD’s general operating budget. (Restricted funds will be derived from grants, private donations, or state appropriations, and allocated to the Conservation Department for use.)
- The costs associated with the installation or reinstallition of art will not be included in the CD’s budget. Art installation costs are run through the Curatorial Department.
- Art considered for purchase and or installation (whether on loan, accessioned or not) will be examined by the CD and subject to the Museums collection’s policy.
- Installation and sighting plans will reviewed by the CD. A landscaping plan (area surrounding the art) will be agreed upon by the CD, Curator, Planning, and Park Manager. This would include plans for upkeep of the landscape in close proximity to the art.
• CD should be keep informed by the Security Department of special events which might impact the art and have plans available for review locating vendors, booths, etc.

• Damage to the art should be reported to the CD, Registration, Curatorial, and Security Departments according to policy. Under normal circumstances, damage should be left undisturbed until the CD can assess the damage, and it can be documented by the Museum Photographer.

• CD will regularly inspect the outdoor art and report and record damages per collections policy.

• Issues relating to the outdoor sculpture will be discussed at the weekly Art Services meeting. An annual review is recommended for purposes of budgeting and time management.

• The Park staff will maintain the surrounding area as intended for each work of art. Maintenance will include weed eating around sculptures, treating the bases, and adding gravel as needed.

**Maintenance Schedule**

GARDENS AND COURTYARDS

1) *Askew*, Roxy Paine, 2009  
   All work will be performed by artist. No maintenance by Conservation Department.

2) Auguste Rodin Sculptures - Cantor Court (Approximately 4)  
   After initial pretreatment by contract conservator, twice annual waxing done by Conservation Department.

3) *Flight Wind Reed*, Bill and Mary Buchen, 2003  
   No annual maintenance. Check for wear on joint parts.

   Twice annual waxing done by Conservation Department.

5) *Large Standing Figure: Knife Edge*, Henry Spencer Moore  
   Twice annual waxing done by Conservation Department.

6) *Three Elements*, Ronald Bladen, 1989  
   Twice annual polishing done by detailing company. Cost is approximately $525 per session ($1025 yearly) and budgeted by the Conservation Department.

7) Ursula von Rydingsvard  
   Re-seal with preservative according to artist's directions.

MUSEUM PARK

   General maintenance as required. Park staff assists in sweeping daily.

2) *Collapse I and Untitled*, Ledelle Moe, 2007 (temporary)  
   No maintenance.

3) *Crossroads*, Martha Jarvis-Jackson, 2006  
   Check for broken/missing/loose bricks. Repair as needed according to artist's directions.

4) *Gyre*, Thomas Sayre. 1999  
   No maintenance. Check for damage at base from climbing.
   No maintenance.
   No maintenance.
7) *To see Jennie smile*, Steven Siegel, 2006 (temporary)  
   No maintenance.
   Ongoing maintenance: greasing of axle joint performed by art handler (requires a mobile lift). Currently needs to be repainted at an approximate cost of $10,000.

**ART-IN-SERVICE**

1) Benches, bike racks, and sign structures, Al Frega, 2005 (art-in-service)  
   Park staff wipes down steel with Penetrol as needed.
2) *Lowe’s Pavilion – Art-as-Shelter*, Mike Cindric and Vincent Petrarca, 2007 (art-in-service)
3) *PICTURE THIS*, Barbara Kruger, 1995 (permanent)

**CURATORIAL**

The Curator of Contemporary Art is responsible for the commissioning and acquisition of art in the Museum Park. The Curator’s responsibilities include:

1) Research of possible projects and artists.
2) Propose artist for project.
3) Act as primary liaison between the Museum and interested or commissioned artists, especially for communication regarding proposals, negotiations and art content.
4) Produce content for interpretive materials.
5) Be a member of the Partnership for Art and Ecology.

**Artist/Art Project Selection and Installation Process**

The following steps will be taken when selecting an artist to create a work of art for the Museum Park:

1) Museum Curator of Contemporary Art proposes an artist for a Park project to the Curatorial Department, Director of Planning & Design, and Museum Director.
2) Upon approval, the artist is invited for a site visit to NCMA and tours the Museum Park with the Curator of Contemporary Art and the Museum Park Manager. The artist is provided a packet of information about the Museum Park including brochures, site plans, the vision statement, and other relevant materials.
3) The artist submits a preliminary proposal for the project, including estimated costs and preferred site to the Curator of Contemporary Art.
4) The Curator of Contemporary Art, Museum Park Manager, and Director of Planning and Design discuss the artist’s proposal. Future maintenance costs must be factored into the decision process, and adequate maintenance funds and staff resources must be identified for all art-in-service pieces as they are not maintained by the Conservation Department. The proposal is approved or resubmitted to the artist with suggested changes.

5) The approved artist’s proposal is presented to the Partnership for Art and Ecology for a technical review of potential site impacts. Necessary final revisions are made to proposal.

6) The artist’s final proposal is presented to the Museum Director and Curatorial Department for final approval.

7) The contract is negotiated between the artist and the Museum. The contract is prepared by the Curator of Contemporary Art.

8) Interim design review and revisions are required prior to installation, as specified in the contract.

9) Art will be examined by the Conservation Department and subject to the Museum’s collection’s policy. Installation and site plans will also be reviewed by the Conservation Department. A landscaping plan for the area surrounding the art must be agreed upon by Conservation, the Curator, Planning, and the Park Manager. This plan should include plans for upkeep of the landscape in close proximity to the art.

10) Fabrication, site preparation, and installation are scheduled and coordinated with Museum staff. Base construction is coordinated and executed by both the Registration Department and the Exhibition Design Department. Museum Park staff prepare the site for installation.

11) Installation and completion of work of art. Park staff are present during installation to make sure that the grounds are not damaged. Art installation costs are run through the Curatorial Department.

12) The artist’s talk and reception are scheduled.

13) NCMA and the Museum Park informative and marketing materials are updated including the website, brochures, and Park signage.

**DEVELOPMENT**

**Naming Opportunities**

Naming opportunities support the maintenance and growth of the Museum Park and the Park Fund. Suggested naming opportunities of Park elements should be submitted in writing to the Park Manager with prior approval from the Development Director. Possible opportunities are carefully reviewed for impacts and must have the final approval of the Executive Director, Director of Development and Director of Planning and Design. A plan for method of recognition and resources to implement recognition must be approved as well. A written decision will be returned within a maximum of one month.
The Museum Park will continue to grow and develop, resulting in new, unforeseen possibilities. If a suggested opportunity is denied, then it can be resubmitted after one year’s time.

The cost of reprinting brochures, maps, and signage is significant; therefore, trails cannot be renamed without extraordinary reason after they are constructed and assigned a name by the Planning and Parks Departments. This will also ensure that frequent and new visitors can easily navigate the site. Trails can, however, be sponsored and supported by a donor. This information will be added to signs and electronic materials quarterly, and updated on maps and brochures when reprinting is necessary (approximately annually).

The Museum does not have the right to sell naming rights to City facilities, and therefore, naming rights of the Greenway must be submitted to the City Council directly. Since there are innumerable naming opportunities in the Park and policies discourage the naming of existing named trails, other naming opportunities should be pursued.

**Grants**

The Park Manager is responsible for updating the Grants Manager of financial and project needs. The Grant Manager alerts the Museum Park Manager and Director of Planning and Design of pertinent grant opportunities. The Park Manager is also responsible for researching funding opportunities.

Completing and filing grant applications and reports are an ongoing collaboration between Grants Manager and Museum Park Manager. Assistance is provided by Administrator in Planning Department as needed. The Park Manager is responsible for writing content and providing finance information; the Grants Manager reworks all content into the required format and submits to grantor agency. The Grants Manager is the point of contact for existing and potential donors, and the Park Manager is copied on all correspondence.

The grant reporting schedule is managed by the Grants Manager and distributed monthly. The Grants Manager determines whether or not to (re)apply for a grant based on project’s relevancy, the Park department’s needs, and schedule conflicts.

**Park Affiliate Support Group**

The group is being formed to support and assist in promoting the Museum Park both locally and nationally. The group will be a connection to the community and park users. With a guided focus, they will develop and implement fundraising strategies and projects for which there are no dedicated institutional resources.
EDUCATION

The Park is a resource for educational programming and enriching learning opportunities. Due to the large maintenance demands and limited staff, the Park Department cannot manage outdoor educational programming. To maximally utilize this resource, a dedicated Park Educator is needed on staff. Reporting to the Director of Education, the educator would coordinate and manage Park programming and operate as a liaison between the two departments.

Interpretative materials are organized and created by the Education Department, such as the Park backpacks.

MARKETING

Promotional materials for the Museum Park are created and distributed by the Marketing Department. Park staff should regularly review these materials to be sure they are current and correct. Brochures are updated annually (approximately), with the schedule to be set by the Graphic Design and Marketing team. Brochures and wayfinding must be integrated into an economical and useful set of materials for on-site and off campus uses.

Content for promotional materials is written and submitted by the Park staff with curatorial review as needed. When submitting a work order for promotional materials, allow time for editing, design, and final production. All park-related content must be reviewed and approved by the Park Manager and Director of Planning and Design prior to printing and distribution. Brochures and maps are printed with Park Operation funds, unless a specific grant is in hand for the production of a brochure/map.

Web content should also be reviewed monthly to ensure its relevancy; report any updates to the Marketing Department using the Web Update form.

New signage and replacement signs are needed frequently as conditions change. Signage requests should be submitted to the Graphic Design Department and are a collaborative effort between Graphic Design and Exhibit Design. (See Design section)

OPERATIONS

Volunteer Services

The Park Staff relies on volunteers to accomplish its goals and to sustain and manage the site. The Museum Park is represented on the Museum’s Volunteer Board by a Museum Park Service Committee Chair. This Chair serves a one-year term (May-April) that can be extended for two additional terms upon reelection. The Chair reports to the Museum Park Manager and the Board of Directors of the North Carolina Museum of Art Volunteer.
The Museum Park Service Committee Chair is responsible for contacting new volunteers; informing the volunteer of the responsibilities and commitment required of Museum Park volunteers; ensuring that new volunteers meet with the Visitor Services Manager to complete a volunteer application as well as the required new volunteer orientation; scheduling sufficient volunteers to complete tasks; coordinating work days; and reporting the activities of the Museum Park volunteers to the Volunteer Board. It is also the responsibility of the Museum Park Service Committee Chair to identify potential leadership for the committee and mentor such volunteers to assume the duties of the Chair prior to the end of his/her current term.

Information regarding volunteer opportunities and work days shall be forwarded to the Visitor Services Manager for posting and advertisement.

**Volunteer Programs**

Volunteers participate in workdays and assist with special projects. Regularly scheduled group workdays occur once a month, except for July and August and when adverse weather conditions prohibit these activities. Park Staff and the Service Committee Chair are responsible for the coordination and supervision of the volunteers.

Additional community group workdays may be scheduled at the discretion of the Park Staff. These events may or may not include NCMA volunteers. Primarily the groups are from the community at large, e.g., Boy Scouts, Eagle Scouts, corporate community outreach groups, and service organizations that volunteer to assist in completing specific projects. Such projects include but are not limited to trail work; mulching trails; planting trees, flowers, grasses, and shrubs; removing exotic invasive plant species; installing and de-installing artwork; and bluebird and purple martin colony monitoring. Although the Park Staff is responsible for the coordination and supervision of these events, they may require the assistance of the Service Committee Chair and/or the Visitor Services Manager for high-profile or larger groups.

Two lead volunteers and two substitute volunteers are needed to assist in handling the bluebird project. Additional volunteers are used to help monitor and evaluate the purple martin colonies. Park Staff is responsible for training these volunteers.

**Visitor Services**

Front Desk workers and all staff that interact with Museum visitors should be able to inform interested parties about the Park and its opportunities. Park-related materials should always be available at the front desk for visitors. Park Staff should update the Information Desk Manager and Visitor Services Manager with any new pertinent information.

Outdoor brochures and maps are stocked by the Park Staff. Information Desk materials are maintained by the Information Desk Manager. Park Staff is responsible for working with
other Museum departments in the development, procurement, and distribution of park-related materials. (See Marketing section)

Security

The State Capitol Police Officer (SCPO) is responsible for responding to all emergency and non-emergency calls for service at the NC Museum of Art and the surrounding grounds. This includes but is not limited to fire alarm activation, intrusion alarm activation, medical assists, larcenies, requests for service, checkmates, and motor vehicle accidents.

During first shift (6:00 a.m. – 6:00 p.m.), the SCPO’s primary responsibility will be to provide law enforcement services to the Museum of Art and will also be responsible for patrolling State Capitol Police Zone # 3. Zone # 3 consists of the property located between Glenwood Ave. and all point west to left on Duraleigh Rd. to right on Reedy Creek Rd. to left on Trenton Rd. become Trinity Rd., right on E. Chatham St. to left on Maynard Rd. to left on Walnut St. to left on Jones Franklin Rd. to right on I-440 to left on Gorman St. to right on Avent Ferry Rd. to right on Western Blvd. to left on Pullen to right on Hillsborough St. to left on Oberlin Rd. to right on Wade Ave. to left on Glenwood Ave. SCP officers permanently assigned to the Museum of Art are required to remain in Zone # 3 at all times. Only under exigent circumstances and with the expressed permission of the supervisor, will the officer be allowed to leave Zone # 3. SCPO’s are not authorized to begin checks of Zone #3 until after 8:00 a.m. each day.

The Cloud Chamber should be unlocked at 7:30 a.m. daily and should be secured at 5:00 p.m. During inclement weather, the Cloud Chamber will remain closed. SCPO must walk to the Cloud Chamber, as it is locates on a secondary mulched trail.

The SCPO on duty patrols the Museum Park every two hours. Gators may only be used prudently, and the provided SCP motor vehicle should function as the main mode of transport.

Security checks completed by the SCOP should be called in via the State Capitol Police 800 mhz 2-way portable radio and should be documented in CAD. Any damage or vandalism to the outdoor works of art should be reported to the Director of Security and a SCP incident report should be completed and filed. The NCMA Security Department will contact the Conservation and Curatorial Departments in the event of damage to works of art and return any recovered pieces to the appropriate department.

During non-operating hours, the SCPO on duty should remain on the Museum of Art property and make interior checks of the facility and exterior checks of the Museum grounds every two hours. All exterior checks should be coordinated with the Security Guard on duty to ensure adequate security coverage inside the facility at all times. Prior to conducting a security check, the Officer should notify Access Control and should call SCP
Communications Center via the State Capitol Police 800 mhz 2-way portable radio. All security checks should be documented in CAD.

The SCPO assigned to the Museum of Art during the 6:00 p.m. until 6:00 a.m. shift shall remain on the Museum property and is only authorized to leave the surrounding grounds for emergency situations and with the expressed permission of the SCP shift supervisor. Before leaving the property, it will be the responsibility of the SCPO to notify Museum Security. The SCPO is also required to notify Museum Security upon his return.

During those occasions when the Museum of Art is hosting a high profile exhibit, special events, or any function where law enforcement presence is deemed necessary, the SCPO will remain on the Museum of Art property and provide crowd control, traffic direction, or any law enforcement services that are needed.

Museum Security will patrol the Park as practical during opening hours on a gator or bike. All secondary and tertiary trails must be patrolled on foot; this includes the Prairie, Woodland and Ramble trails. Any problems should be reported to a Security Supervisor and the Park Manager.

Park Staff should report additional safety concerns and problems to a Security Supervisor for immediate assistance if required.

**Maintenance/Facilities**

**EQUIPMENT**
The Maintenance staff manages all equipment, including the gators, tractor, and tools. Only trained and certified staff can use and service Museum tools and equipment. Currently, Park staff is authorized to use and service the equipment. Park staff changes the oil and belt on their designated gator. Future staff that may be certified to use and service equipment are designated landscape staff for the future gardens and courtyards. The Department of Administration staff (Facilities Services Division) is authorized to operate, service, or repair the Museum lawnmowers. DOA is responsible for fuel costs associated with their use. The NCMA is responsible for the costs associated with maintaining and repairing all NCMA leased/owned equipment.

**FUEL**
Facilities, Park, and Security staff are jointly responsible for filling fuel cans and gators as needed. The fuel cans and truck are filled at a designated State fueling station using the appropriate fuel key. The truck gas key is not to be used for filling fuel cans. Key # 23 must be signed out from Security Access to fueling cans with gasoline or diesel fuel.
BUILT ZONE
The Park Department contracts out pesticide control for both the amphitheater and the pavilion. Facilities manages pesticide control around the base of the building and along the main sidewalks; DOA is involved in pesticide application if needed. Facilities also treats the main sidewalks with herbicides and salts them during icy conditions. Future sidewalks in the gardens and courtyards will be maintained by Park Staff with the assistance of Facilities as the landscape will be sensitive to herbicides and salt. The Department of Administration is responsible for salting and plowing parking lots during wintry weather.

OUTDOOR ARTWORK
Facilities will work with DOA staff to ensure that no mowing, application of herbicide or pesticide, or other lawn maintenance is outside a 10-foot zone of any piece of art. (See Conservation section for details.)

AMPHITHEATER
The Department of Administration (Facilities Services Division) is responsible for maintaining the lawn and cutting the grass as needed.

Park Staff are responsible for tree care and for managing weed and pest control as well as maintenance of specialized landscaped areas.

Maintenance and repair of PICTURE THIS, including annual painting, system repair and winterizing is the responsibility of the Operations Department, in cooperation with the Performing Arts Department and evaluated each year cooperatively. Repairs are funded by the amphitheater endowment.

Housekeeping
Trash receptacles in the Park and the Blue Ridge Parking lots are checked and emptied by housekeeping staff daily. Housekeeping, Park, Security, and Facilities staff are expected to pick up trash anywhere on site when they are on gators or walking around.

Housekeeping also supplies and empties trash receptacles during outdoor events and cleans up any remaining litter following an event in the Park and the amphitheater. All trash and debris must be picked up and removed by the following morning. The trash bins around the Park must also be checked and emptied the following morning as soon as possible, as they are generally full following an event.

Housekeeping staff cleans the amphitheater bathrooms and the amphitheater. Additional time and resources are required for cleaning following outdoor events. Housekeeping must be notified whenever the use of the amphitheater facilities is expected so that restrooms and the general area can be cleaned and prepared for use.
Park staff is responsible for emptying the dog waste station receptacles and for stocking station supplies.

If trash receptacles are needed, requests should be submitted by email to the Housekeeping Supervisor, specifying the number of bins, the locations preferred, and the time the bins should be set up and removed.

**PERFORMING ARTS**

The Performing Arts Department is responsible for all of the outdoor amphitheater programming. They also plan all outdoor events and prepare all service contracts for such events, including Earth Day. Outdoor space usage should be coordinated with the Museum Park Manager.

Park staff prepare the overflow parking fields at the start of each outdoor performing arts season and for large visitor events.

The amphitheater should be cleaned following shows and intermittently throughout the year. Cleaning should be done by the housekeeping staff. If the amphitheater site is not satisfactorily maintained or cleaned, then the Director of Operations should be contacted. (See *Operations- Housekeeping* section for further details.)

**PHOTOGRAPHY DEPARTMENT**

Photo documentation requests should be sent to the Head of Photography electronically using the “Photographic Services Work Order,” which is located in the shared staff folder. If the Museum photographers are unavailable, then Park staff should attempt to take photographs with the Park Department’s camera.

**PLANNING AND DESIGN**

*Planning*

The Director of Planning and Design also serves as the Park Director and is responsible for the long-term planning, general development, and improvements in the Park. The Director of Planning and Design also manages the Park Fund and its allocation to projects and operations. He is a member of the Partnership for Art and Ecology and represents the Park to senior staff and the Executive Director of the Museum.

The Planning Department administrator assists the Park Manager with day-to-day expense tracking, budget preparation, grants, communication, and as-needed assignments.
Design

The Exhibit and Graphic Design Departments oversee the visual unity of the indoor and outdoor Museum environment. These departments fabricate (or contract fabrication), install and repair signage, sign structures, brochure boxes and kiosks. Installation and location of signage should be coordinated with Park staff and the Director of Planning and Design to ensure proper siting and to minimize environmental impact. Concrete footings should be poured by the Exhibits or Facilities Departments; Park staff can assist if staff resources are available.

The Exhibit and Graphic Departments are responsible for the design and installation of temporary signs and signage structures for outdoor museum events and festivals, Park Theatre summer season, and temporary art installations.

Annual park signage needs, schedule and budgets should be discussed with Exhibits and Graphics in January of each year and approved by the Director of Museum Planning prior to the finalized budget each spring.
5.3 APPENDIX C: Museum Park Documentation and Timeline

5.3.1 Memorandum of Understanding with Art and Ecology

MEMORANDUM OF UNDERSTANDING

North Carolina Museum of Art
North Carolina Department of Cultural Resources

And

College of Natural Resources North Carolina State University

For

Partnership for Art and Ecology

Introduction:
The North Carolina Museum of Art (Museum) and North Carolina State University, through the College of Natural Resources (CNR) have a unique opportunity to engage both the arts and ecology on the NCMA campus in Western Raleigh. The Museum is a leader in visual arts in the South and the entire Nation, with exceptional art outreach programs. Located on more than 160 acres, surrounded by a urbanizing landscape, the NCMA is committed to preserving, restoring and developing its campus as a park that blends the best of art, ecological management and public use. The CNR is among the nation's leading colleges for land management, and park and recreation management, with especially strong programs in applied resource management and public outreach. Consequently, CNR is a perfect partner to bring its vast experience with landscapes and public recreation of all kinds to the goals of the Museum. In addition, CNR can serve as a portal to access the full range of opportunities available at NC State to assist the Museum in its long-term goals.

This opportunity is unique among art and natural resource programs in the United States, with enormous potential to enhance ecological sustainability, art literacy, and the connections between them. This partnership can also serve to diversify the Museum's audience, using outdoor art and recreation as a vehicle to introduce a broader public to North Carolina's art museum and its important collections. The partnership will also serve the extremely important and practical purpose of enhancing public and private land stewardship.
The Partnership for Art and Ecology seeks to bring together the expertise and enthusiasm of the partners to create a new public destination and to offer programs that achieve both art appreciation and ecological understanding for the citizens of North Carolina, as well as ecological sustainability for the Museum's campus.

Goals:

Develop and execute a master plan for the museum campus that assures artistic appreciation, ecological sustainability, and effective outdoor public use.

Create and deliver public outreach programs that blend artistic appreciation and development with ecological understanding.

Implement educational programs for CNR students that provide professional practice and experience in recreational and ecological management.

Conduct research and scholarship that advances our joint understanding of the various connections between art and ecology, and develop interdisciplinary programs to engage Museum visitors through those connections.

Objectives:

Mutual Agreements:

In order to address this goal and achieve these objectives, the NCMA and CNR agree to the following mutual commitments.

1. We will work to maintain the successful and collegial relationship that has generated our initial projects and aspirations.

2. We will create a partnership advisory team composed of 2 representatives appointed by the Museum, 2 by CNR, and 3 from the community (chosen by the Museum and CNR appointees) to advise the partners on plans and programs and to serve as a source of inspiration and consultation.

3. We will develop projects related to the goals and objectives of the partnership. Each project will describe specific commitments that the partners make in each instance.

4. We will develop joint funding proposals for submission to agencies, foundations, businesses, and individuals that advance our goal and objectives. Each funding proposal will define the specific commitments that the partners will make should the proposal be funded.
Additional Agreements:

5. Nothing in this agreement obligates either partner to commit any resources except as agreed on a project-by-project basis.

6. Nothing in this agreement requires or allows either partner to violate the separate governing policies, operating guidelines, or missions of their individual organizations.

7. Either partner may withdraw from this agreement at any time by written notification to the other partner.

For the North Carolina Museum of Art:

Dr. Lawrence J. Wheeler, Director

For the North Carolina State University

Dr. James L. Oblinger, Provost and Executive Vice Chancellor
5.3.2 Memorandum of Understanding with City of Raleigh

DRAFT MEMORANDUM OF UNDERSTANDING
BETWEEN THE STATE OF NORTH CAROLINA DIVISION OF CULTURAL RESOURCES AND THE CITY OF RALEIGH

I. PURPOSE

Background

In 2003, the City of Raleigh and the North Carolina Department of Transportation jointly funded, at a cost of $2.9 million, the construction of a public access greenway trail extending from Faircloth Street west along House Creek. The trail currently extends across property controlled by Meredith College and the North Carolina Museum of Art, connected via a pedestrian bridge over I-440 (the Raleigh Beltline). The trail currently terminates on the North Carolina Museum of Art property and connects to an existing trail on that site. Future plans would extend public access to Blue Ridge Road and then west to the existing Loblolly Greenway Trail via a connector along Reedy Creek Road.

The master plan for the North Carolina Museum of Art (NCMA) proposes outdoor environmental art installations and other amenities. The greenway trail will provide for additional access to the NCMA property.

Purpose

The purpose of this memorandum of understanding is to establish a cooperative agreement between the City of Raleigh Parks and Recreation Department (the Department) and the North Carolina Museum of Art (NCMA). Implementation of this agreement will establish roles and responsibilities for use, routine maintenance and capital repair costs associated with the public access trail facility constructed on North Carolina Museum of Art property as described below. City of Raleigh Parks and Recreation Department participation is limited to maintenance of the trail as specified in Section V. of this agreement.

II. STANDING COMMITTEE OF THE PARTNERSHIP FOR ART AND ECOLOGY

The NCMA and DCR have an existing relationship with North Carolina State University, College of Natural Resources, named the Partnership for Art and Ecology (the Partnership). The Partnership functions to regulate projects and management of the Museum Park, and to review its development.
To facilitate the implementation of this agreement, the cooperating agencies NCMA and the City of Raleigh Parks and Recreation Department) each agree to designate liaison officers to serve on a Standing Committee of the Partnership and meet as needed, but no less than semi-annually. Matters for consideration by the Standing Committee are to include inspection of the facility, a review of routine maintenance, discussion of needed capital repairs or replacements, and facility modifications. In addition, the Standing Committee shall review each agency's participation in this agreement, assess the agreement's effectiveness, and address changes that might be necessary. As appropriate, the committee will address urgent issues on an as needed basis. Should an individual liaison officer be unable to continue serving on the Standing Committee, a replacement will be designated as soon as possible by the agency or entity that made the initial designation.

III. LIAISON OFFICERS

For the North Carolina Museum of Art:

Deputy Director - Planning and Design
4630 Mail Service Center, Raleigh, N.C. 27699-46304 (mailing address)
2110 Blue Ridge Road, Raleigh, N.C. 27607-6494 (street address)
Phone: 919-8239-6262
Fax: 919-733-8034

Director of Education
4630 Mail Service Center, Raleigh, N.C. 27699-46304 (mailing address)
2110 Blue Ridge Road, Raleigh, N.C. 27607-6494 (street address)
Phone: 919-8239-6262
Fax: 919-733-8034

Park Curator
4630 Mail Service Center, Raleigh, N.C. 27699-46304 (mailing address)
2110 Blue Ridge Road, Raleigh, N.C. 27607-6494 (street address)
Phone: 919-8239-6262
Fax: 919-733-8034

For the City of Raleigh Parks and Recreation Department:

Parks Superintendent
Marsh Creek Operations Center
4225 Daly Road
Raleigh, North Carolina 27604
(919) 872-4115 (office)
(919) 872-4137 (fax)
IV. DESCRIPTION OF FACILITY

The facility is comprised of two distinct sections. The first section is the jointly developed public access greenway trail beginning at the western terminus of the pedestrian bridge over I-440 and extending approximately 4,000 linear feet to the existing trail on the North Carolina Museum of Art property. The second section is that portion of the existing trail beginning at the western terminus of the public access greenway trail and extending west approximately 2,600 linear feet to its current entrance just east of Blue Ridge Rd. (Exhibit A)

The trail corridor for both sections is defined as a twenty (20) foot width which that includes the paved trail surface of ten (10) feet and a shoulder on each side of five (5) feet.

V. RESPONSIBILITIES OF THE PARTIES

The following roles and responsibilities are established for use, routine maintenance and capital repairs associated with the facility.
Use
It is anticipated that public use of this facility will occur as a result of both its designation as part of the Capital Area Greenway System and its presence on the grounds of the North Carolina Museum of Art. The parties agree that such use is mutually beneficial and that provisions for appropriate types of public access and use should be made.

The designated facility as described above shall be open to the general public from dawn to dusk 365 days a year. The general public will also have access to the parking lot containing 298 spaces (292 regular spaces and 6 handicapped spaces) at the current trail entrance just east of Blue Ridge Rd. This designated public greenway parking area shall be replaced or relocated on the Museum property by the State in the event future development of the museum site impacts the parking lot. (Exhibit B)

Use of the trail by either party that would require trail closure shall require a three (3) month prior written notice to the other party and be subject to review by the Standing Committee.

A separate written agreement will be executed for any event planned by either party that would constitute a special use of the facility beyond that described above.

Routine Maintenance and Capital Repairs
The City of Raleigh Parks and Recreation Department shall be responsible for the following routine and ongoing maintenance of the designated facility. Routine maintenance shall be performed to current department standards and at current frequencies, typical of all trails maintained as part of the Capital Area Greenway System. (see Appendix A).

The Department shall maintain maintenance records and make these records available to the Museum on a semi-annual basis, or upon request.

Access for routine maintenance shall occur from the parking lot at the western terminus of the trail. This work will be accomplished by pick-up truck or gator type vehicle.

Access for tree work or major repair work requiring larger vehicles and/or equipment shall be provided by the North Carolina Museum of Art via a designated route. (Exhibit C)

Some maintenance tasks will require closing of the trail (or portions of the trail) for brief periods of time (herbicide application, tree maintenance, storm clean-up). The department will secure work areas when necessary in order to safeguard the public.

The Department shall be responsible for the following:
Litter and Debris Removal
- Removal of accumulated trash and man-made debris generated by trail users including ground litter and trash receptacles.
- Removal of debris resulting from illegal dumping.
- Removal of accumulated trash and debris at bridges and boardwalks.

Trail Surface Cleaning
- Removal of tree litter, sediment or other foreign matter from the trail surface.

Mowing Maintenance
- Mowing and trimming of grassed trail shoulders five (5) feet wide on each side of the paved trail. NCMA may elect to remove designated areas from mowing as part of restoration projects. The Standing Committee of the Partnership shall review and approve such decisions.

Application of Herbicide
- Use of herbicides to control bermuda grass intrusion of asphalt trail surfaces.
- Use of herbicides to control noxious weed species – poison ivy, etc.
- Herbicide selection and application shall occur in strict accordance with the Department’s pesticide management policy.

Bridge/Boardwalk Inspection and Minor Repairs
- Monthly inspection of bridges and boardwalks.
- Replacement of damaged or deteriorated deck boards, handrails and other non-structural members.
- Repair of stream bank scouring impacting bridge/boardwalk footings or abutments as permitted by the Division of Water Quality (DWQ) with approval of the Standing Committee of the Partnership.

Site Furniture Repair and Replacement
- Monthly inspection and repair of site furnishings provided by the Department and approved by the Standing Committee of the Partnership.
- Replacement of damaged or deteriorated site furnishings as needed.

Trail Signage Repair and Replacement
- Monthly inspection and repair of installed trail signage including trail identification signs, directional signage, information signs, pavement markings, mile markers, etc. provided by the Department and approved by the Standing Committee of the Partnership.
- Replacement of Department trail signage due to damage or deterioration as needed.

Tree Maintenance
- Monthly inspection and removal of tree hazards (hanging limbs, split trees, leaning trees, dead trees, ice damage and other hazardous conditions) that pose a safety concern for trail users.
Inspection and removal of any tree that is adversely impacting the trail surface (asphalt upheaval) or a permanent structure (bridge, boardwalk, retaining wall).

A formal written assessment shall be completed by the Department’s Urban Forestry staff (certified arborist) prior to the removal of any tree. Tree removal must be approved by the Parks Superintendent.

Tree work shall not be limited to the twenty (20) foot trail corridor. Any hazardous tree or portion thereof that has the potential to strike the trail corridor shall be considered under this maintenance task.

Removal of large limbs or trees that do not pose an immediate threat to public safety shall also be approved by the Standing Committee of the Partnership.

Vandalism

- Removal of graffiti from trail surfaces, permanent structures, site furnishings, signage, trees, etc. under the Department’s maintenance.
- Repair and/or removal and replacement of damaged or destroyed structures, furnishings, signage, etc. under the Department’s maintenance.

Emergency Storm Response

- In the event of weather-related damage (severe windstorm, hurricane, ice storm, tornado, flood or other natural disaster), the Department shall provide hazard removal and clean-up as noted above under trail surface cleaning and tree maintenance sections above. Response to this facility will be prioritized along with other Department responsibilities during an emergency event. The Department currently utilizes a tiered system for emergency response. Greenway trails are given low priority. The trail will be monitored daily and secured (closed to public access) until hazard removal and clean-up can occur.
- The department shall also be responsible for repair, removal and/or replacement of Department owned structures that are damaged or destroyed as a result of a natural disaster.

The North Carolina Museum of Art shall be responsible for the following:

Capital Repairs

- All costs associated with resurfacing or replacement of the paved asphalt and/or concrete trail in part or whole as a result of tree root damage, subgrade failure, recurring flooding, surface wear and deterioration, etc.
- All costs associated with replacement of bridges, boardwalks, and retaining walls resulting from natural stream movement, structural deterioration or failure.
- All costs associated with major structural repairs to bridges and boardwalks, including abutments and footings.

Site Furniture/Structures

- All site furniture or structures erected by the museum or its designees shall be located outside of the designated trail corridor (no closer than five feet from the paved trail).
• Inspection and repair of benches, picnic tables, bike racks, litter receptacles, shelters, arbors, and other site furnishings or structures installed by the Museum.
• Replacement of damaged or deteriorated site furnishings as needed.

Signage Repair and Replacement
• Inspection and repair of any ancillary signage or information kiosks installed by the Museum or its designees
• Replacement of signage or information kiosks due to damage or deterioration as needed.

Art Projects
• All art projects erected by the Museum or its designees whether temporary or permanent shall be located outside of the designated trail corridor (no closer than five feet from the paved trail, unless approved by the Standing Committee of the Partnership).
• Site Furniture/Structures and Signage Repair and Replacement sections above apply to art projects erected by the Museum.
• Any projects undertaken by the Museum involving Museum staff and/or unpaid volunteers, use of the general public trail (access), and/or have a direct interface with the public access trail shall be subject to the Section V. Responsibilities of the Parties, Subsection: “Use,” as noted above.

Vandalism
• Removal of graffiti from structures, site furnishings, signage, art projects, etc. that are under the Museum’s maintenance responsibility.
• Repair and/or removal and replacement of structures, site furnishings, signage, art projects, etc. that are under the Museum’s maintenance responsibility that are damaged or destroyed as a result of vandalism.

Storm Damage
• In the event of weather-related damage (severe windstorm, hurricane, ice storm, tornado, flood or other natural disaster), the Museum shall provide hazard removal and clean-up for museum-installed structures as noted in the sections above.
• The Museum shall also be responsible for repair, removal and/or replacement of Museum owned structures that are damaged or destroyed as a result of a natural disaster. This includes the paved trail, boardwalks, bridges, and other museum-installed facilities.

Natural Trail (Woodland Trail)
• Any other trails developed by the Museum outside of or connecting to the designated trail corridor shall be the sole responsibility of the Museum.
• Structures, site furnishings, art projects, signage and other elements associated with these additional trails shall be located in such a manner as to not adversely impact use, sight distance and/or general safety of users of the primary facility.
Maintenance Notification to the City

- The Museum shall notify the Department of any maintenance needs observed by its staff or the general public.

- The Museum shall provide two (2) weeks written notice to the Department for any maintenance needed prior to a special event or function that may require work outside of scheduled frequencies. The Department shall respond in writing confirming its ability to accommodate such requests.

Assistance Provision

The Museum may request and the Department may provide assistance with removal, repairs and/or replacements of items listed above designated as responsibilities of the Museum. Such requests shall be forwarded by the Museum to the Department in writing.

Assistance provided by the Department at the request of NCMA shall be compensated at cost (labor, equipment and materials) plus 15%.

VI. MODIFICATIONS TO THE FACILITY

Both parties have identified the potential need for a portion of the trail to be relocated in the future due to expansion of the art museum. In addition, there may be other identified needs that would require modifications to the facility.

All proposed changes to the facility shall be reviewed and approved by the Standing Committee. A separate joint agreement detailing the modification(s) shall be executed in the same manner as this Memorandum and shall become an addendum to this Memorandum of Understanding.

VII. AGREEMENT TERM, MODIFICATION AND TERMINATION

This agreement becomes effective on the date of last signature and continues for 3 years one year and will automatically renew for two additional years, unless either party declines. It may be modified by mutual written consent of the signing parties at any time. At the conclusion of each 3 the third year period and prior to renewal of this Memorandum of Understanding, the parties will review the agreement and determine the need for modification. The agreement may be terminated by either party upon 90 days advance written notice to the other party.

VIII. EXECUTION

To be determined.
5.3.3 Monitoring Report

Management Zone: ___________
Recorder: _______________________

Site Location: ____________________________________________________
________________________________________________________________________
________________________________________________________________________

Notes:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Land Use:

Property location, physical setting, and condition:
(General description of the landscape and surrounding area, including adjacent land use)
(Attach maps, photos*, and/or illustrations)
________________________________________________________________________
________________________________________________________________________

Existing Human Modifications:
Highlight all structures, roads, trails, dikes and impoundments, watercourses (ditches), lakes, ponds, wells, fences, utility lines and corridors, dumps, etc. on property.
(Attach maps, photos*, and/or illustrations)
________________________________________________________________________
________________________________________________________________________

Archeological and Historical Features:
Note any significant archeological, cultural and/or historical features on property.
(Attach maps, photos*, and/or illustrations)
________________________________________________________________________
________________________________________________________________________
Natural Features/Attributes:

List Acreage or Occurrence as applicable:

Forested Area  ____  Man-made pond/lake  ____
Agricultural Fields  ____  Stream/Creek/River  ____
Forested Wetlands  ____  Rock outcrop/Bluffs  ____
Wetland pond/bog  ____  Other  ____

Significant plant and animal species and communities found through site:
(Attach maps, photos*, and/or illustrations)

A. Note any natural heritage areas and element occurrences.
B. Note aquatic resources, including location of streams, water bodies and wetlands,
   general condition of water quality and notable bank vegetation and stability.
C. Forest or natural community types (If there are rare natural communities, note specific
   locations and include a botanical list. Note presence of any exotic plant species, if
   known. Note specific locations of both on site maps).
D. Rare species habitat (If there are known rare plant species present, identify specific
   habitat types and locations and include botanical list).
E. Wildlife species habitat and general list.
G. Note special status of any of the site’s natural features (i.e. Outstanding Resource
   Waters).

Soils found on site & Soil Characteristics:
(Attach maps, photos*, and/or illustrations)
Exotic Plant and Animal Species found within site:
(Attach maps, photos*, and/or illustrations)

A. Type and species name (plant or animal, scientific and common name)
B. Location (physical location, photo and GPS point)
C. Extent of invasion (square footage, size of species, harm to other plants, etc)
D. Concerns for removal (located on steep slope or near water, potential volunteer project, etc)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Safety Hazards and Encroachments:
(Attach maps, photos*, and/or illustrations)
A. Erosion of land and trails
B. Dead trees
C. Encroachments

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Potential Uses for Site:
(Attach maps, photos*, and/or illustrations)
A. Potential trails
B. Potential sculptures
C. Potential seating areas
D. Potential research Sites

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Past Research Conducted on Site:
(Attach maps, photos*, and/or illustrations)

________________________________________________________________________
________________________________________________________________________

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Actions that Need to be Taken:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

*Photographic documentation:* This is a photographic record of the protected property that is periodically updated. This section should include photos that are easily replicable (from roads or permanent features, or using GPS waypoints).
A. Photos should be numbered and a compass direction should be included to note the direction the photo was taken.
B. Include a photograph index with descriptions.
5.3.4 Scientific Research Form (modified from North Carolina State Parks)

North Carolina Museum of Art
Scientific Research and Collecting Permit

Please print or type legibly. Incomplete or illegible applications will be returned.

1. Principal Investigator

Name: ___________________________________________________________
Institutional Affiliation: __________________________________________
Address: _________________________________________________________
Phone: ________________________ e-mail: _____________________________

2. Project Director or Major Advisor (If Applicable)

Name: ___________________________________________________________
Institutional Affiliation: __________________________________________
Address: _________________________________________________________
Phone: ________________________ e-mail: _____________________________

3. Park Unit(s) Where Research is to be Performed:

________________________________________________________________

4. Research Schedule:

Field work: Start Date___________________ Ending Date__________________
Total project: Start Date___________________ Ending Date__________________

5. Attach a Detailed Project Description. Include:

1. Resume/vita of the Principal Investigator and Project Director. If not apparent from your resume, briefly state your experience and qualifications in the area of proposed research.

2. A project synopsis, including purpose (graduate thesis, independent study, etc.), specific objectives and complete methodology. If applicable, include a species list and the name and address of the proposed curatorial facility. If your project involves ground disturbance, estimate the amount, location and duration.

3. Clearly marked USGS topographic maps (1:24,000) or park brochure maps showing proposed study areas. USGS maps must show the quad name. For information on USGS maps, contact the N.C. Geological Survey Sales Office at (919) 715-9718.

4. A list of other required permits and proof of possession.
NOTE TO THE APPLICANT:

- The permittee must notify the park superintendent prior to initiating any research activities.
- This permit may be used only by the person(s) to whom it is issued.
- Principal investigators will provide the division with two copies of a research report within 60 days of the project's conclusion and two reprints of any publication resulting from studies conducted on state park property. An annual report, due on December 31, is required for any project exceeding one year. Reports are to address the project's goals, methodology, results and conclusions. Progress reports may also be specified as a condition of the permit. The reporting requirement may be waived for classes that use a park as an outdoor classroom.
- This permit is issued subject to the conditions specified below. The permittee shall and hereby does waive and release any and all claim against the North Carolina Department of Environment and Natural Resources, or its employees, or the State of North Carolina for any and all damages, loss or cost to person or property arising either directly or indirectly from the use of said premises and/or from the exercise of the privileges granted by this permit.

______________________________
Signature of Principal Investigator: Date

========================================
FOR ADMINISTRATIVE USE ONLY
Date Received:_______________
Approved by:___________________
Staff Coordinator:_________________

Comments/Conditions:_____________________________________________________
_____   
_____   
_____   

5.3.5 Timeline

April 1983
The new North Carolina Museum of Art, located on Blue Ridge Boulevard in Raleigh, opens to the public. Its suburban site — at that point totaling about 50 acres — is undeveloped, state-owned land. Public officials and legislators favor the suburban site over the Museum’s former downtown location because of several factors, one being the greater potential for future expansion of Museum programs and exhibitions to the outdoors.

June 1987
The Kathleen Price and Joseph M. Bryan Family Foundation of Greensboro, N.C., awards a $5,000 grant to the Museum for improving and maintaining the Museum grounds. The first of many private contributions for grounds maintenance and remedial improvements; it is followed by a $10,000 grant from the A.J. Fletcher Foundation of Raleigh.

July 1987
The N.C. General Assembly allocates $475,000 at the end of the 1987 session for remedial grounds improvements.

August 1987
The N.C. Department of Administration begins remedial improvements to the Museum grounds, including installation of a sprinkler system, restoration of the Museum lawn, placement of new plant beds, and the assignment of personnel for ongoing maintenance.

September 1987
The National Endowment for the Arts awards the Museum a $56,900 grant to assist with preparation of a site plan. The Museum is one of only five recipients under a new NEA program that encourages collaborative projects among design professionals and visual artists. The grant is matched with private funds.

February 1988
The Museum announces that a planning team comprising artist Barbara Kruger, architects Henry Smith-Miller and Laurie Hawkinson, and landscape architect Nicholas Quennell has been selected for the site plan project. The project will place the Museum among the first museums in the country to involve an artist in the planning of its site. The Museum also announces that architect Michael Newman of Winston-Salem, N.C., will begin studies for expansion of the Museum building.

July 1988
The N.C. General Assembly makes a second allocation of $474,000 during the 1988 session for remedial grounds improvements at the Museum.
August 1988
The Museum sponsors "Movies on the Lawn: Back to the Drive-In" as a pilot project. The four-week series of classic films shown outdoors on the Museum lawn on Friday’s draws an average of 450 people each evening.

September 1988
The National Endowment for the Arts awards the Museum a $250,000 grant under a new Challenge grant program that recognizes model projects of national significance. The Museum is among the first 25 recipients under the new program. The funds, which must be matched by private contributions on a 3-to-1 ratio, will assist in implementation of the first phase of the “Art + Landscape” project.

March 1989
*Three Elements*, a minimalist work by Canadian-American artist Ronald Bladen, is installed on the front lawn of the Museum as the first permanent installation in the “Art + Landscape” project.

May 1989
Two 40-foot high "wind machines" by outsider artist Vollis Simpson are installed on the grounds, along with *Critters* by Clyde Jones, an African head by Jeff Williams, and a totem pole by Arliss Watford as part of the Museum’s exhibition "Signs and Wonders: Outsider Art Inside North Carolina."

May 1989
The Capital Area Planning Commission and the Department of Administration approve and endorse the “Art + Landscape” master plan, which the state subsequently incorporates into its plan for the Blue Ridge Road corridor. Museum’s three boards and Development department move forward with the capital campaign to raise funds for “Art + Landscape”.

October 1991
Burroughs Wellcome makes a $250,000 gift to the Museum for the “Art + Landscape” project. NEA makes first $150,000 award of is grand for “Art + Landscape”. Dan Gottlieb begins work with design team to develop first phase of “Art + Landscape”: construction of a new amphitheater adjacent to the south façade of the building.

April 1995
Museum breaks ground on Museum Park Theater. The innovated plan is itself an aesthetic statement, with its primary artistic element created by artist Barbara Kruger. The artist chose the phrase PICTURE THIS to become part of the landscape, through letters created from a wide variety of sculptural materials, such as blue stone, yellow pine and indigenous plantings. The Park Theater will host a variety of musical and dramatic performances, lectures, educational workshops and outdoor films. It will also serve as a picnic area and a site where visitors can discover art in the landscape.
June 1996
Joseph M. Bryan, Jr., contributes a gift of $600,000 toward the completion of the Museum Park Theater. The Museum names the Theater in honor of Bryan for supporting this phase of its growth.

June-July 1996
Museum presents first events in Joseph M. Bryan, Jr., Theater, including performances by Merce Cunningham Dance Company, Chuck Davis’ African-American Dance Ensemble and the North Carolina Symphony to inaugurate the facility.

Fall 1999
The Museum opens the Museum Park Trail, developed jointly with the N.C. Department of Transportation. The mile-long bicycle/pedestrian loop is the first phase of a network of sculpture trails planned for the site.

November 1999

July 2000
North Carolina legislators reassign the entire 164-acre site, including the former Polk youth correctional facility, to the North Carolina Department of Cultural Resources, for the NCMA to develop a museum park.

April 2001
Museum and North Carolina State University’s Department of Forestry agree to a collaborative effort to restore and manage the Museum Preserve. This collaboration, called the Partnership for Art & Ecology, will provide for environmental management of the park; cultural programming in the form of public art and other artist-conceived projects; and the development of educational opportunities for students at all grade levels.

2001-2003
First of a series of woodland trails is developed through the south woods of the Museum’s property.

June 2002
*Wind Machine*, Vollis Simpson (American, born 1919). A 35-foot-tall wind machine constructed from parts including bicycle wheels, propellers, candleholders and a model airplane. The whirligig measures 14 feet tall and 17.5 feet wide and sits atop a red, white and blue pole rising from a horse pasture on the Museum ground near the paved trail.

Summer 2002
Funding from the U.S. Department of Education will support design and program planning for the re-creation of the Pond as a work of art in the landscape, an educational resource, and a demonstration model for best practices of storm water management.
2003

Cloud Chamber for the Trees and Sky Chris Drury, British, born 1948 (Stone, wood, and turf). Commissioned by the North Carolina Museum of Art with funds from the North Carolina Art Society (Robert F. Phifer Bequest) Chris Drury creates functioning sculptures in the landscape that appear almost as organic outgrowths of the natural world. This cloud chamber, one of a series, operates as a walk-in camera obscura, or pinhole camera, with a small opening in the roof as the aperture. Once inside (with the door closed for optimal effect), the viewer sees an inverted image of the sky on the floor of the chamber. Instead of looking up at the sky, trees, and clouds, the viewer looks down on them. Drury has reoriented perspective.

Spring 2003

Boy Scouts from Raleigh-area troops begin Eagle projects to blaze a new Lower Woodland Trail and to complete two bridges in the forested Museum Preserve.

March 2003

Museum receives gift from anonymous donor to fund demolition of abandoned 45-acre Polk Correctional Facility. The project calls for demolition of approximately 12 buildings as well as landscaping along Blue Ridge Road.


April 2003

The Council of State approves leasing the former Polk Correctional Facility property to the NCMA Foundation for the purpose of demolishing most of the structures and cleaning the site. At the completion of the project, the property will revert back to the State for the NCMA.

May 2003


June 2003

DH Griffin Wrecking Co. is awarded the contract to demolish and clean up the structures on the prison property.

Fall 2003

N.C. Department of transportation will award contract to construct a bicycle/walking trail, connecting the first phase of the Museum Trail through the Park and over the I-440 beltline, via a pedestrian bridge. It will link the Museum to the University district and Umstead State Park and provide the first means of non-vehicular transportation to the Museum.
2004 – 2006
First NCSU Museum Park Fellow – John Pugh Masters student from Parks, Recreation and Tourism Management

February 2005
Internationally acclaimed North Carolina artist Patrick Dougherty installs *Trail Heads*, an environmental sculpture on the grounds of the North Carolina Museum of Art. His sculpture is located along the Museum Park trail and serves as an organic work that plays off the landscape.

September 2005
Prairie Trail is completed

2006 – 2008
Second NCSU Museum Park Fellow – Dena Justice Masters’s student from Parks, Recreation and Tourism Management

2006
Martha Jackson Jarvis, *Crossroads/Trickster I*

April 2006
Steven Siegel, *To see Jennie smile* The newspapers for this sculpture project have been generously donated by The News & Observer, Raleigh, N.C. Steven Siegel’s temporary sculptures consist of multiple layers of materials culled from the debris and throwaways of contemporary culture—newspapers, junk mail, plastic bottles, shredded tires—often combined with natural materials, such as tree branches, dirt, grass, and moss. His layered works emulate geologic time and the topographical layers of the landscape, encapsulating the clash between nature and culture, and reflecting upon contemporary consumerism, our consumption of natural resources, and the resulting mountains of trash and recycled materials.

June 2006
On Saturday, June 3, 2006, Secretary of the Interior Dirk Kempthorne named the House Creek Greenway, which connects the North Carolina Museum of Art to the Capital Area Greenway System, a National Recreational Trail. The designation was announced in conjunction with the observance of National Trails Day.

August 2006
Museum is awarded $1.573 million from the Clean Water Management Trust Fund to redesign an existing detention pond, which will provide a large-scale opportunity to involve an artist in the Park’s environmental restoration. As a permanent work of collaborative art, the process transcends the boundaries of profession and blurs the lines between art and science.
September 2006
Landscape architects from Lappas + Havener, PA begin revision of the Park Master Plan.

November 2006
The first NCMA Park visitor study is conducted.

December 2006
The first NCMA Park Manager is hired.

February 2007
Patrick Dougherty and Park staff de-installs Trail Heads, an environmental sculpture on the grounds of the North Carolina Museum of Art. His sculpture was located along the Museum Park trail and was a temporary piece. The artist decided that it was time to take the piece down so that it did not become hazardous to visitors.

August 2007
Ledelle Moe, Collapse is installed along the Greenway Trail and Untitled is installed along the Woodland Trail

February 2008
Park Master plan is completed

April 2008
Part (1700 feet) of the Ramble Trail is completed. Future funding will be obtained in order to complete the loop.

April 2008
Vinny Petrarca and Mike Cindric, Lowes Park Pavilion is completed

April 2008
Jim Gallucci Whisper Bench is installed along the Ramble Trail

April 2008
Steed Taylor Road Tattoos installed on the Greenway

April 2008
Workingman Collective, birdhouses installed along the Woodland Trail

April 2008
The First Earth Day Park Festival is launched

May 2008
The first Horticulture/Grounds Technician position is created and hired
July 2008
The second Horticulture/Grounds Technician is filled by a temporary employee

August 2008
Work on new park map art brochure begins. All art brochures and park maps will be consolidated into one format.

August 2008
Third NCSU Museum Park Fellow – Kimberly Shumate Masters student from Forestry Department

March 2009
Eagle Scout Daniel Vitek completes Eagle Scout project with NCMA Museum Park. Builds stone steps entering the Woodland Trail.

April 2009
Earth Day 2009 is conducted and approximately 3500 people come out to enjoy the event in the NCMA Museum Park.

May 2009
Work on the pond project begins.

Work on the pond project is temporarily stopped due to contract confusion with DENR, CWMTR and Balfour Beatty Construction (and Steve Blake’s firm name?).

Jerod Krazter retires as Volunteer Service Committee Chair (Volunteer Coordinator) and Carol Schlim is appointed as the new Volunteer Coordinator.

June 2009
Management Plan completed and bound. The plan is an all encompassing how-to manual which explains everything from the mission and vision of the park to the management of the various ecosystems found in the preserve. The plan also codifies the interdepartmental relationships and responsibilities of the various Museum departments and their involvement with the Museum Park.

Billboard project installed. See Linda Dougherty on artist’s names and explanation of piece. Three billboard stanchions will be permanently installed in the park and temporary art will be screen printed onto the front of the boards.
### 5.4 APPENDIX D: Plant Species Lists

#### 5.4.1 Prairie Plant Species List

1) Availability and Pricing for Ernst Conservation Seed Company

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Availability &amp; Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andropogon gerardii</td>
<td>Big Bluestem</td>
<td>$32/lb NC</td>
</tr>
<tr>
<td>Andropogon ternarius</td>
<td>Splitbeard Bluestem</td>
<td>$96/lb</td>
</tr>
<tr>
<td>Asclepias tuberosa</td>
<td>Butterfly weed</td>
<td>$160/lb</td>
</tr>
<tr>
<td>Chrysopsis mariana</td>
<td>Maryland Golden Aster</td>
<td>N/A</td>
</tr>
<tr>
<td>Conoclinium coelestinum</td>
<td>Mistflower</td>
<td>N/A</td>
</tr>
<tr>
<td>Eragrostis spectabilis</td>
<td>Purple Lovegrass</td>
<td>$180/lb VA</td>
</tr>
<tr>
<td>Eupatoriadelphus fistulosus</td>
<td>Hollow Joe Pye Weed</td>
<td>N/A</td>
</tr>
<tr>
<td>Helianthus angustifolius</td>
<td>Narrowleaf Sunflower</td>
<td>$48/lb NC</td>
</tr>
<tr>
<td>Liatris graciniifolia</td>
<td></td>
<td>$400/lb NC</td>
</tr>
<tr>
<td>Liatris spicata</td>
<td>Blazing Star</td>
<td>$210/lb com</td>
</tr>
<tr>
<td>Lobelia cardinalis</td>
<td>Cardinal Flower</td>
<td>call for price</td>
</tr>
<tr>
<td>Lupinus perennis</td>
<td>Wild Lupine</td>
<td>$96/lb MI</td>
</tr>
<tr>
<td>Monarda punctata</td>
<td>Horse mint</td>
<td>$120/lb NC</td>
</tr>
<tr>
<td>Panicum virgatum</td>
<td>Switchgrass</td>
<td>$11/lb NC</td>
</tr>
<tr>
<td>Phlox carolina</td>
<td>Carolina Phlox</td>
<td>N/A</td>
</tr>
<tr>
<td>Pityopsis graminifolia</td>
<td>Silkgrass</td>
<td>N/A</td>
</tr>
<tr>
<td>Rudbeckia fulgida</td>
<td>Orange Coneflower</td>
<td>$400/lb VA</td>
</tr>
<tr>
<td>Rudbeckia hirta</td>
<td>Black-eyed Susan</td>
<td>$24/lb NC</td>
</tr>
<tr>
<td>Saccharum giganteum</td>
<td>Sugarcane Plume grass</td>
<td>N/A</td>
</tr>
<tr>
<td>Schizachyrium scoparium</td>
<td>Little Bluestem</td>
<td>$40/lb NC</td>
</tr>
<tr>
<td>Solidago rugosa</td>
<td>Wrinkleleaf Goldenrod</td>
<td>$260/lb</td>
</tr>
<tr>
<td>Sorghastrum nutans</td>
<td>Indiangrass</td>
<td>$24/lb NC</td>
</tr>
<tr>
<td>Tridens flavus</td>
<td>Purpletop</td>
<td>$32/lb NC</td>
</tr>
<tr>
<td>Veronica noveboracensis</td>
<td>Ironweed</td>
<td>$280/lb NC</td>
</tr>
</tbody>
</table>
5.4.2 Potential Prairie Species


Burning Meadow Potential Herb Layer Species List: Meadow/roadside native species of the Clemson area Compiled from Haywood; Jones and Foote; Radford, Ahles and Bell; Niering and Olmstead; and Batson


Grasses
* Wet species in orange, wet-dry species in blue, and dry species in white.

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Moisture</th>
<th>Height</th>
<th>Bloom Time</th>
<th>Color</th>
<th>Showy</th>
<th>Indicator species from Piedmont Prairie remnants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrostis perennans</td>
<td>Bentgrass</td>
<td>wetter</td>
<td>&lt; 30&quot;</td>
<td>Aug-Nov</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Andropogon gerardii</td>
<td>Big Bluestem</td>
<td>drier</td>
<td>36-72&quot;</td>
<td>Jul-Oct</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Andropogon virginicus</td>
<td>Broomsedge</td>
<td>wet-dry</td>
<td>36-60&quot;</td>
<td>Sep-Oct</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Aristida oligantha</td>
<td>Three Awn</td>
<td>drier</td>
<td>8-24&quot;</td>
<td>Aug-Oct</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Aristida dichotoma</td>
<td>Three Awn Grass</td>
<td>drier</td>
<td>&lt; 28&quot;</td>
<td>Aug-Oct</td>
<td>yellow-purp</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Arundinaria gigantea</td>
<td>Cane</td>
<td>wetter</td>
<td>20-400&quot;</td>
<td>sporadic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danthonia spicata</td>
<td>Northern Oat Grass</td>
<td>drier</td>
<td>4-30&quot;</td>
<td>May-Jul</td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Dichanthelium dichotomum</td>
<td></td>
<td>wetter</td>
<td>6-48&quot;</td>
<td>Apr-Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dichanthelium sphaerocarpon</td>
<td></td>
<td>drier</td>
<td>6-24&quot;</td>
<td>Jun-Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Common Name</td>
<td>Seasonality</td>
<td>Height</td>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>-------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Elymus virginicus</em></td>
<td>Virginia Wild Rye</td>
<td>drier</td>
<td>36-48&quot;</td>
<td>Jun-Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Eragrostis hirsute</em></td>
<td>Love Grass</td>
<td>drier</td>
<td>.5-1&quot;</td>
<td>Jul-Oct</td>
<td>reddish</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td><em>Eragrostis refracta</em></td>
<td>Love Grass</td>
<td>wetter</td>
<td>12-40&quot;</td>
<td>Jul-Oct</td>
<td>reddish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Eragrostis spectabilis</em></td>
<td>Purple Love Grass</td>
<td>drier</td>
<td>16-32&quot;</td>
<td>Aug-Oct</td>
<td>purplish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Erianthus alopeceuroides</em></td>
<td>Woolly Plume Grass</td>
<td>drier</td>
<td>120&quot;</td>
<td>Oct-Nov</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Erianthus contortus</em></td>
<td>Plume Grass</td>
<td>drier</td>
<td>40-80&quot;</td>
<td>Sep-Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gymnopogon ambiguus</em></td>
<td>Beard Grass</td>
<td>drier</td>
<td>12-24&quot;</td>
<td>Aug-Oct</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Panicum anceps</em></td>
<td>drier</td>
<td></td>
<td>12-48&quot;</td>
<td>Jul-Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paspalum boscianum</em></td>
<td>drier</td>
<td></td>
<td>12-36&quot;</td>
<td>Jul-Oct</td>
<td>greyish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paspalum floridanum</em></td>
<td>drier</td>
<td></td>
<td>24-60&quot;</td>
<td>Aug-Oct</td>
<td>dark red</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paspalum leave</em></td>
<td>drier</td>
<td></td>
<td>12-36&quot;</td>
<td>Jun-Aug</td>
<td>yellowish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Paspalum setaceum</em></td>
<td>drier</td>
<td></td>
<td>4-32&quot;</td>
<td>Jun-Sep</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Schizachryrium scoparium</em></td>
<td>Little Blue Stem</td>
<td>drier</td>
<td>30-60&quot;</td>
<td>Aug-Oct</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sorghastrum nutans</em></td>
<td>Indian Grass</td>
<td></td>
<td>96&quot;</td>
<td>Sep-Oct</td>
<td>yellowish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sphenopholis obtusata</em></td>
<td>Wedge Grass</td>
<td>drier</td>
<td>8-30&quot;</td>
<td>Apr-May</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tridens flavus</em></td>
<td>Purple Top</td>
<td>drier</td>
<td>32-60&quot;</td>
<td>Jul-Oct</td>
<td>purplish</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vulpia octoflora</em></td>
<td>Six Weeks Grass</td>
<td>drier</td>
<td>6-24&quot;</td>
<td>Apr-Jun</td>
<td>red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Forbs

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Moisture</th>
<th>Height</th>
<th>Bloom Time</th>
<th>Color</th>
<th>Showy</th>
<th>Indicator species from Piedmont Prairie remnants</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Agalinis purpurea</em></td>
<td>Purple Gerardia</td>
<td>wetter</td>
<td>16-48&quot;</td>
<td>Aug-frost</td>
<td>purple</td>
<td>+</td>
<td>Species from Piedmont Prairie remnants</td>
</tr>
<tr>
<td><em>Agalinis tenuifolia</em></td>
<td>Gerardia</td>
<td>drier</td>
<td>8-24&quot;</td>
<td>Aug-Oct</td>
<td>lavender</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td><em>Aletris farinosa</em></td>
<td>Colicroot</td>
<td>wet-dry</td>
<td>16-48&quot;</td>
<td>Apr-Jun, Jul-Aug</td>
<td>white</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><em>Amorpha herbacea</em></td>
<td>False Indigo</td>
<td>drier</td>
<td>12-60&quot;</td>
<td>May-Jul, Jul-Oct</td>
<td>blue-white</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><em>Asclepias amplexicaulis</em></td>
<td>Milkweed</td>
<td>drier</td>
<td>16-40&quot;</td>
<td>May-Jul, Jun-Aug</td>
<td>rose-purple</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Asclepias tuberosa</em></td>
<td>Butterfly Weed</td>
<td>drier</td>
<td>8-32&quot;</td>
<td>May-Aug, Aug-Sep</td>
<td>red-yellow</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><em>Aster concolor</em></td>
<td>Aster</td>
<td>drier</td>
<td>12-24&quot;</td>
<td>Sep-Oct</td>
<td>violet,yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Chamaecrista fasciculata</em></td>
<td>Partridge Pea</td>
<td>drier</td>
<td>24&quot;</td>
<td>Jul-Aug</td>
<td>yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Coreopsis major</em></td>
<td>Greater Tickseed</td>
<td>drier</td>
<td>24-42&quot;</td>
<td>May-Jul</td>
<td>yellow-red</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><em>Croptilon divaricatum</em></td>
<td></td>
<td>drier</td>
<td>24-66&quot;</td>
<td>Aug-Oct</td>
<td>yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croton glandulosus</td>
<td>drier</td>
<td>4-24&quot;</td>
<td>May-Oct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmodium laevigatum</td>
<td>Tick-trefoil</td>
<td>drier</td>
<td>24-48&quot;</td>
<td>Jun-Sep, Aug-Oct</td>
<td>pink-purple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmodium marilandicum</td>
<td>drier</td>
<td>24-60&quot;</td>
<td>Jun-Sep, Aug-Oct</td>
<td>purplish</td>
<td></td>
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<tr>
<td>Desmodium paniculatum</td>
<td>Tick-trefoil</td>
<td>drier</td>
<td>24-48&quot;</td>
<td>Jun-Sep, Aug-Oct</td>
<td>purplish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmodium perplexum</td>
<td>Tick-trefoil</td>
<td>drier</td>
<td>20-60&quot;</td>
<td>Jul-Sep, Aug-Oct</td>
<td>purplish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diodia teres</td>
<td>Buttonweed</td>
<td>drier</td>
<td>6-24&quot;</td>
<td>Jun-frost</td>
<td>white</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Eclipta alba</td>
<td>wettest</td>
<td>4-40&quot;</td>
<td>Jun-frost</td>
<td>white</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erigeron strigosus</td>
<td>Daisy Fleabane</td>
<td>drier</td>
<td>18-54&quot;</td>
<td>May-Oct</td>
<td>white-lav</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td>Eupatorium album</td>
<td>drier</td>
<td>16-32&quot;</td>
<td>Jun-Sep</td>
<td>white</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eupatorium capillifolium</td>
<td>Dog Fennel</td>
<td>drier</td>
<td>36-78&quot;</td>
<td>Sep-frost</td>
<td>white-purple</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Eupatorium coelestinum</td>
<td>Hardy Ageratum</td>
<td>wettest</td>
<td>12-36&quot;</td>
<td>Jul-Oct</td>
<td>blue-violet</td>
<td>+</td>
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<tr>
<td>Eupatorium fistulosum</td>
<td>Joe-Pye Weed</td>
<td>wettest</td>
<td>18-108&quot;</td>
<td>Jul-Oct</td>
<td>pink-purple</td>
<td>+</td>
<td></td>
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<tr>
<td>Eupatorium hyssopifolium</td>
<td>drier</td>
<td>24-42&quot;</td>
<td>Jul-Oct</td>
<td>white</td>
<td>Y</td>
<td></td>
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<tr>
<td>Eupatorium perfoliatum</td>
<td>Boneset</td>
<td>wettest</td>
<td>24-54&quot;</td>
<td>Aug-Oct</td>
<td>white</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td>Eupatorium serotinum</td>
<td>drier</td>
<td>24-78&quot;</td>
<td>Aug-Oct</td>
<td>white</td>
<td></td>
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<tr>
<td>Euphorbia corollata</td>
<td>Flowering Spurge</td>
<td>drier</td>
<td>4-20&quot;</td>
<td>May-Sep</td>
<td>white</td>
<td></td>
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<tr>
<td>Geranium carolinianum</td>
<td>drier</td>
<td>4-32&quot;</td>
<td>Mar-Jun</td>
<td>pink</td>
<td>Y</td>
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<tr>
<td>Gnaphalium helleri</td>
<td>drier</td>
<td>24-36&quot;</td>
<td>Sep-Oct</td>
<td>white</td>
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<tr>
<td>Hedeoma pulegioides</td>
<td>Pennyroyal</td>
<td>drier</td>
<td>4-18&quot;</td>
<td>Jul-Oct</td>
<td>white-lav</td>
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<tr>
<td>Species</td>
<td>Common Name</td>
<td>Season</td>
<td>Height (in)</td>
<td>Color</td>
<td>Water Requirement</td>
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<tr>
<td><em>Helenium autumnale</em></td>
<td>Sneeze Weed</td>
<td>Sep-Oct</td>
<td>24-78&quot;</td>
<td>yellow</td>
<td>+</td>
<td></td>
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<tr>
<td><em>Helenium flexulosum</em></td>
<td>Sneeze Weed</td>
<td>May-Aug</td>
<td>16-40&quot;</td>
<td>red-yellow</td>
<td>+</td>
<td></td>
<td></td>
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<tr>
<td><em>Helianthus angustifolius</em></td>
<td>Narrow-leaved Sunflower</td>
<td>Jul-frost</td>
<td>36-78&quot;</td>
<td>yellow</td>
<td>+</td>
<td></td>
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<tr>
<td><em>Helianthus atrorubens</em></td>
<td>Dark-eyed Sunflower</td>
<td>Jul-Oct</td>
<td>24-60&quot;</td>
<td>purplish-red</td>
<td>+</td>
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<td></td>
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<tr>
<td><em>Helianthus microcephalus</em></td>
<td></td>
<td>Aug-Oct</td>
<td>30-96&quot;</td>
<td>yellow</td>
<td>Y</td>
<td></td>
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<tr>
<td><em>Helianthus strumosus</em></td>
<td>Woodland Sunflower</td>
<td>Jun-Oct</td>
<td>36-114&quot;</td>
<td>yellow</td>
<td>+</td>
<td></td>
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<tr>
<td><em>Helianthus tuberosus</em></td>
<td>Jerusalem Artichoke</td>
<td>Jul-Oct</td>
<td>36-120&quot;</td>
<td>yellow</td>
<td>+</td>
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<tr>
<td><em>Heterotheca mariana</em></td>
<td></td>
<td></td>
<td>8-36&quot;</td>
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<tr>
<td><em>Houstonia caerulea</em></td>
<td>Bluets</td>
<td>Apr-May, May-Jun</td>
<td>2-7&quot;</td>
<td>blue</td>
<td>+</td>
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<tr>
<td><em>Hypericum gentianoides</em></td>
<td>Pine Weed</td>
<td>Jul-Oct</td>
<td>4-20&quot;</td>
<td>yellow</td>
<td>+</td>
<td></td>
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<tr>
<td><em>Hypericum mutilum</em></td>
<td>Dwarf St. John's-wort</td>
<td>Jun-Oct</td>
<td>6-28&quot;</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Hypoxis hirsute</em></td>
<td>Yellow Star Grass</td>
<td>Mar-Jun, May-Jul</td>
<td>2-8'</td>
<td>yellow</td>
<td>+</td>
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<tr>
<td><em>Krigia virginica</em></td>
<td>Dwarf Dandelion</td>
<td>Mar-Jun</td>
<td>6-12&quot;</td>
<td>yellow</td>
<td>Y</td>
<td></td>
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<tr>
<td><em>Lechea racemulosa</em></td>
<td>Pine Weed</td>
<td>Jun-Jul, Oct</td>
<td>4-16&quot;</td>
<td>red-maroon</td>
<td>Y</td>
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<tr>
<td><em>Lespedeza hirta</em></td>
<td>Hairy Bush Clover</td>
<td>Aug-Oct, Sep-Nov</td>
<td>48&quot;</td>
<td>white</td>
<td>+</td>
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<tr>
<td><strong>Lespedeza repens</strong></td>
<td>Creeping Bush Clover</td>
<td>drier</td>
<td>12-32&quot;</td>
<td>Jul-Sep, Aug-Nov</td>
<td>purplish</td>
<td>+</td>
<td>Y</td>
</tr>
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<tr>
<td><strong>Lespedeza virginica</strong></td>
<td>Slender Bush Clover</td>
<td>drier</td>
<td>12-36&quot;</td>
<td>Jul-Sep, Aug-Nov</td>
<td>rose-purple</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Liatris graninifolia</strong></td>
<td>Grassleaf Blazing Star</td>
<td>drier</td>
<td>60&quot;</td>
<td>Oct-frost</td>
<td>lavender</td>
<td>+</td>
<td></td>
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<tr>
<td><strong>Liatris spicata</strong></td>
<td>Gay Feather</td>
<td>wetter</td>
<td>12-72&quot;</td>
<td>Jul-Sep</td>
<td>rose-purple</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Lobelia cardinialis</strong></td>
<td>Cardinal Flower</td>
<td>wettest</td>
<td>24-102&quot;</td>
<td>Jul-Oct</td>
<td>scarlet</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><strong>Lobelia inflata</strong></td>
<td>Indian Tobacco</td>
<td>drier</td>
<td>4-40&quot;</td>
<td>Jul-frost</td>
<td>lavender</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td><strong>Lobelia puberula</strong></td>
<td>wet-dry</td>
<td>24-72&quot;</td>
<td>Jul-Oct</td>
<td>violet</td>
<td></td>
<td>Y</td>
<td></td>
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<tr>
<td><strong>Lysimachia quadrifolia</strong></td>
<td>Whorled Loosestrife</td>
<td>drier</td>
<td>12-40&quot;</td>
<td>May-Jul, Aug-Oct</td>
<td>red, black</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><strong>Monarda punctata</strong></td>
<td>Dotted monarda</td>
<td>drier</td>
<td>12-36&quot;</td>
<td>Jul-Sep, Sep-Oct</td>
<td>lavender</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><strong>Nuttallanthus canadensis</strong></td>
<td>Toad-flax</td>
<td>drier</td>
<td>6-28&quot;</td>
<td>Mar-May</td>
<td>blue-purple</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><strong>Oenothera biennis</strong></td>
<td>Evening Primrose</td>
<td>drier</td>
<td>60&quot;</td>
<td>Jun-Oct</td>
<td>yellow</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Parthenium integrifolium</strong></td>
<td>Wild Quinine</td>
<td>drier</td>
<td>24-48&quot;</td>
<td>May-Aug</td>
<td>white</td>
<td>Y</td>
<td></td>
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<tr>
<td><strong>Phlox carolina L.</strong></td>
<td></td>
<td>drier</td>
<td>&lt;30&quot;</td>
<td>May-Jun</td>
<td>pink-purple</td>
<td></td>
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<tr>
<td><strong>Polygala curtissii</strong></td>
<td>Polygala</td>
<td>wetter</td>
<td>3-16&quot;</td>
<td>Jun-Oct</td>
<td>pink-white</td>
<td>Y</td>
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<tr>
<td><strong>Polymnia uvedalia</strong></td>
<td>Bear's Foot</td>
<td>drier</td>
<td>36-78&quot;</td>
<td>Jul-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><strong>Pseudognaphalium obtusifolium</strong></td>
<td>Rabbit Tobacco/Everlasting</td>
<td>drier</td>
<td>24-36&quot;</td>
<td>Aug-Oct</td>
<td>white</td>
<td></td>
<td></td>
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<tr>
<td><strong>Ptilimnium capillaceum</strong></td>
<td>wetter</td>
<td>4-32&quot;</td>
<td>May-Jul, Jul-Aug</td>
<td>white</td>
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<tr>
<td><strong>Pycnanthemum incanum</strong></td>
<td>Hoary Mint</td>
<td>drier</td>
<td>36-78&quot;</td>
<td>Jun-Aug, Sept-Oct</td>
<td>white</td>
<td>+</td>
<td></td>
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<tr>
<td><strong>Rhexia virginica</strong></td>
<td>Virginia Meadow Beauty</td>
<td>wetter</td>
<td>36&quot;</td>
<td>May-Oct</td>
<td>rose-purple</td>
<td>+</td>
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<tr>
<td><strong>Rudbeckia fulgida</strong></td>
<td>Black-eyed Susan</td>
<td>drier</td>
<td>28-48&quot;</td>
<td>Aug-Oct</td>
<td>yellow</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Rudbeckia hirta</strong></td>
<td>Black-eyed Susan</td>
<td>drier</td>
<td>16-40&quot;</td>
<td>May-Jul</td>
<td>yellow</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Rudbeckia laciniata</strong></td>
<td>Cut-leaf Cone Flower</td>
<td>wetter</td>
<td>36-96&quot;</td>
<td>Jul-Oct</td>
<td>yellow</td>
<td>+</td>
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<tr>
<td><strong>Rumex hastatulus</strong></td>
<td>Sorrel</td>
<td>drier</td>
<td>6-11&quot;</td>
<td>Mar-May, Apr-Jun</td>
<td>pink, yellow</td>
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<tr>
<td><strong>Sabatia angularis</strong></td>
<td>Rose Pink</td>
<td>wetter</td>
<td>4-32&quot;</td>
<td>Jul-Aug, Sep-Oct</td>
<td>pink</td>
<td>+</td>
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<tr>
<td><strong>Salvia lyrata</strong></td>
<td>Lyre-leaved Sage</td>
<td>drier</td>
<td>12-24&quot;</td>
<td>Apr-May, May-Jul</td>
<td>blue-violet</td>
<td>Y</td>
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<tr>
<td><strong>Scutellaria integrifolia</strong></td>
<td>Skullcap</td>
<td>drier</td>
<td>6-32&quot;</td>
<td>May-Jul, Jul-Aug</td>
<td>blue-violet</td>
<td>+</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Silene antirrhina</strong></td>
<td>Sleepy Catchfly</td>
<td>drier</td>
<td>12-36&quot;</td>
<td>Apr-Jul</td>
<td>purplish</td>
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<tr>
<td><strong>Silphium asteriscus var. laevicaule</strong></td>
<td>drier</td>
<td>24-102&quot;</td>
<td>May-Aug</td>
<td>yellow</td>
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<tr>
<td><strong>Silphium compositum</strong></td>
<td>Compass Plant</td>
<td>drier</td>
<td>36-156&quot;</td>
<td>May-Sep</td>
<td>yellow</td>
<td>+</td>
<td>Y</td>
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<tr>
<td><strong>Sisyrinchium angustifolium</strong></td>
<td>Blue-eyed Grass</td>
<td>wet-dry</td>
<td>6-20&quot;</td>
<td>Mar-Jun</td>
<td>blue</td>
<td>+</td>
<td>Y</td>
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<tr>
<td>Species</td>
<td>Common Name</td>
<td>Season</td>
<td>Height</td>
<td>Flower Type</td>
<td>Notes</td>
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<tr>
<td><em>Solidago altissima</em></td>
<td>Tall Goldenrod</td>
<td>drier</td>
<td>May-Jul</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Solidago erecta</em></td>
<td></td>
<td>drier</td>
<td>Sep-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Solidago gigantean</em></td>
<td>Late Goldenrod</td>
<td>drier</td>
<td>Aug-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Solidago nemoralis</em></td>
<td>Common Goldenrod</td>
<td>drier</td>
<td>Sep-Oct</td>
<td>yellow</td>
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<tr>
<td><em>Solidago rugosa</em></td>
<td>Rough-stemmed Goldenrod</td>
<td>wet-dry</td>
<td>Sep-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Solidago speciosa</em></td>
<td>Showy Goldenrod</td>
<td>drier</td>
<td>Sep-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Symphyotrichum lateriflorus</em></td>
<td>Starred Aster</td>
<td>drier</td>
<td>Sep-Nov</td>
<td>white, orange</td>
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<tr>
<td><em>Symphyotrichum puniceum</em></td>
<td>Aster</td>
<td>wetter</td>
<td>Sep-Oct</td>
<td>violet</td>
<td></td>
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<tr>
<td><em>Trichostema dichotomum</em></td>
<td>Bastard Pennyroyal</td>
<td>drier</td>
<td>Aug-Oct</td>
<td>blue-violet</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Verbena urticifolia</em></td>
<td></td>
<td>wetter</td>
<td>May-Nov</td>
<td></td>
<td></td>
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<tr>
<td><em>Verbesina occidentalis</em></td>
<td></td>
<td>drier</td>
<td>Aug-Oct</td>
<td>yellow</td>
<td></td>
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<tr>
<td><em>Vernonia noveboracensis</em></td>
<td>New York Ironweed</td>
<td>wetter</td>
<td>Jul-Sep, Aug-Oct</td>
<td>violet</td>
<td>+</td>
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### 5.4.3 Dry to Mesic Sites

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<th>Forest Type</th>
<th>Canopy</th>
<th>Understory</th>
<th>Shrub</th>
<th>Herb</th>
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<tr>
<td><strong>Dry- Mesic Oak-Hickory Forest</strong></td>
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<tr>
<td><strong>Quercus alba</strong></td>
<td><em>Acer rubrum</em></td>
<td><em>Viburnum rafinesquianum</em></td>
<td><em>Hexastylis spp.</em></td>
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<tr>
<td><strong>Quercus rubra</strong></td>
<td><em>Cornus florida</em></td>
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<td><em>Vaccinium stamineum</em></td>
<td><em>Goodyera pubescens</em></td>
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<tr>
<td><strong>Quercus velutina</strong></td>
<td><em>Oxydendron arboreum</em></td>
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### Basic Oak-Hickory Forest

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### Xeric hardpan Forest

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### 5.4.4 Wet Sites

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<td>Elymus hystrix</td>
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<td>Sedum ternatum</td>
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<td></td>
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<td>Geum canadense</td>
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<td></td>
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<td>Polygonum virginianum</td>
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<td>Verbesina alternifolia</td>
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<td><strong>Impatiens capensis</strong></td>
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<td><strong>Cryptotaenia canadensis</strong></td>
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<td><strong>Senecio aureus</strong></td>
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REFERENCES


Cosco, Nilda, 2009. *Art Has No Boundaries Surveys*, NCMA, Center of Universal Design, Natural Learning Initiate, College of Design, NCSU. Raleigh, NC.


EPILOUGE

After the plan was completed in June 2009, I submitted the plan to the NCMA staff for review. I received no comment on the plan and it was accepted as a working document by staff. Soon after the submission of the plan, the former park manager resigned and the Art and Ecology Partnership ceased activity. A former park staff person was reassigned as the park manager, but, to date, the management plan has not yet been implemented. In the summer of 2010, a NCSU student working with Dr. Ted Shear was hired by the NCMA Park to maintain the prairie. It is likely the prairie management section of the plan will be implemented in 2011.
CHAPTER 2

SERVING THE COMMON INTEREST IN URBAN PARKS: A CASE STUDY
FROM NORTH CAROLINA MUSEUM OF ART PARK, RALEIGH, NORTH CAROLINA
ABSTRACT

I conducted a common interest analysis on a small scale urban park in North Carolina to determine if the common interest was being served. To serve the common interest, three criteria should be met. These include the substantive, procedural, and pragmatic tests. I found that the common interest at this park was not fully served due to a failure to meet procedural criteria.

Inclusiveness and transparency in the decision-making process were lacking. The participants did share a common vision and their goals, priorities, and expectations were consistent with those of the broader community, thus meeting the substantive criteria. To assure the long term success of small scale urban parks, it is necessary for all participants to share a common interest and participate in both the planning and implementation phase of the park when the decisions affect them.

INTRODUCTION

A fundamental principle for analyzing policy and environmental management is to search for common ground among stakeholders. Reaching common ground for sound decision-making is known as serving the common interest (Lasswell 1971; Brunner and others 2002; Brunner and Steelman 2005; Steelman and Rivera 2006; Rutherford and others 2009; Steelman and DuMond 2009). The common interest is made up of interests shared widely by members of a community (Brunner and others 2002). When the common interest is found and served, participants’ satisfaction with decisions can increase due to inclusion and the feeling that they have been treated fairly (Rutherford and others 2009). My primary
goal in this research was to perform a common interest analysis by using a stakeholder based approach to determine, in part, whether a common vision was present at the North Carolina Museum of Art Park (NCMA Park), and to determine whether the common vision was reflected in the management and decision-making process.

The second goal was to test the common interest analysis process itself, using the park as a particular case study. Stakeholder analysis is generally conducted for very large scale projects or policies that affect a large number of people. I applied the principles of stakeholder analysis to the development and management of a small urban park of only 164 acres with an annual visitation of less than 100,000 visitors. Even at this scale, there are multiple stakeholders that may or may not share a common interest.

North Carolina Museum of Art Park

The NCMA Park is an urban park located in Raleigh, NC and is surrounded by neighborhoods, universities, colleges, and businesses. The NCMA Park provides a place for recreation within an atmosphere of ecosystems and art (Shumate and others 2009). A typical sculpture park, such as the Vigeland in Norway or the Hirshhorn in Washington DC, commissions art pieces that are placed in a landscape that has been designed around the sculptures. The NCMA Park is exactly the opposite; artists draw inspiration from the surrounding environment and respond to that ecosystem with a sculpture that speaks to a specific location. One of the goals for the NCMA Park is to provide a variety of landscapes that represent different ecosystems within the southern Piedmont that promote inspiration for artistic expression. Due to the past agricultural history, the landscape has been degraded.
The intent of the NCMA Park is to restore and create naturally occurring processes to enhance the natural communities connected with a series of trails for patron exploration of both art and ecology (Shumate and others 2009).

Participants

Many different stakeholders have been involved in the NCMA Park. The NCMA Park is located adjacent to Meredith Woods, a residential neighborhood, and shares a boundary with many landowners. The NCMA Park is overseen by the Director of the North Carolina Museum of Art and a Board of Trustees. The Museum is owned and operated by the State of North Carolina under the Division of Cultural Resources, which serves North Carolina’s citizens across the state in an outreach capacity to broaden minds and spirits, preserve history and culture, and to recognize and promote cultural resources as an essential element of North Carolina’s economic and social well-being (NC Division of Cultural Resources 2006). The second in command for the NCMA Park is the Director of Planning and Design who spearheads both the planning and implementation of the park’s components. There is a NCMA Park Manager who oversees two maintenance staff in the execution of the NCMA Park’s mission. The NCMA Park Art Curator works with artists to establish outdoor installations along trails throughout the park.

Part of the NCMA Park’s goal is to create a linkage to other resources within Raleigh. In 2006, the House Creek Greenway was completed through the NCMA Park (Shumate and others 2009). The greenway is a paved multiuse path designed as a means of alternative transportation and is part of the City of Raleigh’s larger greenway system. It
connects the NCMA Park with the adjacent institutions, North Carolina State University (NCSU), Meredith College, and Umstead State Park. The greenway was funded through the federal government and designed and built by the NC Department of Transportation (NC DOT). Professors from the College of Natural Resources at North Carolina State University were consultants on the design and placement of the greenway trail. After the project was completed, the City of Raleigh took over the operation of the greenway.

NCSU has been involved in many research projects on the NCMA Park grounds. The NCMA Park is used as a living laboratory for classes at NCSU such as Ecology and Hydrology. The NCMA Park has been used as a research site for graduate students in the Departments of Natural Resources and Parks, Recreation, and Tourism Management. The NCMA Park has also teamed with NCSU researchers in the Center for Universal Design and the Learning Initiative to improve the accessibility for senior citizens, individuals with disabilities, and families with children.

History

Planning for the park began in 1981 and continues through the present. At the outset, park staff attempted to collaborate with participants to create a model site representing a multi-agency partnership of management. However, the flexible framework for design, the order in which plans have been established, and the addition of new partners have caused problems in the implementation of the plan. The initial concept behind the NCMA Park was a flexible framework for design. This concept lacked clear direction, causing a myriad of ad hoc projects throughout the landscape. The first landscape plan was
developed in the late 1980s for what was then a 50 acre site. The current NCMA Director of Planning and Design was not hired until 1991, two years after the initial plan was in place.

In 2000, the NCMA Park acquired adjacent land bringing the site to its current 164 acres. In 2001, a Memorandum of Understanding (MOU) was signed with the NCSU College of Natural Resources to form the Art and Ecology Partnership (the Partnership). The Partnership was composed of an advisory team made up of two representatives appointed by the Museum, two by the NCSU College of Natural Resources, and three citizens at large to advise the partners on plans and programs. This advisory board was to serve as a source of inspiration and consultation on both art and ecology issues. The Partnership later added the City of Raleigh in 2006 after the completion of the greenway.

Up until 2008, when the Master Plan was developed by a landscape architect firm, numerous art installations, landscape restoration projects, and trail development occurred without a clear plan for implementation. Then in 2009, a Comprehensive Management Plan was developed. The plan is an all-encompassing how-to manual that explains everything from the mission and vision of the park to the management of the various ecosystems found in the park. The plan also codifies the interdepartmental relationships and responsibilities of the various Museum departments and their involvement with the NCMA Park.

Resource allocation has been an issue since the inception of the NCMA Park. There are limited funds available, and the State of N.C. currently does not provide funding to the NCMA Park. Funding is limited to private donations and grants. Staffing has also been an issue. It was not until 2006 that a NCMA Park Manager was hired. The NCMA Park Manager oversaw park implementation and maintenance, educational opportunities,
volunteers, and researchers and facilitated the Partnership meetings. The NCMA Park Manager also worked to build relationships with adjacent land owners and communicate the NCMA Park plan. In 2009, the NCMA Park Manager resigned. After her resignation, the position took a shift in duties and the current NCMA Park Manager only oversees park development and maintenance. The other duties of a park manager, such as partnership development and education, are no longer carried out. The shift was a result of a hiring freeze within the organization, and the director moved a current NCMA Park employee to the manager position. Due to the background of this employee, the current director exercised their managerial discretion and shifted the direction of the position.

The issues in the planning and implementation processes and the multitude of stakeholders lead me to the common interest analysis. The Partnership was designed to integrate the perspectives of NCMA Park employees, NCSU, City of Raleigh, and community members. However, the Partnership has never, to date, included any community members. The lack of community involvement eliminates the perspectives from people who are more focused on the value of the park. The ad hoc development of the NCMA Park due to the lack of direction, integrated decision-making, and resource allocation indicated to me that the intended collaborative decision making processes at the NCMA Park had issues that needed to be identified to better manage the property. The common interest analysis uses a stakeholder-based approach to determine if all stakeholders share common vision, goals, and expectations and whether participation in decision-making is inclusive (Clark 2002). Information gained from the analysis can lead to improvements in management by
identifying where problems lie in both the planning and implementation processes. This analysis could be used as a model for other urban parks.

**Common Interest Analysis**

The common interest is served when the common vision of a community is represented in management decisions (Clark 2002). One of the challenges to serving the common interest occurs when single interests dominate in a decision process. The current issues in planning and implementation within the NCMA Park can be understood within the broader concepts of scientific management and the role of single interests in those governance processes.

Scientific management is a governance paradigm by which top-down implementation strategies of a small group of experts use rational measurements and efficiency for decision making and policy development (Hays 1959). These policies typically focus on a single, fixed target and disregard social and scientific uncertainties. These policies are applied universally regardless of context. Consequently, the strategies of scientific management can pit single interest groups against each other due to the creation of only one solution to a complex issue (Brunner and Steelman 2005). Like scientific management, parks typically take this top-down approach to decision making. A governing person or body makes planning and implementation decisions and typically develops a management plan without input from the affected parties.

A potential solution to addressing the problem with scientific management in park planning and implementation is the use of community-based initiatives (Gailing 2007).
Community-based initiatives are used to integrate various interests of people within the context of the community into a balanced policy (Brunner and Steelman 2005). Community-based initiatives integrate fragmented authority and control over policy issues and decision making and form structure around the community. Therefore, the policy is not solely technical and takes into account both facts and values within the local context where stakeholders have diverse and interdependent interests. Parks could benefit by including community members in the decision-making process to achieve desired results of increased visitation and recognition.

The concepts derived from community based initiatives relate to the common interest by relying on a bottom-up implementation strategy. The common interest “…is composed of interests widely shared by members of a community. It would benefit the community as a whole and be supported by most community members, if they can find it” (Brunner and others 2002, pg. 8). This collaborative process, which operates at a community level, has an added benefit of including participants that have the potential of being directly affected by the decisions being made (Rutherford and others 2009). By integrating all potentially affected participants, the possibility for negative reactions to decisions has the potential to decrease.

The managing authorities should work with the community to find and secure the common interest to reach satisfaction with decision making. It is the managing authority’s role to be a facilitator who works to clarify community goals, and then implements the goals which are compatible with the common interests of the most inclusive community (Lasswell
and McDougal 1992). In order to secure the common interest, the substantive, procedural, and pragmatic criteria must be met.

Substantive Test

The substantive test is a tool to determine whether the participants’ perspectives were valid and appropriate (Brunner and others 2002). Two broad criteria help assess if an interest is valid and appropriate. First, a valid and appropriate interest is one in which the participants’ goal is supported by the broader community rather than one person or a small group of people (Steelman and Rivera 2006). Second, if a person’s or group’s expectations are not warranted by the evidence that is available, the interests should be discounted and deemed invalid (Brunner and others 2002).

A single interest is when the perspectives of participants are excluded or one part of the community is served at the expense of another (Brunner and others 2002). A single interest is not valid and appropriate because it only benefits one participate or group and discredits the perspectives of the community as a whole. A management decision, in the same vein as a policy, has to satisfy the interests of all valid and appropriate participant perspectives. The common interest is not necessarily a single target but rather an ongoing effort by the community to find solutions that work for the collective group (Cherney and Clark 2009). In the case of the NCMA Park, to be substantively robust, the participants had to share a common vision and valid concerns had to be incorporated into both the goals and expectations.
**Procedural Test**

The procedural test is a tool used to determine whether the process was inclusive in regards to responsible participants (Brunner and others 2002). For a process to be inclusive there must be ample opportunity for participants to interact. Through the interactions, stakeholders’ valid and appropriate concerns must be taken into consideration in order for the process to be fair. How decisions are made and the perspectives that are included in the decisions are clear, making the process transparent.

The inclusion of participants not only enlightens decisions but also has the potential to improve satisfaction through the perception of fairness. Drawing from the social-psychological theory of “procedural justice,” stakeholder satisfaction with the decisions relies on the perceived fairness of the process of making the decisions (Lind and Tyler 1988). This concept of fairness means that participants have the opportunity to express their views and that the decision-making process is open, clear, and consistent about the guiding rules (Lawrence and Daniels 1997, Folger and Martin 1986). It does not necessarily mean that every process will be fair to all interests, but at least the participants feel included. For the purposes at the NCMA Park, I used the “group value model” developed by Lind and Tyler (1988), which is grounded in community participation, in which the process of decision making becomes important due to the values people hold in the way they are treated in groups.

A variety of stakeholder perspectives is essential to understand the complexity of the problem at hand (Gonzola-Turpin and others 2008). By integrating a variety of stakeholders into a decision making situation, insight into the participants’ relation to resources and a
better definition of their values, beliefs, and preferences are understood (Endter-Wada and others 1998). Participants’ values, beliefs, and expectations based on their preferences are the basis for identifying the problems that exist within a system (Lasswell 1971). Once the problems have been identified, the group can work to find common ground. In order to generate effective solutions that are in the common interest, problems must be identified and assessed to address the factors underlying the main issues (Rutherford and others 2009). In order for participants to determine the problems that exist, they must interact with one another. The situations in which participants are interacting have been named arenas by Cherney and Clark (2009), and these arenas are used to reconcile difference and find common ground. In the case of the NCMA Park, participation and decision making had to be inclusive, the process had to be transparent, and there needed to be ample opportunity to participate in order for procedural fairness to be present in the decision-making process.

**Pragmatic Test**

The pragmatic test determines if the expectations of the participants were met in the final outcomes of the decision (Brunner and others 2002; Steelman and DuMond 2009). This last test is only used after the management or policy has been put into place. The pragmatic test was excluded from the analysis because the management plan for the NCMA Park was only completed the summer prior to this research. Due to the management plan’s infancy, no clear results could be formulated. Further analysis is needed once the management of the park is well established to fully understand if the pragmatic test is met.
We focused on the substantive and procedural aspects of the common interest. I conducted this analysis to determine if the participants shared a common vision, had valid and appropriate concerns integrated in their goals and expectations, and if the decision-making process was inclusive and transparent. Problems within the processes were then identified. By understanding where problems lie between participants, better decisions can be made in regards to the common interest (Laswell 1971; Endter-Wada and others 1998; Brunner and Steelman 2005; Gonzola-Turpin 2008; Rutherford and others 2009).

METHODS

Interview Process

A complete list of stakeholders involved with the NCMA Park was developed by reviewing the NCMA Park Comprehensive Management Plan, Memoranda of Understanding between the North Carolina Museum of Art (NCMA) and the City of Raleigh and NCMA and NCSU, and the Park Master Plan. Emails and/or phone calls were used to contact interviewees. A snowball sampling method was used to identify additional stakeholders (Kemper and others 2003). A person had to be suggested at least twice by an interviewee, have directly participated in the NCMA Park, or have been directly affected by the decisions made at the NCMA Park to be included in the sample. Potential interviewees retained the right to deny participation if unable or unwilling to participate.

Interviewees included 18 people comprised of decision makers and a sample of others directly affected by park decisions. They included NCMA employees who are directly involved with the park, a NCMA Board of Trustee member, a NCSU professor
working on ecological restoration, a NCSU researcher working on human accessibility issues, City of Raleigh employees associated with the greenway, the NC DOT greenway designer, a landscape architect for the NCMA Park, and homeowners within the adjacent Meredith Woods residential neighborhood (Table 2.1). Thirteen people were originally interviewed and these interviewees suggested five additional participants. Three people identified to be interviewed either declined or did not respond.

Table 2.1: Interviewees for the NCMA Park Common Interest Analysis

<table>
<thead>
<tr>
<th>Participant Groups</th>
<th>Numbers of Participants</th>
<th>Number of Non-responders or Declines</th>
</tr>
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<tbody>
<tr>
<td>NC Museum of Art</td>
<td>7</td>
<td>1</td>
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<tr>
<td>Meredith Woods neighborhood (neighbors)</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>NC State University</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>City of Raleigh</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>NC Department of Transportation</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Contracted Landscape Architects</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Meredith College</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>3</strong></td>
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</table>

Data were collected using semi-structured, face-to-face interviews with stakeholders (Appendix A: list of interview questions). Interviews were conducted by Kim Shumate during the period of March to July 2010. Supplementary emails containing missed or follow up questions were sent to a few interviewees in August 2010.

The interviews were tape recorded, transcribed, and returned to the interviewee for verification. Due to the nature of this study, confidentiality could not be assured. Therefore, the verification of the transcription by the interviewee was necessary to ensure that what was recorded was both correct and in the best interest of the interviewee. The interviewee then
had the right to change anything on the transcription and or decline the use of the interview in the research. Some interviewees made minor adjustments to their interview but all transcripts were accepted and approved for use.

Data Analyses

Codes were developed using Atlas.ti (6.1.17) qualitative data analysis software using the descriptions of the social process outlined by Clark (2002) and the common interest analysis outlined by Steelman and DuMond (2009). Microsoft Excel (2007) was used to organize all codes into categories within the social process and the common interest analysis. The social process categories consist of participants, perspectives, situations, base values, strategies, outcomes, and effects. The social process categories that corresponded with the common interest analysis were integrated into the procedural and substantive tests. What was in the common interest was determined by similar responses from the majority of the participants.

RESULTS

Substantive Test (Common Vision, Goals, and Priorities; Valid and Appropriate Concerns)

The substantive test determined if the visions, goals, priorities, and expectations were consistent with the broader community and if the concerns were empirically valid and supported. I defined vision as the big picture, over-arching concept for the NCMA Park. I defined goals as more short-term objectives for each of the park components, a priority as the one component of the park in which the participant was most interested, and expectation as desirable outcomes from the management. I compared these elements of the substantive
test among participants as well as what was defined in the NCMA Park’s Comprehensive Management Plan.

“The Museum Park’s vision as defined in the Comprehensive Management Plan: is a venue for regional, national, and international artists to create temporary and permanent works of art in response to the Park’s landscape; an accessible part of the Museum for guests to informally experience art; a community-gathering place that fosters dialogue about the relationships between art and public space, art and landscape design, and art and the environment; an attractive, well maintained place that attracts new audiences to the Museum by encouraging encounters with art through recreation and entertainment; and preserved as open space and managed responsibly as a publicly accessible laboratory for art in an ecologically restored landscape.”

(Shumate 2009, pg. 7)

This plan which contained the Park’s vision, goals, expectations, operational duties, and descriptions about ownership and collaboration was not well known by most participants. Only nine out of the 18 interviewees had seen the plan. The majority of the people who knew about the plan said that they were not very familiar with it but felt that it expressed their vision, goals, and expectations. All of the NCMA staff had seen the plan along with the restoration professor from NCSU, and the two representatives from the City of Raleigh. The other half of the participants did not know of the plan. This included the landscape architect, all of the neighbors, the accessibility researcher from NCSU, the
NCMA Board of Trustees member, and the NC DOT greenway designer. Most of these interviewees were involved with the NCMA Park before the plan was developed.

Common Vision

The visions for the park expressed by the interviewees covered nearly all aspects of the park. There was a strong divide between people who had a single objective and people who had multiple objectives. The majority of interviewees that had multiple objectives shared a common vision. The most common vision responses, with twelve people each, were art observation and a place to recreate, as illustrated in Table 2.2. The landscape architect stated, “I expect it to be a beautiful place that people, you know, after they finish their Museum experience, they feel comfortable taking a loop through the Park and seeing some of the sculpture and the beautiful spaces that are in that area (2010).” Seven people said their vision was a unique park that integrated both art and ecology, and five participants saw the park as simply open space. Visions that included art inspired by nature, a place for both art and environmental education, and a location that contained restored landscapes all received four responses each. Both the NCMA Director of Planning and Design and the professor from NCSU working on ecological restoration issues in the park shared a vision of a socioeconomic and environmentally sustainable park. With only one response each, a park with ever changing park components such as art and trails and a park as a resting place were the least common visions. A representative from the City of Raleigh and NC DOT saw the park as the plot of land that provided greenway connectivity. This is a special objective and therefore fell out of the common interest.
Table 2.2: Interviewees’ visions, goals, priorities, and expectations.

<table>
<thead>
<tr>
<th>Visions</th>
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<th>Priorities</th>
<th>Expectations</th>
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<td>Trails to be maintained and safe (2, 8, 9, 10, 14, 18)</td>
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<td>Greenway connectivity (5, 8)</td>
<td>Greenway as alternative mode of transportation (8)</td>
<td>Physical accessibility (4, 13)</td>
<td>Accessible trails (11, 13)</td>
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<td>Socioeconomic and environmental sustainability (2, 13)</td>
<td>Sustainable landscape (2, 5, 6, 11, 12)</td>
<td>Long-term sustainability (1, 2, 3)</td>
<td>Sustainable landscape (2)</td>
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<td>Landscape aesthetics (1, 12)</td>
<td>Aesthetics (1, 4, 11)</td>
<td>Aesthetically pleasing (2, 11, 14, 18)</td>
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<td>Gathering place (2)</td>
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<td>Dynamic, well maintained outdoor art (4, 14, 16, 18)</td>
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<td>Education (1, 3, 4, 5, 6, 7, 14, 16)</td>
<td>Education (1, 6, 7)</td>
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<td>Communicate with neighbors (18)</td>
<td>Communication of Park’s plan (16, 17)</td>
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<td>Collaboration (2, 5, 6, 13, 16)</td>
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<td>Signage (4, 9)</td>
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<td>Amphitheater (16)</td>
<td></td>
<td>Minimize disturbance to neighbors (17)</td>
</tr>
<tr>
<td>Completed park components (1, 2, 4, 5, 6, 11, 12, 13, 14, 18)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2.2 Continued

*NCMA Director of Museum (1); NCMA Director of Planning and Design (2); NCMA Board of Trustees Member (3); NCMA Park Art Curator (4); NCMA Park Manager (5); NCMA Former Park Manager (6); NCMA Educator (7); NCDOT Greenway Designer (8); City of Raleigh Greenway Management (9); City of Raleigh Greenway Maintenance (10); Landscape Architect (11); NCSU Restoration Professor (12); NCSU Accessibility Researcher (13); Neighbor 1 (14); Neighbor 2 (15); Neighbor 3 (16); Neighbor 4 (17); Neighbor 5 (18)

**Underlined means interview felt the NCMA Park was moving toward their vision.

Moving Towards Vision

Eleven participants thought the park was moving towards their vision (as indicated in Table 2.2), though four of those eleven claimed that the park was moving very slowly. The most common reason for the slow pace was the lack of resources at the NCMA Park, including money, time, and people. Only the NCMA Educator, City of Raleigh Greenway Manager, NCSU Accessibility Researcher, and Neighbor 2 stated that the park was not moving towards their vision. According to these interviewees, the NCMA Park was not moving towards their vision because the open space was being taken away by park components, the landscape was not being restored, or the park was not moving in the direction of sustainability. The remaining four participants either did not have a vision or did not respond to the question.

When comparing the common visions and park progress among participants, the majority of people both shared a common vision and felt that the park was moving towards that vision. Therefore, the park seems to be moving in the direction of both art observation and recreation which is an integration of multiple objectives. One participant who does not share a common vision did not think the park was moving towards his vision. This NCSU restoration professor wants the park to “… become a bit of a model on how to do urban
restoration in a recreational place (2010).” This participant’s vision included sustainability and landscape restoration which falls into the single object category and was not common.

A different participant claimed the park was moving towards his vision although he also did not share a common vision. This participant was mainly focused on a single object of greenway connectivity.

**Expectations**

In addition to vision, participants’ expectations play a role in their perspective for management at the NCMA Park. There was no common expectation for management. There were eleven different expectations each identified by one to six interviewees, as indicated in Table 2.2. Six people expected the trails to be maintained and safe, which was the most common response. The second most common responses with four each were dynamic, well maintained, outdoor art and an aesthetically pleasing landscape. Three people expected the park to have adequate staff to maintain a fully running park and three people expected to the NCMA Park to be a model park. Two participants expected park managers to communicate the Park’s plan to the neighbors and two people expected there to be informative signage out in the Park. The least common expectations with only one response each were a sustainable landscape, a landscape as a gathering place, accessible trails, and a barrier blocking the neighborhood from sound and traffic.
Priorities

In conjunction with the most common vision of recreation and the most common expectation of well maintained trails, one of the highest priorities for nine interviewees was the trail system. This included the City of Raleigh representatives, all but one neighbor, the NCSU accessibility researcher, and the NCMA Art Curator. Other priorities included the landscape and ecology, aesthetics, art, education, long term sustainability, physically accessibility, signage, and the amphitheater.

Goals

There were many detailed goals for the NCMA Park. The most common goal with ten responses was to complete the park components, as indicated in Table 2.2. This included trails, art work, the pond, the lawn, and the prairie. Eight people considered increasing the availability of education as a top goal. With five responses each, dynamic outdoor art, greenway maintenance, sustainable landscape, collaboration, and staff building were goals represented by interviewees. Three people felt an important goal was for the Museum and the Park to be more integrated. Only a couple participants said that a goal was to develop a place for research, for art to reflect nature, to communicate with neighbors, to minimize disturbance to the neighbors, and to have the greenway for alternative modes of transportation. One interviewee each wanted to secure funding, to create informative signage, to develop accessible trails, for the trails to change, to build more trails, and to relocate the park.
Substantive Evaluation

The commonality in vision, goals, and priorities and the validity and appropriateness of concerns were used to determine if the substantive criteria was met. Concerns were considered valid and appropriate if the participant’s priorities, expectations, and goals were consistent with the broader community vision. The goals, priorities, and expectations were consistent between interviewees and with what was laid out in the management plan. The goal of completed park components fit with the common vision of recreation and art observation as well as the most common priority and expectation of well maintained trails. The goal to increase education was a component within many participants’ vision and priorities. The majority of claims were empirically valid due to the commonalities in the substantive criteria between participants and with the management plan.

Substantively, the NCMA Park process was robust (Table 2.3). The majority of participants had multiple objectives for the park and shared a vision for the integration of those components. There was also strong consistency in goals and priorities among participant responses. Though there was no common expectation, the expectations were consistent with the goals, priorities, and visions of the broader community. The majority of the participants felt that the park was moving towards their vision, which showed that they were in support of the direction of the park, and the majority of the interviewees thought that the management plan represented their perspective.

Only one interviewee was considered a special interest. “A special interest benefits only part of the community at the expense of the rest of the community” (Clark 2002). The only goal of neighbor 4 was to move the park so not to disturb him. He stated, “As an
individual citizen, I am entitled to peace and quiet. If I hear anything from them, that’s a disturbance (2010).” He claimed that the lights and sound coming from the Park’s amphitheater disrupted his life. He had concerns with pedestrian traffic through his yard though he stated that the issue of traffic through his yard “…has not happened in recent years” (2010). He was concerned about activity in the park after the hours of operation. This claim was valid due to the potential of illegal activity near his place of residency. The NCMA Park security recognized this concern and had taken measures to decrease after hours activities in the park. These claims made by neighbor 4 were not empirically validated by other neighbors, and his goal of moving the park would effectively mean that the interests of all the other participants could not be served. Therefore, he was considered a special interest. Even though one participant was considered a special interest, the majority of the claims by the other participants were well supported and therefore substantively robust.
Table 2.3: Substantive Test results

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consistency</strong>, as demonstrated by:</td>
<td>1 interviewee was considered a special interest due to his goal to move the park so not to disturb him. Determined not valid on broader community and empirical grounds.</td>
</tr>
<tr>
<td>12 of 18 interviewees shared a common vision of art observation and recreation.</td>
<td></td>
</tr>
<tr>
<td>11 of 18 interviewees thought that the park was moving towards their vision.</td>
<td>Most of the interviewees outside of the NCMA Park were not familiar with the management plan. Nonetheless, they seemed to have vision, goals, priorities and expectations consistent with the plan.</td>
</tr>
<tr>
<td>Highest priority for the majority of participants was the trail system.</td>
<td></td>
</tr>
<tr>
<td>The most common goal for 10 of 18 interviewees was to complete park components.</td>
<td></td>
</tr>
<tr>
<td>The expectations of well-maintained trails, dynamic well maintained outdoor art, aesthetically pleasing landscape, fully staffed park, and informative signage, all fit within the common visions and goals.</td>
<td></td>
</tr>
<tr>
<td><strong>Consistent</strong> with management plan.</td>
<td></td>
</tr>
</tbody>
</table>

Procedural Test (Inclusive, Transparent, and Participation Opportunities)

Participation Opportunities and Inclusiveness

Participation in decision making at the NCMA Park occurred quarterly at the Art and Ecology Partnership (the Partnership) meetings. Only six of the 18 participants were regular members at these meeting. Since the resignation of the former park manager in 2009, no meetings had taken place. The partners were representatives from NCSU working with restoration and recreation issues, employees with the City of Raleigh associated with the greenway, and representatives associated with the NCMA Park. There were no representatives from the neighborhood, Meredith College (adjacent property connected by the greenway), the landscape architect, or people in charge of the maintenance of the park.
and greenway. In addition to the Partnership meetings, the NCMA Director of Planning and Design met individually with other participants such as the City of Raleigh, the NCMA Director, and the landscape architect on a weekly basis depending on the park planning stage. The NCMA Park Manager met with researchers out in the park twice a year and had weekly meetings with the NCMA Director of Planning and Design.

Fifteen of the 18 participants reported that they had met with the NCMA staff either formally or informally, as indicated in Table 2.4. Nine participants said they interacted with other participants either through the Partnership meetings or other formal meetings. There were three people that did not interact with staff or other participants; all three were neighbors to the park who claimed their only interaction was non-participatory informative meetings about the design of the park. Neighbor 2 stated, “I’m unaware that they have ever let me be an active participant in any formal decision-making process. I’ve attended one or more of the presentation meetings when they have discussed plans for the Museum (2010).”

Respondents indicated a variety of ways they would have liked to participate. Six participants wanted to be involved in the design of the park and three in park planning. In all cases, people who were only involved in the implementation phase at the park would have liked to be more involved in the planning phase. Two people were interested in greenway design, neighborhood effects, and guiding research in the park. Only one person each was interested in art installation, art planning, ecology, networking, and raising awareness of the park. Four people were only interested in participating at their current role.

Even though there seemed to be a lack of opportunities to participate, eleven people thought that there was ample opportunity to participate and only five felt there was not. The
remaining two participants did not respond. Only one neighbor felt that he had opportunities to participate. Barriers to participation included meeting regularity, money, being left out, lack of progress, meeting structure, time, and inadequate planning.

Table 2.4: Interviewees’ level of participation, decision making, and awareness of how decisions are made.

<table>
<thead>
<tr>
<th>Participation Opportunities</th>
<th>Participation Inclusiveness</th>
<th>Participation Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting with NCMA staff (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17)</td>
<td>Inclusive (1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 16)</td>
<td>Design (2, 3, 4, 10, 12, 14)</td>
</tr>
<tr>
<td>Meeting with non NCMA staff (1, 2, 4, 5, 6, 7, 8, 9, 12)</td>
<td>Not Inclusive (6, 10, 13, 17, 18)</td>
<td>Planning (3, 4, 14)</td>
</tr>
<tr>
<td>Art and Ecology Partnership (2, 4, 6, 7, 9, 12)</td>
<td>non-response (14, 15)</td>
<td>Greenway design (2, 3, 14)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision Making Inclusiveness</th>
<th>Management Influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive (1, 4, 5, 6, 8, 9, 10, 11, 12)</td>
<td>Greenway design (2, 4, 8)</td>
</tr>
<tr>
<td>Not Inclusive (2)</td>
<td>Operational management (2, 5, 11)</td>
</tr>
<tr>
<td>Don't Know (3, 4, 7, 14, 15, 16, 17, 18)</td>
<td>Budget (2, 5)</td>
</tr>
<tr>
<td></td>
<td>Layout design (2, 5, 11)</td>
</tr>
<tr>
<td></td>
<td>Greenway management (9)</td>
</tr>
<tr>
<td></td>
<td>Scientific knowledge (12)</td>
</tr>
<tr>
<td></td>
<td>No influence (3, 10, 14, 15, 16, 17, 18)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaders in Decision Making</td>
</tr>
<tr>
<td>NCMA Park (1, 3, 4, 5, 6, 7, 8, 11, 12)</td>
</tr>
<tr>
<td>No leader (9, 10)</td>
</tr>
</tbody>
</table>

*NCMA Director of Museum (1); NCMA Director of Planning and Design (2); NCMA Board of Trustees Member (3); NCMA Park Art Curator (4); NCMA Park Manager (5); NCMA Former Park Manager (6); NCMA Educator (7); NCDOT Greenway Designer (8); City of Raleigh Greenway Management (9); City of Raleigh Greenway Maintenance (10); Landscape Architect (11); NCSU Restoration Professor (12); NCSU Accessibility Researcher (13); Neighbor 1 (14); Neighbor 2 (15); Neighbor 3 (16); Neighbor 4 (17); Neighbor 5 (18)
Decision Making Inclusiveness

When asked about decision making, nine people thought it was inclusive and one person felt that it was not inclusive, as illustrated in Table 2.4. This indicated that just because people participated, it did not mean that they felt involved in the decision-making process. Those who indicated that they were part of the decision-making process had a range of management influences. Three people each thought they had influenced greenway design and operational management. The NCSU human accessibility researcher issues said, “I think they have been extremely receptive and we did a lot of studies with shade and slope and rest stops and we did visits with people with disabilities and we already recommended some changes and we have seen them already implemented (2010).” There were two people who thought that they influenced budgeting and layout design, and one person each felt involved in greenway management and scientific knowledge. All of the neighbors, one City of Raleigh representative, and the NCMA Board of Trustees member said that they had no influence on the management of the park because they did not feel a part of the decision-making process. The NCMA Board of Trustees member commented, “[The NCMA Director of Planning and Design] has the final say and generally things don’t come up that the Board needs to vote on. [The NCMA Director of Planning and Design] keeps us apprised of what is going on in the Park as well as the building. We are just kind of listening to his ideas (2010)…” Everyone in this group, except one neighbor, wanted to be more involved in the decision-making process.
Transparency

The decision-making process was not transparent even though half of the participants thought the decision-making process was inclusive. Ten people thought that the NCMA was the leader in decision making for both the planning and the implementation phases. Leadership in this case meant that the NCMA staff had more weight in the decisions that were made. Neighbor 1 said, “It was a working type of a meeting. The Museum listened to us but then they proceeded with their plans. I think their ducks were already in a row and they knew what they were going to do” (2010). All of the participants said that NCMA was the leader in decision making, except for a City of Raleigh representative, who thought the decision-making process was inclusive. The two City of Raleigh representatives both thought there was no leader in decision making. Eight people stated that they didn’t know how decisions were made which indicated that the decision-making process at the NCMA Park was not transparent.

Procedural Evaluation

I concluded that procedurally the NCMA Park process had strengths and weaknesses (Table 2.5). Neighbors, in particular as a group, were not well integrated into the process. There seemed to be more opportunity for the NCMA staff to interact than other participants. The one recurring meeting that did include NCMA staff and other participants had not met since the formal park manager left in 2009. The decision-making process also had mixed results. Half of the interviewees thought that the process was inclusive, yet all but one of those people also thought that the NCMA staff had more weight in the decision-making
process. The other half of the participants did not know how decisions were made at the NCMA Park and therefore the process was not transparent.

Table 2.5: Procedural Test results

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in park planning and management was considered inclusive by 11 of 18 interviewees.</td>
<td>Most neighbors felt that they were not included.</td>
</tr>
<tr>
<td>Decision making was considered inclusive by 9 of 18 interviewees.</td>
<td>The Art and Ecology Partnership ceased activity in 2009 (and only included NCMA staff, NCSU representatives, and City of Raleigh representatives).</td>
</tr>
<tr>
<td>Opportunities for involvement included the Art and Ecology Partnership and informal meetings between the NCMA Park staff and other participants.</td>
<td>Decision making was not transparent because 8 of 18 interviewees did not know how decisions were made.</td>
</tr>
</tbody>
</table>

Summary

The commonalities in the substantive test were visions of art observation and recreation, a priority of the trail system, and a goal of completed park components. After determining what was considered common and verifying that it was upheld in the substantive test, I determined where in the process people participated (Table 2.6). The only group that shared both a common vision and participated in both the planning and the implementation phase of the process were the NCMA staff.

The people involved in the greenway did not share a common vision because unlike the other participants, they had a single objective rather than multiple objectives. The City
of Raleigh greenway management representative responded, “I think the managers at the NCMA Park recognize that my expertise is greenways and they frankly haven’t interfered with what I’m doing and I haven’t had much reason to interfere with what they are doing” (2010). This idea compartmentalized the aspects within the park and did not allow for holistic management. There was also an issue of no participation. All of the neighbors and the Board of Trustees member did not participate in either process because they were not part of the decision-making process.

**Table 2.6:** Substantive commonality and in which part of the park process participants participated.

<table>
<thead>
<tr>
<th></th>
<th>Common Vision, Goals, and Priorities</th>
<th>Not Common Vision, Goals, and Priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planning Phase</strong></td>
<td>Landscape Architect</td>
<td>NCSU restoration professor</td>
</tr>
<tr>
<td></td>
<td>NCSU accessibility researcher</td>
<td>NC DOT greenway designer</td>
</tr>
<tr>
<td><strong>Implementation Phase</strong></td>
<td>NCMA- Park Manager</td>
<td>City of Raleigh-greenway maintenance</td>
</tr>
<tr>
<td><strong>Planning and Implementation Phases</strong></td>
<td>NCMA-Art Curator</td>
<td>City of Raleigh-greenway management</td>
</tr>
<tr>
<td></td>
<td>NCMA-Director of Museum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NCMA-Director of Planning and Design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NCMA-Former Park Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NCMA-Educator</td>
<td></td>
</tr>
<tr>
<td><strong>Neither Phase</strong></td>
<td>NCMA-Board of Trustees member</td>
<td>neighbor 2</td>
</tr>
<tr>
<td></td>
<td>neighbor 1</td>
<td>neighbor 4</td>
</tr>
<tr>
<td></td>
<td>neighbor 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>neighbor 5</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION AND RECOMMENDATIONS

My primary interest was to determine if there was a common vision for the NCMA Park and whether it was reflected in the management and decision-making process. The stakeholders shared a common vision, goals, and priorities but the process of decision making was not inclusive. What this means in the terms of the specific context of this research is discussed below as well as how this analysis could be used in other urban parks to ensure long-term success.

Substantively, the process was quite robust on the grounds of a commonality in vision, goals, and priorities. A clear vision is needed to give participants “a clearer sense of purpose” and “a picture of what’s going on” (Allan and Curtis 2005). All of the participants’ expectations were valid due to their consistency with the goals and visions of the broader community. The majority of participants also felt that the park was moving towards their vision. Half of the participants had seen the management plan that was completed in the summer of 2009 and out of those, nearly all felt that the plan represented their visions, goals, and expectations. Half of the participants were not familiar with the plan but this could be due to either the novelty of the plan or the lack of participation in the procedural process. Nearly all participants’ visions were consistent with what was outlined in the management plan even though some had not seen it.

Procedurally, the process lacked opportunities to participate, inclusiveness, and transparency in decision making. Participation was considered inclusive to all participants involved in the Partnership. The NCMA Park recognized that with the multitude of interests from a variety of groups, there was a need to form a partnership to make decisions that
satisfied all parties involved. This partnership previously met quarterly with involvement from the City of Raleigh, NCMA staff, and NCSU, but since the former manager of the park left, the meetings have ceased.

The group that felt excluded from participation and decision making was the neighbors. The majority of the neighbors did indicate interest in participating in the process if there were opportunities for interaction, and if they felt that their opinions would be heard and taken into consideration. It is important to include the neighbors in the process because decisions made at the NCMA Park directly affect them due to the proximity of their property.

Regardless of the level of participation, the majority of interviewees felt that the NCMA staff was the leaders in the decision-making process. They either did not know or felt that they had not influenced management. Additionally, there was a problem with transparency in the decision-making process because nearly half of the participants claimed they did not know how decisions were made at the park. Therefore, the procedural test had mixed results. There is clearly room for improvement.

Being informed of decisions and actually being part of the decision-making process were very different. To fully serve the common interest, the process should not only be transparent but stakeholders’ perspectives should be considered in final decisions. The results from this research are similar to those found by Steelman and DuMond (2009). Working on three cases of national forest policy, they found that substantive criteria were met, while procedural aspects were faulty. In order to fully satisfy the common interest, the
valid and appropriate substantive claims must be incorporated into final decisions through the collaboration of all stakeholders.

In the case of the NCMA Park, there did seem to be a clear big picture vision that was shared by the majority of the stakeholders, yet there were problems in participation. The issue did not lie with meeting the substantive criteria, but was more with the procedural criteria. When considering the implementation of the components of the park, there was room for improving communication processes. Neighbor 5 stated in regards to a pond construction project on the NCMA Park grounds:

“The other day there were two girls in our backyard and I think they were two State students and they were measuring something. It’s like, I don’t know. There needs to be more communication about what is happening with the pond. You know it is all runoff from the construction. I am glad they are working on the pond, but I would like to know more.” (2010)

This was an issue with procedure. There needs to be increased communication and collaborative decision making at all levels of the park to serve the needs of the affected participants. Without participation from the affected participants, there is the potential for increased dissatisfaction with the decisions that are made (Rutherford and others 2009). The animosity caused by the lack of inclusion of the affected parties could undermine the longer term success of the NCMA Park.

If people are not involved in planning and implementation phases, the longer term success of the project may be jeopardized (Gailing 2007; Gobster 2001). Participation in one phase and not the other can cause dysfunctional elements within a park. When people
involved in the planning phase do not participate in the implementation phase, information can be lost and the project may not go as planned, if at all (Gobster 2001). Conversely, those who are implementing projects should be part of the planning process to not only add their expertise but to also feel they had a part of the decision making (Rutherford and others 2009). A City of Raleigh greenway maintenance interviewee stated, “The one thing I would have changed is if we could have gotten in a little more on the design of the trail. But you know, it was pretty much designed by the State and they built it to DOT Specs not the City of Raleigh’s. So, it is what it is and we do the best we can to keep it maintained” (2010). If people who are going to be implementing the projects are included in the planning, issues such as this one could have been resolved. This integration of expertise in all phases has the potential to create the best solutions for all issues regarding the park.

NCMA staff was the only group that collaborated with other participants to reach goals in both the planning and implementation phases. A potential solution is identifying arenas for interaction to remedy the problem of exclusion. Arenas for participation could be used to build community, civility, and promote dialogue between community members and government officials (Cherney and Clark 2009). Arenas should include both multilateral and bilateral interaction. Multilateral interactions are ones that included a range of multiple participants that meet on a regular basis in a structured setting. These types of interactions are good for some people and not for others that may not have the time or interest in this much dedication. For these people, bilateral interactions are more appropriate. Bilateral interactions are when leaders in decision making make an effort to inform participants and ask for their feedback in a more informal setting. Both types of interaction are important.
due to the different desired level of participation among individuals. Regardless of the level of participation, if people from both the community and agencies participate, there is the potential for a stronger commonality in the park’s vision, goals, and expectations as well as inclusiveness in the process which could lead to inclusive decision making (Steelman and DuMond 2009; Rutherford and others 2009; Steelman and Rivera 2006; Brunner and Steelman 2005; Lasswell 1971).

The participants of the decision-making process should be considered. The principle of affected interests, which states that people who are directly affected by the decisions ought to be included in the process, should be applied (Dahl 1989). The principle of affected interests is tempered by the criteria of competence and time. The criterion of competence corresponds to the idea that not all participants will have the need or knowledge to inform decisions because the decisions being made may not directly affect them. As park development progresses, there could be shifts in priorities and goals which favor a more dynamic understanding of this principle. Those who ought to be included in the decision-making process change over time as the consequences of the decisions made fall on different individuals. The criterion of time relates to the idea that not all participants have the time or desire to be extensively involved in all processes. For example neighbor 5 stated, “It is not so much about wanting to be involved in the decisions but I would want to be aware of what was going on” (2010). This idea relates back to the need for both multilateral and bilateral interactions.

There is some precedent for involving people in different ways to achieve a procedurally robust outcome. Clark and others (2008) through their social analysis of the
federal regulation of polar bear conservation in Canada found that peoples’ perspectives were divided among people directly affected and not directly affected by the decision-making process. In the case of the NCMA Park, a similar divide in perspectives was also expressed between such participants within the City of Raleigh and the NCMA Park. The City of Raleigh was only concerned about the decisions regarding the greenway which is a small portion of the site, a concept known as “compartmentalizing” (Allen and Curtis 2005). This idea of compartmentalizing “encourages reductionism and thwarts the opportunity for the collaborative and holistic thinking required for adaptive management” (Allen and Curtis 2005). The reduction of these lines of separation must be considered to promote social learning that could improve the decision-making process (Allen and Curtis 2005). The reduction of “compartmentalization” and the integration of all participants did not mean that there should not be a designated leader in conflict resolution (Olsson and others 2004; Bowcutt 1999; Moote and others 1997). In this case, the NCMA is the operating agency and should act as this leader because they are ultimately responsible for the park.

When taking all things into consideration, an analysis of this sort works at this scale. An urban park can have as many stakeholders as states or regions that deal with environmental management at a much larger scale. In the three case studies by Steelman and DuMond (2009) of the Healthy Forest Restoration Act, 14 to 22 stakeholders were interviewed for each case, which compares favorably with the 18 interviewees in my study. Even with commonality of vision, goals, and priorities, there is opportunity at this urban park for more integrated decision making that allows participants to feel that their interests are fully considered. The integration of valid and appropriate concerns into an integrated
decision-making process has the potential to increase the long-term success of urban parks due to the added sense of ownership and accountability, just as it can with large scale environmental management.

**CONCLUSIONS**

The NCMA Park attempted to create a collaborative process of decision making with the formation of the Art and Ecology Partnership. This is unlike many other urban parks that take a more traditional form of management that relies on top-down decision making. This analysis was used to assess the progress and success of this collaborative approach with the use of the common interest analysis. It was also used to offer suggestions to improve the decision-making process. In conclusion, the common interest at this park was not fully served due to a lack of inclusiveness and transparency of the decision-making process, even though there was a clear vision, goals, and priorities of all participants. There did seem to be clear consensus on the big picture vision of the park, but issues regarding the smaller components did not seem to be well communicated. To assure the long term success of urban systems such as this one, it is important that participants share a common interest and participate in both the planning and implementation phase of all aspects of the park when the decision directly affects them.


APPENDIX
## APPENDIX A: Interview Questions

<table>
<thead>
<tr>
<th></th>
<th>In what way are you involved in the management of the NCMA Park?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Probe: What management decisions have you been involved with?</td>
</tr>
<tr>
<td></td>
<td>Greenway, Sculptures, natural resource management, restoration,</td>
</tr>
<tr>
<td></td>
<td>environmental education, volunteers, etc…</td>
</tr>
</tbody>
</table>

| 2 | In what part of the process do or did you participate? Planning phase or application phase? |

| 3 | Is there anyone else that you know of that is involved in the decision making process at the NCMA Park? |

| 4 | Conceptually, what is your big picture vision for the Park? |
|   | Probe: What do you conceptualize the park being? Is the progression of the park moving towards your vision? Gathering place, place for art and ecology, environmental education, etc… |
|   | Probe: What aspects of the park are your priorities? Plant habitats, ecosystem integrity, aesthetics, restoration, recreation |

| 5 | What are your specific goals for the management of the park? |
|   | Probe: Do you have goals for the greenway, prairie, forest, art, education, volunteers, visitors, etc… |

| 6 | How do you achieve your goals? |
|   | Probe: Provide volunteers, provide scientific information… |

| 7 | What are your expectations for the management of the park? |
|   | Probe: Management of the trails, sculpture, restoration, volunteer effort… |

| 8 | Are you familiar with the Comprehensive management Plan? |
| 9  | Are your vision, goals, and management expectations reflected in the management plan? |
| 10 | In what situations do you interact with other participants for the purpose of decision making? Are there opportunities that you choose not to participate in?  
**Probe:** Public meetings, public comments, committees, meetings, internal interactions…  
**Probe:** How often do you meet? How often do you attend? |
| 11 | Ideally, in what situations would you like to participate? |
| 12 | Is there a heavy emphasis on any one group in decision making?  
**Probe:** Planning phase and/or implementation? |
| 13 | Do you feel that your participation has an influence on the management plan or management decisions? |
| 14 | Is the decision making process inclusive? Do you feel involved in the process? Is participation inclusive?  
**Probe:** If not, why? If so, why?  
**Probe:** What factors do you feel are barriers to participation or which facilitated participation? Planning or implementation? |
| 15 | What are some of the concrete things that you have achieved in this process?  
**Probe:** During your interactions, what types of decisions have been made? |
| 16 | What do you think the management plan will achieve in the future? |