

CITY OF IOWA CITY

NATURAL AREAS INVENTORY AND MANAGEMENT PLAN



JANUARY 2018

**SUBMITTED TO:
THE CITY OF IOWA CITY, IOWA**



**SUBMITTED BY:
APPLIED ECOLOGICAL SERVICES, INC.**



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EXECUTIVE SUMMARY

Iowa City was founded on the natural resources in and around the Iowa River and its tributaries. Early American settlers recognized the value of the Iowa River for transportation and water power and the surrounding prairies as highly productive cropland. Over the decades, the City developed an extensive park system for both active and passive recreation. Iowa City has over 1,500 acres of parks and natural areas, harboring several high quality, large ecosystems characteristic of central Iowa. Natural areas in the parks represent the City's best and most protected natural habitat. A natural area is land and water that exists in a natural condition, with human use largely limited to foot traffic. Natural areas vary greatly in size, the type of vegetation they contain, and the connections to other natural areas—connections that let many species survive in good numbers over time.

These parks and natural areas are valuable to the community, providing important ecosystem services—those spontaneous benefits people gain from nature's processes—such as water purification and regulation, soil building and maintenance, wildlife and fish production, and air purification. On the other hand, past land uses, erosion, and colonization by invasive species compromised the functions and value of the City's natural areas and natural resources. This plan seeks to reverse that trend and improve the ecological health and resilience of the City (including meeting the City's STAR Community goals) by laying out a program of ecological restoration and management for the next ten years.

Iowa City's park system contains about 430 acres of forest, 188 acres of prairie, and 79 acres of wetlands—as well as smaller areas of savanna, shrubland, and open water. This land and water supports recreation, serves stormwater management and wellhead protection, and achieves wetland mitigation. Iowa City is proud of its recent progress in managing natural areas. The City has invested about \$8 million dollars to purchase, construct, and maintain these areas. Long-term planning, focused management, and additional funding are needed to control invasive species, conduct prescribed burns, and implement conservation practices that protect this investment and ensure the health and resilience of its natural areas for the long term. Only with a commitment to ongoing and long-term management will the cultural, economic and ecological benefits and attractiveness of these natural areas be ensured.

This Natural Areas Inventory and Management Plan ("Natural Areas Plan") identifies locations owned or managed by the City that warrant management. It also specifies how best to restore and regularly manage these areas in order to preserve their ecological functions and increase biodiversity, which the STAR Community guidance recommends. Without this planning, together with adequate funding and a program of implementation, the City may not achieve its STAR goals for the environment and other conservation goals. A glossary of technical terms is found in Appendix A.

This vision statement was developed specifically for Iowa City's Natural Areas Plan.

Iowa City recognizes the important role that natural areas play in an urban and suburban setting. The City's natural areas are a boon for local residents, an enjoyable and interactive experience for families, children, and visitors, an outdoor classroom for students of all ages, and a home for a surprising variety of wildlife. Maintaining an equitable distribution of natural landscapes throughout the City ensures that current and future generations will continue to enjoy these resources. These renewed spaces will persist in supporting a strong and diverse economy, fostering healthy and active lifestyles, advancing environmental sustainability, and enhancing quality of life.

These planning principles, developed by staff and consultants, will guide natural areas restoration and management in Iowa City.

Overall

- Protect the City's sensitive natural resources in order to foster resilient and biodiverse natural areas within Iowa City
- Understand the historical and current conditions of natural areas to describe a future ecological path for natural resources
- Design within the limits of existing soil, hydrology, and vegetation conditions
- Create attractive and resilient plant communities that can be managed economically
- Tell the ecological story of the City to inspire people through its restoration
- Bring people into the City's natural areas while protecting biodiversity and ecosystem resilience

- Use indicators and monitoring to document trends in natural resources and determine the success of restoration and management efforts

Vegetation

- Protect and restore the City's rare ecological land cover types to prevent their disappearance
- Maintain and enhance common land cover types
- Promote a natural variety of native flowering plants across the growing season
- Control the invasive or aggressive native plants that reduce biodiversity and ecological resilience
- Establish a vegetation structure that requires the least effort to maintain

Wildlife

- Protect, improve, and restore habitat for all wildlife
- Create the largest, roundest habitats for area-sensitive wildlife species (round habitats tend to be higher quality because they resist negative edge effects from adjacent land uses)
- Design to reduce wildlife-damaging edge effects from adjacent properties
- Install special habitat features (nest boxes, etc.)
- Identify and seek to make connections to similar habitat on nearby conservation lands

Soil & Hydrology

- Preserve stable soils and natural hydrology
- Find solutions to eroding soils and damaged hydrology
- Protect neighboring properties from water damage
- Use vegetative stabilization and a natural ecosystems approach before resorting to more hard-armored and engineered solutions
- Use a series of natural features (e.g., rain gardens, prairies, wetlands) to manage stormwater runoff from impervious cover, beginning with reducing runoff at its source
- Design soil and hydrology solutions in the most cost-effective way possible

Human Use

- Separate minimum use sensitive natural areas from locations that can accommodate higher use
- Make management easier by defining management units and access points
- Detect problems early by monitoring trail and off-trail use
- Recruit organizations, experts and volunteers to help maintain and monitor natural areas
- Protect cultural resources

This Natural Areas Plan focused on 42 City parks and natural areas selected by City staff and consultants. Existing reports, plans, and other information were gathered and reviewed. At the project onset in 2016, Applied Ecological Services, Inc. (AES) took high resolution, multi-spectral aerial imagery of the entire City. This increased the efficiency and accuracy of land cover mapping of natural areas; the imagery will be useful for other City purposes as well. With an intensive field effort in 2017, the consultants completed an inventory and quality assessment of all sites. To broadly characterize each site, land cover was mapped and plant communities documented in photos. Plant species were identified and given an abundance rating in each plant community at each site. Incidental wildlife observations also were made.

The inventory and assessment confirmed that Iowa City supports regionally significant natural areas, uncommon native plants, and interesting animal species. All of the 42 sites, however, were affected by past incompatible land uses, invasive species, and suppression of surface fires, a natural disturbance that most of the City's original plant communities required on a regular basis to maintain their integrity.

The field of applied restoration ecology has developed techniques for addressing these issues and impacts. Removing invasive vegetation, planting diverse native species, and restoring natural disturbances, especially prescribed burning, are proven and effective ways to restore the ecological health of natural lands and waters. Landscape ecology and population biology have demonstrated that enlarging and connecting natural areas creates viable habitat for many species that disappear from small, isolated natural areas. Better quality and larger, more connected natural areas will increase the enjoyment by residents and visitors of the natural bounty and beauty in Iowa City's parks.

Brief management plans for each of the 42 sites—called “management briefs”—provide guidance for Iowa City staff, volunteers, and others to understand the restoration and management intentions for each site (Appendix B). Each management brief gives general site information, detailed plant lists and abundance by plant community, restoration and management recommendations, and opinions of probable cost to complete initial restoration and management work.

Every City has competing financial priorities. Recognizing this, City staff and consultants developed a ten-year site priority and phasing plan for restoration and management work. The scenario described in this Natural Areas Plan assumes \$100,000 is expended in the first year and slightly more for the following nine years, increasing 2 percent annually for inflation. One quarter of the budget is assumed to come from grants, with the City to provide \$75,000 in its annual budget. Work begins with the largest, most important natural areas: Ryerson's Woods, Hickory Hill, Kickers Soccer Park, Sand Prairie, Sycamore Greenway, Terry Trueblood, and Waterworks. The City can expand its effort to other areas with new funding sources, such as new REAP grants, and cost-saving strategies including partnerships and volunteers. Funding staff positions dedicated to natural area restoration and management can leverage additional restoration and management work by directing volunteers, writing grants, and doing the work itself.

Executing this Natural Areas Plan and raising STAR scores for the environment will also require that the City revise its policy and ordinances to benefit natural areas, rare species, and ecosystem health. Committing to perpetual stewardship after the initial major restoration effort finishes is, of course, the most important first step the City can take to improve the health and resilience of its natural areas and secure their ecosystem services and recreational benefits for its residents.

1 INTRODUCTION

Iowa City's park system contains approximately 430 acres of forest, 188 acres of prairie, and 79 acres of wetlands – plus additional acres of savanna, shrublands, and open water. These natural areas provide a variety of benefits, including recreation, stormwater management, wellhead protection, and wetland mitigation. Iowa City is proud of the progress made in natural areas management over the past decade. The City has invested approximately \$8 million dollars to purchase, construct, and maintain these areas. Coordinated management, long-term planning, and additional funding are necessary to control invasive species, conduct prescribed burns, and implement other conservation practices to protect the City's investments and ensure the health and resilience of its natural areas over the long term. Ongoing management is essential to maintaining the functional, economic, recreational, and aesthetic values of these natural areas. Qualified personnel are needed to oversee this effort. These individuals have a deep understanding of ecology and ecosystem processes, and extensive experience with prescribed burning and other management methods, invasive species identification and control practices, and native plant, animal and soil identification.

While once abundant in Iowa, only a fraction remains of the original prairies, savannas, wet meadows, marshes, woodlands and forests. Actions taken now to implement the long-term management of natural areas in Iowa City not only secures these valuable resources for residents, but contributes to the protection and perpetuation of Iowa's natural heritage.

The purpose of this Natural Areas Inventory and Management Plan ("Natural Areas Plan") is to identify locations owned or managed by the City that warrant management, and specify how best to restore and regularly manage these areas in order to preserve their ecological function and maintain or increase biodiversity. The urban and suburban environment of many of the City's natural areas poses a challenge that can nevertheless be overcome with good planning and proper management. In this way the City's residents will ensure that past investments are protected and the future benefits of natural areas are secured.

1.1 Natural Resources and Their Importance

The American settlers who came to Iowa City in the mid-1800s recognized the importance of the Iowa River for navigation and water power. Since that time the vast prairies on the surrounding high ground were converted to productive cropland, while the steep bluffs and stream valleys were used for grazing and a source of wood. The development of the city followed.

Today Iowa City has protected 1,500 acres of what remains. These natural resources existed spontaneously before Americans arrived. Today we classify them as non-living (sunlight, air, water, metals, and minerals) and living (soil, vegetation, and animals). Sunlight and air are abundant, while fresh water and certain animal populations are not. Some, like endangered species, are quite rare. Although some natural resources are thought to be inexhaustible, most are limited and can be lost if over-used or managed poorly.

Our society and other modern economies value natural resources for how useful they are (extrinsic value). These include timber, gravel, cropland soils, groundwater, and surface water. Some people believe that all species have a basic right to exist—they have intrinsic value. There is a large and growing body of ethical thought which grants humans and nature equal standing. Aldo Leopold—born in Burlington, Iowa—was a conservationist and the first professor of wildlife biology in the country. He promoted the idea of a land ethic, in which people saw themselves as part of the ecology and responsible for treating it well. He wrote in his best known book, *A Sand County Almanac*:

A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

and

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.

The idea that nature has intrinsic value has been gaining support as people look for experiences in park natural areas, through travel, by visiting museums and zoo exhibits, or simply watching television programs about nature.

It is also well known that most people want to live near parks and open space. Homeowners and businesses consistently rate proximity to a park as highly desirable, which typically generates higher demand for buildings near open space. Several studies have measured the effect of parks on property values and found a value increase. For example, a study from Michigan State University focused on Dallas, Texas, found that distance to and size of a park resulted in a price premium of up to two to three percent. Other researchers found that homes next to greenbelts in Austin, Texas saw an increase in value of six to twelve percent. In Minnesota’s Twin Cities, researchers summarized four property value studies and found that proximity to parks increased urban and suburban property values, except in suburbs where active recreational parks decreased property values.

1.1.1 Ecosystem Services

Besides the economic value of the land itself, natural areas are vital to Iowa City residents for several reasons. Wetlands and forested areas along rivers and streams help reduce flood impacts, and prairies and forests absorb rainfall, reducing the amount of runoff and eroded sediment reaching City waters. Natural areas also absorb and store atmospheric carbon, helping the City’s efforts to reduce greenhouse gasses. Schools, organizations and families use many natural areas to learn about the natural world in an outdoor setting, especially important for young children who spend less and less time outdoors. The City’s quality of life is elevated by natural areas, which give citizens and visitors nearby opportunities to walk, bike, bird watch, or to simply sit still surrounded by greenery.

Iowa City residents may not realize that natural areas provide these benefits, called “ecosystem services”. These services actually save people expenses over the long term (see the Millennium Ecosystem Assessment 2005). If people were to pay to clean the air and water, to build soil or regenerate forest trees and wild fish and game, the cost would be in the hundreds of millions of dollars annually for Johnson County alone. Building flood control infrastructure, or rebuilding after floods, would be much more expensive without floodplains and the natural capacity of watersheds to regulate the water moving through them.

Ecosystem services include:

Supporting (Natural Processes)

- Photosynthesis to grow plants
- Nutrient cycling (carbon, phosphorus, etc.)
- Carbon sequestration in plants & soil
- Soil formation
- Erosion control by vegetation and soil biota
- Air purification and oxygen production
- Water purification
- Decomposition of waste
- Detoxification of soil & water
- Groundwater recharge
- Disease and pest control
- Pollination of crops and wild plants
- Seed dispersal for regeneration
- Local shading and cooling (microclimate)
- Blocking of harmful ultraviolet radiation

Provisioning (Goods)

- Clean air
- Fresh, clean water
- Fertile & productive soil
- Food production
- Forest products (lumber, paper pulp, etc.)
- Fuel production (biomass for energy)
- Game & fish production
- Biodiversity & wild genetic material

Regulating

- Climate stabilization
- Water volume and flow regulation
- Flood and drought regulation
- Disease and pest regulation
- Hazard reduction

People’s health and well-being benefit from natural resources, too. Research in the last twenty years has demonstrated a strong link between time spent in or near nature and better physical and mental health. Viewing nature out a window can improve test scores in school children or elevate moods in adults. Of course, people love to fish, hike, bike, ski, picnic, camp, and celebrate with family in natural areas. Sometimes just sitting still in nature can nourish the spirit and calm people.

Iowa City's character also emerges from its natural resources. They create a sense of place that attracts people and businesses and convinces them to remain in the area. They cause people to visit and spend time in Iowa City, or convince people and business here to remain. Ecosystem services not only support and enrich society and the economy, they are the foundation of a healthy environment. Ecosystem services can be conserved by protecting and managing Iowa City's natural areas.

1.2 Reasons for a Natural Areas Inventory and Management Plan

A story of loss is also a story of hope. It begins with recognizing that many of Iowa City's natural resources have been lost, fragmented and degraded over the past 150 years. Rejuvenating natural processes such as fire, which shaped vegetation and wildlife for thousands of years, have been largely eliminated. Invasive species further challenge the goal of maintaining healthy ecosystems and natural resources.

Nature has an amazing ability to recover from past injury and take care of itself in the long term. Some landowners know that management is needed to prevent deterioration or improve the quality of natural resources on their lands. Natural resource management is complicated and requires knowledge of ecological and hydrological systems and cycles, of the ways that climate is shifting, and the habits of plants and animals. When deciding how to manage natural resources, Iowa City should consider the following:

- Main purpose for protecting and using the land
- Current natural resource conditions
- Issues and concerns about the natural resources
- Adjacent land use that affects natural resources
- Government policies and ordinances
- Demographic changes that are affecting how natural resource are or could be used
- Existing and future financial resources for restoring and managing natural resources

Iowa City approved the development of this Natural Areas Plan in recognition of these factors and is committed to improving natural resource management on City-owned lands. This report represents a system-wide plan for natural areas that:

- Presents the results of a system-wide natural areas inventory;
- Describes in moderate detail the issues facing the City's natural areas;
- Specifies the vision, principles and goals for managing these natural areas;
- Presents issues facing natural areas on system-wide and individual park basis;
- Specifies management approaches and priorities to strategically implement ecological restoration and management throughout the City; and
- Provides a phasing plan and annual cost estimate for carrying out the first ten years of the plan.

This plan is a strong foundation for refining and expanding, if desired, natural resource management plans for individual parks and natural areas. Natural resource management plans can use information from this system plan as a framework to complete more detailed assessments, refine restoration and management recommendations, and develop more accurate cost estimates for implementation. Implementation of this City-wide plan and future detailed natural resource management plans will enhance biodiversity throughout the City, enhance human enjoyment of natural areas, and put natural areas on a trajectory towards long-term ecological health and resilience.

1.3 What is Ecological Restoration?

Iowa City has engaged in several ecological restoration projects, chiefly prairies and herbaceous wetlands. Ecological restoration is the art and science of improving the health and resilience of natural environments by stabilizing and enhancing diversity and natural processes. Scientific understanding of ecologically healthy

plant communities and ecosystems is used by restoration ecologists to describe current conditions and lay out a program to effect positive changes. Species in decline or uncommon, species that need high quality or large habitats, and species that respond poorly to intensive human use all benefit from this approach. Iowa's Wildlife Action Plan suggests that up to half of all species in some animal groups need active management to prevent further declines. Moreover, people benefit from the improved functioning of ecosystems, from the large scale to the personal. A glossary of technical terms is found in Appendix A.

1.4 Restoration and Management Stages and Approach

The focus of ecological restoration is to create healthy and sustainable ecosystems, often in the context of a developed or disturbed landscape. The composition, structure, and function of restored ecosystems are similar to that of native ecosystems. As a result, a moderate level of management is necessary to maintain these ecosystems in perpetuity. Restored ecosystems are recognizable by a diversity of native plant and animal species and an increase in functionality and resilience.

This plan will guide the restoration and management of plant communities native to the region. However, changes in the larger landscape and in local conditions often prevent the full re-creation of natural conditions from 150 years ago. Those historical conditions provide insight into what natural conditions are possible at a given site, and no more. More importantly, the goals of a project area will dictate the level of effort expended and the eventual condition of the ecosystems. Not all City natural areas will be restored to exceptional native plant communities, but all will be restored and managed to meet City goals. As more healthy and sustainable ecosystems are restored, ecological functioning, wildlife populations, and human enjoyment will be enhanced.

Restoration and management plans need to be flexible. Restoration programs experience variability in implementation due to the timing of funding, adjustments due to the response of the ecosystems to restoration work, and changing management needs. At times, programs need to respond to new scientific data and insights. For these reasons, the restoration and management briefs included in this plan (Appendix B) should be viewed as a starting point in a process of restoring the biodiversity and natural processes to the City's natural areas. This plan should guide major restoration and management efforts and projects. As more detailed data are gathered, it is expected that restoration and management activities will be refined. The most successful restoration programs use regular monitoring and reporting as feedback on the program's effectiveness. Monitoring also generates information to justify changes in the restoration and management program. Adaptive management (a cycle of implementation, monitoring, evaluation, adjustment, and implementation) is central to the best restoration programs and should begin with the initial restoration work and continue indefinitely as part of the stewardship of the project area. Mutual benefit can be gained from engaging "citizen scientists" as well as universities and schools to assist with observations, data collection, and analysis, whereby the site becomes a "living lab" for research and study as well as public education and engagement. Some types of monitoring require a higher level of expertise, training, or oversight.

1.4.1 Restoration and Short-Term Management

Ecological restoration has short- and long-term management phases. The initial short-term, or "establishment" or "restoration" phase is the most time-consuming and costly. Usually lasting three to five years, a significant effort is needed to prepare and begin establishing the proposed native plant diversity types and ages for different management units. Tasks often include selective woody plant removal, controlling invasive species with herbicide, soil preparation, seeding and planting native species, re-establishing natural hydrological cycles in aquatic systems, re-introducing fire regimes in fire-dependent systems, and using bio-control techniques for invasive species management when available. The length of time before moving from short-term to long-term management depends on many factors including the site's initial quality and other issues, weather conditions, how the site responds, size, and other complexities of the area.

"Enhancement" is a management term used to describe activities where minimal-to-moderate effort and cost is required to improve the resource. Adding more native flower species into a reconstructed prairie, or removing box elder from an oak forest, or planting native shrubs are examples of enhancements.

1.4.2 Long-Term Management

After short-term restoration and management goals are achieved in a project area, the process shifts to a lower-cost, but equally important, long-term (or perpetual) “maintenance regime.” Without a commitment to long-term management, it is likely that short-term restoration investments will be wasted. Scheduling and budgeting for long-term management each year will protect the investment already made, and ensure that the plant community and wildlife continue on a trajectory toward greater ecological health. Typical long-term management tasks include spot-herbiciding of invasive plants, re-seeding disturbed or poorly developing areas, re-planting woody plants that have died, and maintaining appropriate ecosystem disturbances to perpetuate a diverse and resilient plant community. Most ecosystems need some type of disturbance that removes dead plant material, regenerates many plant species, and opens up new habitats for plants and animals to perpetuate themselves or to maintain diversity. Controlled burns in fire-dependent communities (prairies, savannas, wetlands, and some woodlands), which mimic wildfire, are a common tool to achieve this objective. Harvesting hay from prairies, which mimics grazing, can also be effective. One-hundred fifty years ago, the vast majority of Iowa City was frequented by fires, and the plants and animals were adapted to those conditions.

1.5 What Happens When Natural Resources Are Not Managed?

Some people do not understand that natural resources need to be managed. After all, nature has been around a very long time and can take care of itself, it is thought. Others think that more important issues and problems face us and that managing natural resources does not merit the use of limited staff and financial resources. While these are valid perspectives, they are not the whole story.

Studies over the last half century clearly demonstrate that, without management, natural resources change in ways that are not always beneficial to people or supportive of ecosystem services (Alstad et al. 2016, Le Maitre et al. 1996, Leach and Givnish 1996). A common problem in many unmanaged forests and woodlands of Iowa City is invasion by non-native honeysuckle. When these non-native shrubs invade natural areas, a cascade of negative effects occurs. Oak regeneration is suppressed, native shrubs decline, ground vegetation is shaded, leading to the loss of soil-anchoring plants and increasing erosion. Flower resources for pollinators are eliminated, reducing the amount and variety of food for other wildlife and depressing wildlife populations.

Large and ecologically complex regions may resist these negative trends, but natural resource quality generally declines over time without proper management. This is especially true in small and scattered natural areas, which is the situation in Iowa City. With some level of consistent management the situation can be stabilized and even improved. For example, removing invasive honeysuckle from slopes in woodlands preserves the soil and seedbank, and prevents sediment from reaching water bodies. This Natural Areas Plan identifies and prioritizes the management actions which the City can implement to improve the health and resilience of its natural areas and the ecosystem services and recreational benefits therein.

2 BACKGROUND, VISION, PRINCIPLES & GOALS

2.1 Background

Iowa City has a long history of providing its residents and visitors with a variety of outdoor recreational opportunities, from parks for ball games and celebrations to natural areas for walking and running. The City's sustainability initiatives and recognition of the value of healthy ecosystems led to the City's decision to improve natural resources on City-owned land. This Natural Areas Plan will facilitate strategic investments in restoration and management and help achieve the City's natural areas and sustainability goals.

2.2 Vision Statement

Vision statements are created to convey aspirational goals for a specific endeavor. The following vision statement was developed specifically for Iowa City's Natural Areas Plan.

Iowa City recognizes the important role that natural areas play in an urban and suburban setting. The City's natural areas are a boon for local residents, an enjoyable and interactive experience for families, children, and visitors, an outdoor classroom for students of all ages, and a home for a surprising variety of wildlife. Maintaining an equitable distribution of natural landscapes throughout the City ensures that current and future generations will continue to enjoy these resources. These renewed spaces will persist in supporting a strong and diverse economy, fostering healthy and active lifestyles, advancing environmental sustainability, and enhancing quality of life.

2.3 Planning Principles

Planning principles are guideposts, used to define how a project should unfold. Based on City goals and discussions with staff, these planning principles were established for natural areas restoration and management in Iowa City.

Overall

- Protect the City's sensitive natural resources in order to foster resilient and biodiverse natural areas within Iowa City
- Understand the historical and current conditions of natural areas to describe a future ecological path for natural resources
- Design within the limits of existing soil, hydrology, and vegetation conditions
- Create attractive and resilient plant communities that can be managed economically
- Tell the ecological story of the City to inspire people through its restoration
- Bring people into the City's natural areas while protecting biodiversity and ecosystem resilience
- Use indicators and monitoring to document trends in natural resources and determine the success of restoration and management efforts

Vegetation

- Protect and restore the City's rare ecological land cover types to prevent their disappearance
- Maintain and enhance common land cover types
- Promote a natural variety of native flowering plants across the growing season
- Control the invasive or aggressive native plants that reduce biodiversity and ecological resilience
- Establish a vegetation structure that requires the least effort to maintain

Wildlife

- Protect, improve, and restore habitat for all wildlife
- Create the largest, roundest habitats for area-sensitive wildlife species (round habitats tend to be higher quality because they resist negative edge effects from adjacent land uses)
- Design to reduce wildlife-damaging edge effects from adjacent properties
- Install special habitat features (nest boxes, etc.)
- Identify and seek to make connections to similar habitat on nearby conservation lands

Soil & Hydrology

- Preserve stable soils and natural hydrology
- Find solutions to eroding soils and damaged hydrology
- Protect neighboring properties from water damage
- Use vegetative stabilization and a natural ecosystems approach before resorting to more hard-armored and engineered solutions
- Use a series of natural features (e.g., rain gardens, prairies, wetlands) to manage stormwater runoff from impervious cover, beginning with reducing runoff at its source
- Design soil and hydrology solutions in the most cost-effective way possible

Human Use

- Separate minimum use sensitive natural areas from locations that can accommodate higher use
- Make management easier by defining management units and access points
- Detect problems early by monitoring trail and off-trail use
- Recruit organizations, experts and volunteers to help maintain and monitor natural areas
- Protect cultural resources

2.4 Project Goals

Based on the City's request for proposals, consultation with AES, and the development of the project Vision and Principles, the following goals and deliverables were identified for this Natural Areas Plan.

- A graphical/illustrative 10-year management plan for 42 City-owned natural areas that helps protect functional, economic, recreational and aesthetic values
- High-resolution, multi-spectral aerial imagery
- Natural areas inventory, including field assessment of each natural area's current conditions, native and invasive species lists, issues/concerns, rare natural features, human uses, and GPS coordinates of pertinent features
- Geographic information system database of all City-owned natural areas and collected data
- Recommendations for maintenance and enhancements (minimum/basic level and preferred level of maintenance)
- Metrics to show progress toward STAR Community Goals (especially Invasive Species and Natural Resource Protection)
- Identification of adjacent/nearby areas for improved ecological value and connectivity
- Review and recommendations regarding related City policies and ordinances
- Detailed tasks and priorities in the form of a 10-year management plan

- Cost estimate for recommended tasks
- 12 meetings with Steering Committee
- Presentations to Iowa City Parks Commission (draft report) and Iowa City Council meeting (final report)
- Fifteen (15) bound copies of final report
- Final Natural Areas Inventory Map (poster)

3 DATA AND METHODS

3.1 Existing Data Review

To assess the City's regional context, existing ecological conditions, management opportunities, and constraints on City-owned natural areas, AES reviewed previous studies and other existing data including, but not limited to:

Natural Resource-Related Data

- Iowa City Natural Areas Inventory, Management Needs and Assessment (City of Iowa City 2016)
- STAR (Sustainability Tools for Assessing and Rating Communities) Certification Results Report (STAR Community Rating 2016)
- Iowa City - City Code (http://www.sterlingcodifiers.com/codebook/index.php?book_id=953)
- Numerous park and natural area-specific studies, including mitigation monitoring reports, planting/seeding lists, and prescribed burn plans (see Appendix B, Management Briefs for site-specific data listings)
- Iowa Department of Natural Resources (Iowa DNR) "Landform Regions of Iowa" (Iowa DNR 2016a)
- Ecoregions of Iowa and Missouri (Chapman et al. 2002)
- Landforms of Iowa (Iowa DNR 2015)
- Iowa DNR Indiana bat guidelines (Iowa DNR, no date)
- Known Northern Long-eared Bat Hibernacula and Roost Trees in Iowa (USFWS 2016a)
- Final 4(d) Rule for the Northern Long-Eared Bat (USFWS 2016b)
- Northern Long-Eared Bat Final 4(d) Rule, White-Nose Syndrome Zone Around WNS/Pd Positive Counties/Districts (USFWS 2017)
- Securing a Future for Fish and Wildlife: A Conservation Legacy for Iowans (Iowa DNR 2015)

AES also compiled and reviewed existing City geographic information system and other digital mapping data including:

- Iowa City limits
- Iowa City park and natural area boundaries
- Elevation data from Light Detection and Ranging (LiDAR)
- U.S. Department of Agriculture/Natural Resources Conservation Service digital soils data
- U.S. Fish & Wildlife Service National Wetlands Inventory (NWI)
- National Land Cover Dataset (NLCD)
- Aerial photography (historical and 2016 flight by AES, true-color and infra-red)
- Original Vegetation of Iowa (General Land Office mapping)
- Geologic mapping
- Hydrography data
- Iowa DNR Natural Heritage Information System rare features data and reported high quality communities (Iowa DNR 2017b)

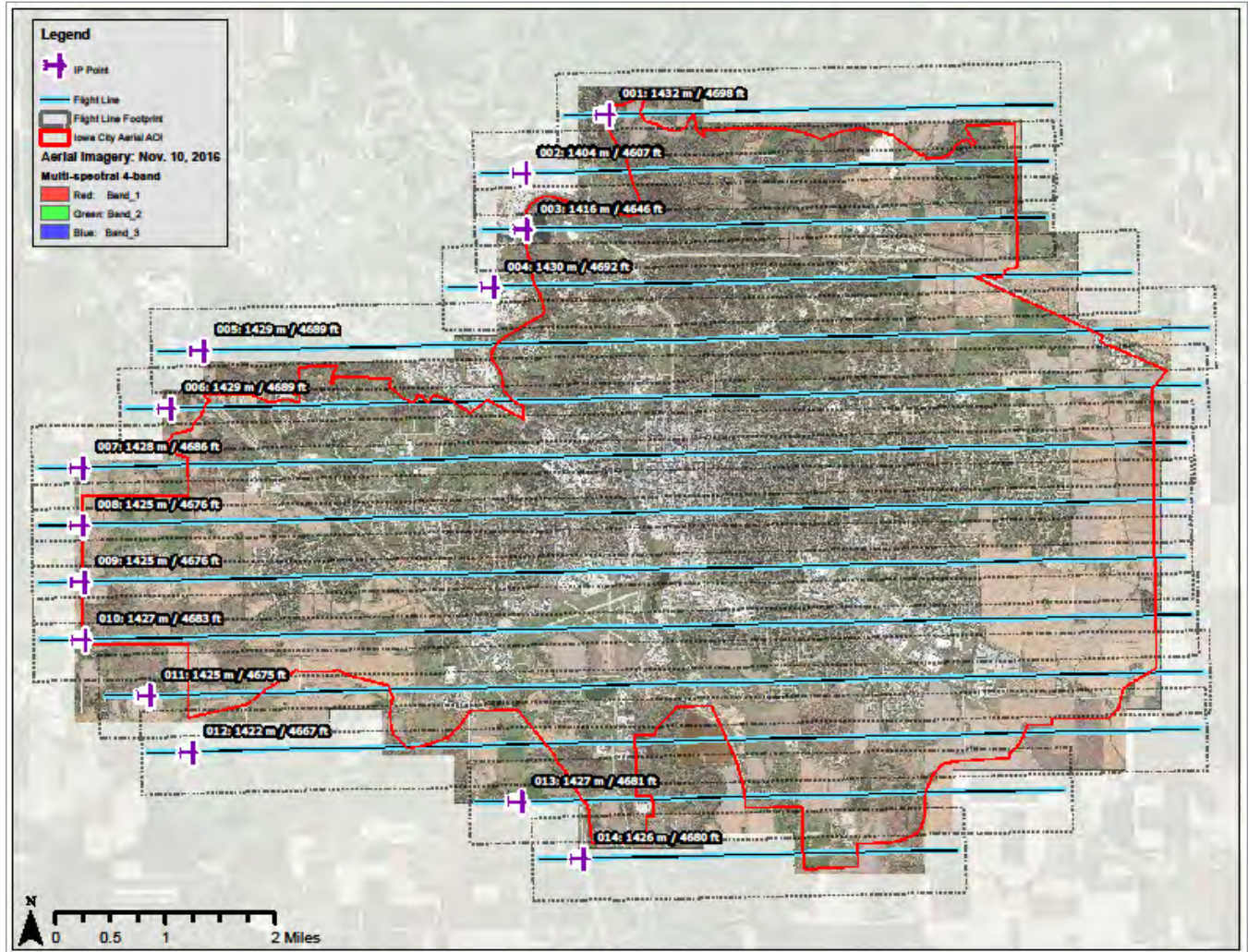
3.2 Aerial Imagery

Aerial imagery is a powerful tool for inventorying and managing natural resources, as well as documenting and monitoring City infrastructure. For this project, vegetation community mapping and identification of invasive woody shrubs was the chief interest. Some invasive plants can be seen on aerial imagery on the basis of their life history patterns. For example, invasive honeysuckle, buckthorn, and multiflora rose tend to retain green

leaves into late fall. Areas of these invasive shrubs, from photographs taken in the late fall, show up as reddish in color infrared imagery.

AES was directed by Iowa City to collect high resolution, multi-spectral aerial imagery of the entire city. Using a Leica RCD 30 multi-spectral digital camera, this imagery was collected on November 10, 2016. An airplane with the camera mounted in its belly flew multiple flight lines across Iowa City, taking pictures at regular intervals and covering the entire City with aerial imagery (Figure 1). Four different light wavelengths were captured by the camera: infrared, red, green and blue (IR RGB).

Figure 1. Flight plan for collecting Iowa City aerial imagery showing flight paths along which photos were taken.



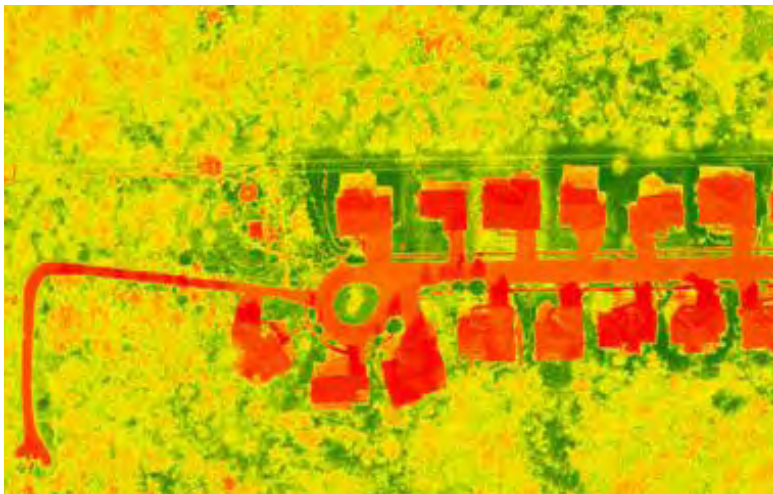
The camera resolution was 6 inches on the ground, also known as ground sample distance (GSD). The captured imagery was processed into a digital image file that contains both the natural RGB color and infrared bands. Combining these four spectra in different ways allows the user to represent the data in different ways for different purposes. For this natural areas inventory, the imagery provided an up-to-date and accurate representation of the ecological landscape of the City's parkland for AES field ecologists to inspect before and while visiting the sites. The imagery was used to map plant communities, identify invasive woody plants, and provide high-resolution imagery to compare with future imagery. In addition, the imagery can be used to inventory urban trees, document stream conditions, and assess infrastructure condition. Example imagery from a location in Iowa City is shown in the following images.



Natural color image: colors appear as they do to the human eye.



Infrared color image: colors represent the infrared spectrum, showing areas in red where vegetation is actively growing.



Normalized Difference Vegetation Index (NDVI): this method of data presentation shows a gradient of "greenness" in which impervious cover is red.

For more information on aerial imagery, see:

- Infrared imagery: <http://www.aerialarchives.com/infraredcolors.htm>
- Normalized Difference Vegetation Index (NDVI): https://phenology.cr.usgs.gov/ndvi_foundation.php
- Using aerial imagery for invasive species management: <https://www.fs.fed.us/eng/rsac/invasivespecies/>

3.3 Desktop Methods

As a platform for developing and managing Iowa City's natural area vegetation data, AES built an ArcGIS™ geodatabase. (A geodatabase is a collection of geographic datasets of various types held in a common file system folder or database.) Developing the geodatabase began with compilation of existing geospatial data, including City buildings; impervious surfaces; existing natural resource data layers such as elevation contours and wetlands mapping; historical aerial photographs; and the high-resolution multi-spectral aerial imagery collected by AES in fall 2016. Using these data, major land cover types were digitized (i.e., outlined) in the geographic information system.

A powerful feature of a geographic information system is that multiple characteristics or “attributes” can be assigned to each area or “polygon.” A land cover classification system appropriate for Iowa City natural areas management was developed and approved by the City, and preliminary land cover types were assigned to polygons of different plant communities in each park and natural area, to be confirmed later in the field.

Using geographic information system data layers and other sources, a variety of quality assurance/quality control procedures were followed to ensure initial vegetation mapping was as accurate as possible. This entailed making visual, on-screen comparisons among geographic information system datasets. The digitized land cover polygons were compared to recent aerial imagery, elevation contours, and other datasets. Edits to polygon geometry and attribute codes were made as warranted. This desktop mapping was used to create maps for use in the field assessment.

A comprehensive plant species list for Iowa City was compiled from previously published work in Iowa City and the surrounding area (Appendix C). The list was updated to reflect current species nomenclature (with the U.S. Department of Agriculture “Plants” website serving as guidance for the standard names accepted by federal agencies) and nomenclature used commonly in the region. The species list was later expanded to include plant species observed by AES in its field assessment that were missing from the original compilation. Not all species in Appendix C were observed by AES during its assessment.

3.4 Field Assessment Methods

In April, June and July 2017, AES ecologists conducted field inventories and assessments of 42 parks and natural areas in Iowa City. Field maps were used to verify and refine plant community classifications and plant community boundaries, and to assign a quality rank conveying the area's ecological quality. Quality ranks consider a variety of ecological criteria:

- Diversity of native species
- Level of disturbance
- Presence of invasive species
- Structural and spatial diversity (i.e., vegetation layers and plant variety across the natural area)
- Connectivity with other plant communities versus to turf or active use park areas
- Degree of erosion due to processes such as excessive runoff or foot traffic
- Other negative management or use effects observed

All of these criteria were considered for each plant community assessed in Iowa City, but quality ranks were most influenced by the abundance of invasive plant species. Using the criteria above, quality ranks were defined as follows:

- **A** = High quality natural community. No damaging disturbances evident and natural processes are intact.
- **B** = Good quality natural community. Natural processes are intact, but signs of past human impacts are evident. Low levels of invasive plants are present.
- **C** = Moderate condition natural community. Obvious past disturbance evident, but still clearly recognizable as a native plant community. Not dominated by weedy species in any layer.
- **D** = Poor condition natural community. Includes some native plants, but is dominated by non-natives and/or is obviously disturbed or altered throughout.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Often, a mapped plant community may be heterogeneous with different areas having characteristics of more than one quality rank. For instance, a moderate quality forest (C rank) may have large, dense patches of invasive buckthorn (justifying a D rank). In this case, the rank assigned to this single plant community is CD.

Species lists were recorded for each unique plant community type present at each of the 42 sites surveyed and a categorical cover class (based on percent cover) was assigned for each species in that community. Invasive species were noted, both by cover class and general distribution within the plant community. Species lists were generated by a random walk and were not intended to be comprehensive but strove to capture the dominant species in three structural layers: canopy, shrub/vine/sapling, and herbaceous. Notable/representative species were also recorded to support plant community classifications.

Digital photography (georeferenced, using Collector for ArcGIS and ArcGIS Online) was used to document representative plant communities, discrete concentrations of invasive vegetation, erosion features, and other notable aspects of the City's natural areas. Desktop refinement of geographic information system data was conducted after field inventory and assessment, resulting in detailed land cover maps of each site (included in Appendix B).

4 CITY-WIDE ECOLOGICAL CONDITIONS & ASSESSMENT

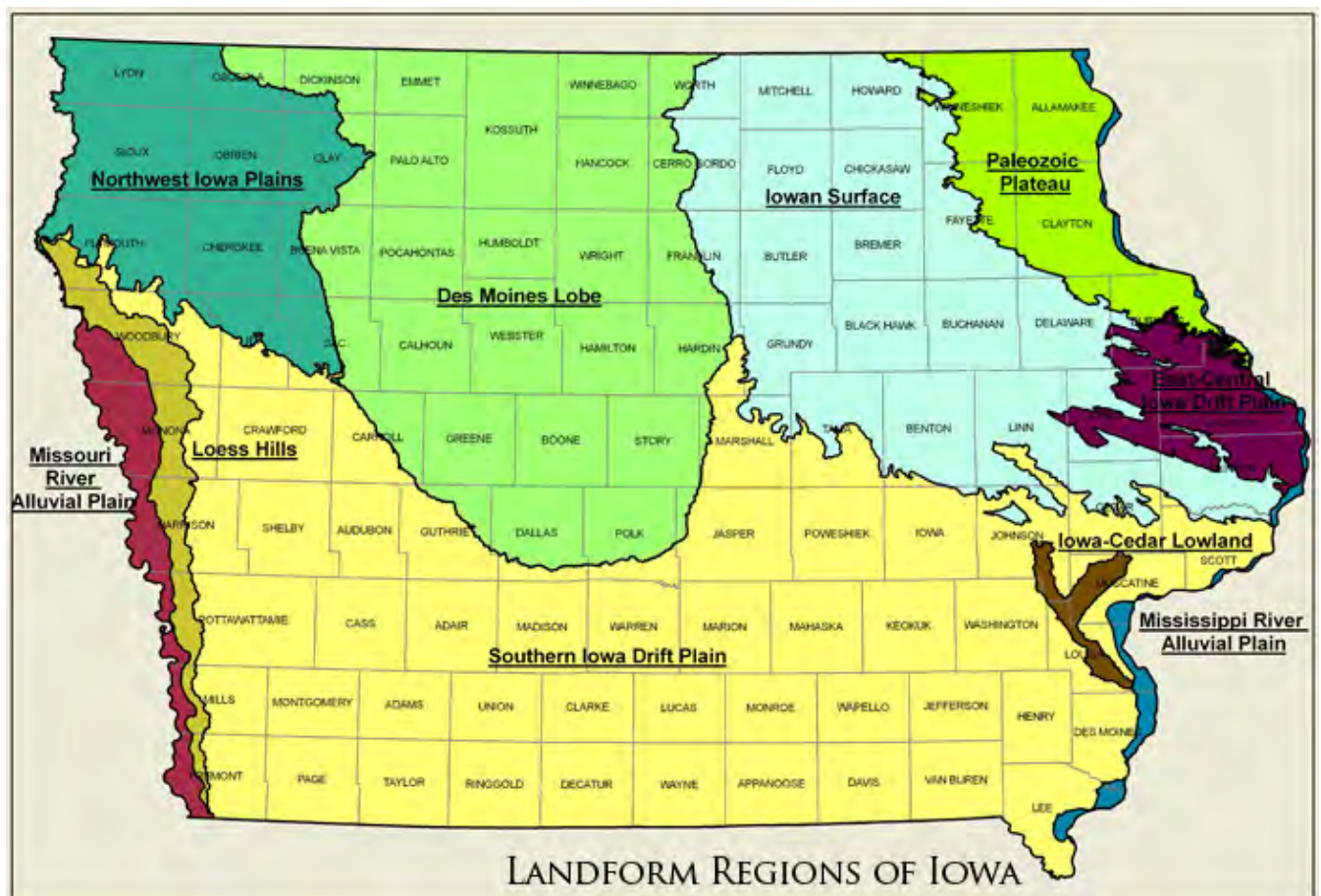
4.1 Regional Context

Iowa City is located in the east-central portion of the state in Johnson County (Exhibit 1). The City's 16,588 acres contain a mix of urban land uses (including commercial and moderate-density residential in the central portion of the City) and low-density residential and agricultural land closer to the city limits. The cities of Coralville and North Liberty lie just northwest of Iowa City, and Cedar Rapids is approximately 20 miles north-northwest of the City. The Iowa River flows south through the center of Iowa City. Large natural areas in the vicinity of Iowa City are Lake Macbride State Park (approximately 7 miles north) and Hawkeye Wildlife Management Area (approximately 10 miles northwest).

4.2 Landforms, Soils and Water Features

Iowa City exhibits a variety of landforms due to the glacial and geologic history of the region (Exhibit 2). These "landform regions" are defined by their internally distinctive geology, soils, slopes and elevations (Figure 2).

Figure 2. Landform regions of Iowa (Iowa DNR 2015).



Iowa City spans two landforms: the Southern Iowa Drift Plain and the Iowa-Cedar Lowland. The former covers most of the City and the latter is primarily along the Iowa River in the southern part of Iowa City.

The Southern Iowa Drift Plain is a tallgrass prairie region, part of the great Midwestern Corn Belt. It is almost entirely glacial drift from Pre-Illinoian glaciers over 1 million years ago. The glacial drift is a few to several hundred meters thick. Because the drift is so old, streams have eroded the land and formed well-defined, regularly-branching drainages. Hilltops are at a similar elevation at about the land surface deposited by glaciers. After the glaciers retreated, wind-blown fine sediment called loess fell on the landscape to a depth of 2 to 10 meters. Around 10,000-13,000 years ago, large rivers like the Iowa had glaciers in their headwaters. As the

Wisconsinan ice sheet melted, the vast quantity of flowing water created the width and depth of the rivers. In many places the rivers cut through the glacial drift into the underlying sedimentary bedrock. The rough wooded terrain of the valley bluffline is scenic, provides important wildlife habitat, and is where many recreational areas were established.

The Iowa-Cedar Lowland occupies the wide floodplain at the confluence of the Iowa and Cedar Rivers. It was first formed during the Illinoian glacial period, then later shaped by water and wind in the Wisconsin glaciations 13,000 years ago. Thick deposits of silt and sand lie nearest the rivers, while older terraces and benches near the bluffs are covered by ancient sand dunes and loess—a fine clayey sediment carried from glacial river valleys to the west.

Based on these landforms, Iowa City contains a complex mosaic of upland and lowland soil types. A custom Web Soil Survey report prepared for the entire City (USDA/NRCS 2017) shows that the most extensive soil types are fine-textured silt loams:

- Fayette silt loam and silty clay loam (2 to 40 percent slopes),
- Downs silt loam (2 to 14 percent slopes), and
- Tama silt loam (2 to 14 percent slopes).

The primary flowing (lotic) water features in the City are the Iowa River (flowing generally south) and its tributaries Ralston Creek, Willow Creek, and Snyder Creek. The primary non-flowing (lentic) waters in the City's parks and natural areas are the constructed lake at Terry Trueblood Recreation Area and ponds/wetlands at Waterworks Prairie Park and Sycamore Greenway. Exhibit 2 illustrates these water features in relation to the City and its parks and natural areas.

Stormwater runoff is a major issue for Iowa City (and most developed communities). Extensive cover by impervious surfaces of rooftops and pavement, and the conversion of natural vegetation to cropland, has accelerated runoff from the land. This overloads the capacity of streams to carry water and leads to erosion and pollution of streams, lakes, ponds and wetlands. In the City proper, bank erosion is occurring along the Iowa River and its tributaries due to uncontrolled upstream runoff. A large percentage of the sediment in Midwestern streams is due to collapsing riverbanks (see, for example, Sekely et al. 2009; Belmont et al. 2011). Likewise, some of the City's ponds and wetlands are negatively affected by insufficient stormwater management; this causes water levels to rise and fall dramatically, reducing vegetation cover and eroding banks, and carries nutrients and contaminants into the water. The issue of policies to address runoff is discussed in greater detail in Sections 6 and 16.

4.3 Land Cover and Vegetation

A land cover classification system was developed in collaboration with City staff for ease of use in natural areas management. Each plant community type (described in detail below the following tables), is useful for prescribing vegetation management, but not overly detailed and cumbersome for staff working in the field. By using this classification, City staff managing natural areas can talk more precisely about natural areas among themselves and with residents, volunteers, and stakeholders.

The land cover classification (Table 1) is hierarchical, with each level indented according to level of organization. For instance, at the first level, natural land covers are separated from cultural land covers (those that are altered or regularly maintained). Next, upland communities with relatively dry soil are separated from lowland communities with typically wet or inundated soil. At the third level, the dominant form of the vegetation separates types. At subsequent levels additional information is brought into the classification, such as the dominant plant species.

Table 1. Land Cover Classification

NATURAL LAND COVERS	DEFINING CHARACTERISTICS
Upland Plant Communities	High, dry ground
Forest/Woodland	50-100% tree canopy
Mature Forest/Woodland	Large trees
1. Dry-Mesic Forest/Woodland	Often oaks
2. Mesic Forest	Often maples
3. Altered Forest/Woodland	Often box elder, green ash
Savanna/Brushland	5-50% tree canopy
4. Savanna	Tree dominated
5. Shrub/Scrub	Shrub dominated
Grassland	<5% tree canopy
6. Prairie	Native plants dominate
7. Non-Native Grassland	Little native plant cover
Lowland Communities	Low areas, including wetlands
8. Forested Lowland	50-100% tree canopy
9. Shrub/Scrub Lowland	5-50% tree canopy
10. Herbaceous Lowland	<5% tree canopy
11. Open Water	Submerged or floating vegetation
CULTURAL LAND COVERS	DEFINING CHARACTERISTICS
12. Woodland with Turf	50-100% tree canopy
13. Recreation Area	0-50% tree canopy
14. Building	---
15. Other Impervious Cover	---

Higher classification levels are not numbered or mapped because they include more than one plant community. Only the numbered plant communities were mapped, although higher levels can be described by combining the lower levels they contain.

Applying this land cover classification to the 42 sites indicates that over a quarter (28.5 percent) of the area assessed are forest and woodland (Table 2, Exhibit 3). Cultural land cover types comprise nearly a third (30.5 percent) of the sites. Prairie and non-native grassland cover 20.5 percent of the sites, and 11.4 percent of the sites are open water. Other natural land covers are less than 4 percent each. More detailed, site-specific land cover mapping is provided in each management brief (Appendix B).

Table 2. Iowa City Parks and Natural Areas Land Cover

LAND COVER TYPE	ACRES	PERCENT OF STUDY AREA
NATURAL LAND COVERS		
Upland Plant Communities		
Forest/Woodland		
Mature Forest/Woodland		
1. Dry-Mesic Forest/Woodland	224.11	14.7%
2. Mesic Forest	7.69	0.5%
3. Altered Forest/Woodland	88.09	5.8%
Savanna/Brushland		
4. Savanna	4.58	0.3%
5. Shrub/Scrub	57.14	3.8%
Grassland		
6. Prairie	187.85	12.4%
7. Non-Native Grassland	122.55	8.1%
Lowland Communities		
8. Forested Lowland	113.36	7.5%
9. Shrub/Scrub Lowland	24.16	1.6%
10. Herbaceous Lowland	54.46	3.6%
11. Open Water	174.13	11.4%
CULTURAL LAND COVERS		
12. Woodland with Turf	32.59	2.1%
13. Recreation Area	343.06	22.6%
14. Building	7.02	0.5%
15. Other Impervious Cover	80.22	5.3%
TOTALS	1,521.01¹	100%²

¹ Total acres does not include Riverfront Crossings Park (18.23 ac) because it was under construction at the time of AES's field assessment.

² Total not based on rounded numbers above.

A description follows for each numbered land cover type.

4.3.1 Natural Land Covers

1. Dry-Mesic Forest/Woodland (224.11 acres)

Characteristic Plant Species

- Bur oak (*Quercus macrocarpa*)
- White oak (*Q. alba*)
- Red oak (*Q. rubra*)
- Black cherry (*Prunus serotina*)
- Shagbark Hickory (*Carya ovata*)
- American Elm (*Ulmus americana*)

Other Plant Community Characteristics

- Tree canopy typically has scattered openings, where direct sunlight dapples the forest floor.
- Compared to Mesic Forest, Dry-Mesic Forest/Woodland tends to be more susceptible to invasion by invasive honeysuckles, especially Amur honeysuckle (*Lonicera maackii*).
- Typically considered a fire-dependent plant community.

Soil and Slopes

- Often occurs in well- to moderately well-drained soils.
- Found in many landscape and aspect settings, with the exception of steeper north- or east-facing slopes, which are typically Mesic Forest.

Historical Conditions

- Historically burned relatively frequently (approximately once every 10 years).
- Low-intensity surface fires were important for maintaining plant community structure and species composition. Without fire, sun-requiring species disappear, reducing the variety of plants and insects in the community.



Dry-Mesic Forest/Woodland, east section of Ryerson's Woods.

2. Mesic Forest (7.69 acres)

Characteristic Plant Species

- Sugar maple (*Acer saccharum*)
- Red oak (*Q. rubra*)
- White oak (*Q. alba*)
- Black cherry (*Prunus serotina*)
- Basswood (*Tilia americana*)
- Hackberry (*Celtis occidentalis*)
- American elm (*Ulmus americana*)
- Jack-in-the-pulpit (*Arisaema triphyllum*)

Other Plant Community Characteristics

- Tree canopy closure often is nearly 100 percent, which limits or excludes shrub and groundstory vegetation that requires direct sunlight.
- Typically not considered a fire-dependent plant community.

Soil and Slopes

- Often occurs in moderately well-drained soils.
- Typically found on steeper north- or east-facing slopes, but can occur on flat sites with more poorly drained soils.

Historical Conditions

- Historically, burned rarely (approximately once every 20-50 years).
- Tends to become dense stands of maple in the natural process of forest succession.



Mesic Forest, center of Ryerson's Woods.

3. Altered Forest/Woodland (88.09 acres)

Characteristic Plant Species

- Box elder (*Acer negundo*)
- Green ash (*Fraxinus pennsylvanica*)
- Siberian elm (*Ulmus pumila*) - invasive
- Honey Locust (*Gleditsia triacanthos*)
- Black Walnut (*Juglans nigra*)
- Eastern Cottonwood (*Populus deltoides*)
- Silver Maple (*Acer saccharinum*)

Other Plant Community Characteristics

- Some areas contain planted trees of native and non-native deciduous and coniferous species.
- Invasive plants are common, including non-native honeysuckles (*Lonicera* spp), garlic mustard (*Alliaria petiolata*), creeping Charlie (*Glechoma hederacea*), oriental bittersweet (*Celastrus orbiculatus*), and reed canary grass (*Phalaris arundinacea*).
- Not considered a natural community.

Soil and Slopes

- Occurs in a broad range of soils and slope positions.

Historical Conditions

- Often formerly disturbed areas that were colonized by pioneering species of bottomlands, which have light, highly mobile seeds (see Characteristic Plant Species above); these trees may range in age from young to mature.



Altered Forest/Woodland, south end of Ryerson's Woods.

4. Savanna (4.58 acres)

Characteristic Plant Species

- Bur oak (*Quercus macrocarpa*) – although not common in Iowa City’s Savannas
- Native Prairie grasses and forbs – although not common in Iowa City’s Savannas
- Silver maple (*Acer saccharinum*)
- Eastern Cottonwood (*Populus deltoides*)
- Reed canary grass (*Phalaris arundinacea*) - invasive

Other Plant Community Characteristics

- Savanna is used to describe landscapes with less canopy cover than forests and woodlands (typically <50 percent canopy cover), and where the woody (i.e., tree and shrub) vegetation is dominated by trees as opposed to shrubs.
- The broken tree canopy allows sunlight to reach the groundlayer, often supporting substantial herbaceous vegetation where shrubs and colonizing trees are not dominant.
- The term “Savanna” does not necessarily mean a high quality native community, such as an intact oak savanna with native groundcover; rather, Savanna in this classification means a community has the physical structure of a savanna, with 10-50 percent canopy cover, mostly of trees, and a shrubby or herbaceous groundlayer. Ecological quality ranks discussed later in this plan can be used to easily differentiate savannas having oaks and native groundlayer plants from those savannas comprised of species not characteristic of historical, species-rich savannas.
- Many of the grand, arching oaks seen throughout Iowa City originated in savannas, and often still present the look of a natural savanna even though the groundlayer is mowed or composed of non-native plants.
- Amur honeysuckle is an invasive shrub that can dominate the understory of Savannas.

Soil and Slopes

- Occurs in a broad range of soils and slope positions.

Historical Conditions

- Historically, experienced frequent fires (approximately once every 2-4 years). However, where canopy cover approached 50 percent, these fires were not severe, with flame lengths only a few feet in height. Where trees covered only 10 percent of the ground, fires were like those in prairies, with much longer flame lengths due to the abundance of dry groundlayer vegetation as fuel. While shrubs and seedlings were often to-killed by these fires, they resprouted from rootstocks. Fire-tolerant trees such as the thick-barked bur oak and also trees that grew rapidly from root masses (called “grubs”), like oak, were usually able to reach a size that survived the surface fires. Fire helped maintain an open and patchy vegetation structure in the community, with some areas in full sun and others in partial shade.
- Variety of tree canopy cover and different amounts of light promoted a diversity of flowering shrubs, grasses, and wildflowers, combining forest and prairie flora, and made these habitats productive and able to support a wide range of wildlife.
- Attractive to people because of their park-like quality. Early white visitors to savanna regions of the Midwest often said they looked like parks due to the spaces between trees, uncluttered understories, and grassy groundcover. The frequent fires lit by American Indians created these “parks,” which made travel and settlement by whites easier.



Savanna, southwest edge of Longfellow Nature Trail.

5. Shrub-Scrub (57.14 acres)

Characteristic Plant Species

- Roughleaf dogwood (*Cornus drummondii*)
- Amur honeysuckle (*Lonicera mackii*) - invasive
- Sandbar willow (*Salix exigua*)
- Kentucky bluegrass (*Poa pratensis*) - invasive
- Smooth brome (*Bromus inermis*) – invasive
- Reed canary grass (*Phalaris arundinacea*) – invasive
- Canada goldenrod (*Solidago canadensis*)
- Wild bergamot (*Monarda fistulosa*)

Other Plant Community Characteristics

- Like Savanna, Shrub-Scrub describes landscapes with less canopy cover than forests and woodlands (<50 percent cover); however, the woody vegetation is primarily shrubs and not trees.
- Generally not considered a natural community, but prior to 1850, Shrub-Scrub communities on high ground were common and supported a wide array of native plants and animals.

Soil and Slopes

- Occurs in a broad range of soils and slope positions.

Historical Conditions

- Most are former grassland areas that became overgrown with shrubs and scattered trees.
- If previously farmed or heavily grazed, groundlayer often consists of non-native plants, similar to those of Non-Native Grasslands.



Shrub-Scrub, south end of Sand Prairie.

6. Prairie (187.85 acres)

Characteristic Plant Species

- Big bluestem (*Andropogon gerardii*)
- Indian grass (*Sorghastrum nutans*)
- Ohio spiderwort (*Tradescantia ohioensis*)
- Cup plant (*Silphium perfoliatum*)
- White and yellow sweet clover (*Melilotus alba*, *M. officinalis*) – invasive
- Wild bergamot (*Monarda fistulosa*)
- Kentucky bluegrass (*Poa pratensis*) – invasive
- Smooth brome (*Bromus inermis*) – invasive
- Canada goldenrod (*Solidago canadensis*)
- Sedges (*Carex* spp.)

Other Plant Community Characteristics

- Herbaceous plant community, often dominated by grasses.
- Invasive species include Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*) in dry prairies and reed canary grass (*Phalaris arundinacea*) in more moist prairies.

Soil and Slopes

- Occurs in a broad range of soils and slope positions: dry prairie is often on sandy soils and/or south- or west-facing slopes, the hottest, driest locations in the region; moist or mesic prairie is found in a variety of settings, but never excessively dry or wet.

Historical Conditions

- Historically burned frequently (fires occurred less than 10 years apart). Currently, however, a return interval of 4 years or less is required to combat the many invasive plants which were not present in Iowa 150 years ago.



Prairie, west side of Sycamore Greenway.

7. Non-Native Grassland (122.55 acres)

Characteristic Plant Species

- Smooth brome (*Bromus inermis*) -- invasive
- Kentucky bluegrass (*Poa pratensis*) – invasive
- Tall Fescue (*Festuca arundinacea*) – invasive
- Yellow and white sweet clover (*Melilotus officinalis*, *M. alba*) – invasive
- Ground clovers (primarily *Trifolium repens*, *T. pratense*) – invasive
- Canada goldenrod (*Solidago canadensis*)
- Common and giant ragweed (*Ambrosia artimisiifolia*, *A. trifida*)
- Reed canary grass (*Phalaris arundinacea*) – invasive

Other Plant Community Characteristics

- Dominated by non-native herbaceous vegetation that is not typically mowed or maintained.
- Not considered a natural community.

Soil and Slopes

- Occurs in a broad range of soils and slope positions.

Historical Conditions

- Often previously farmed or grazed.



Non-Native Grassland, northwest section of Iowa City Kickers Soccer Park.

8. Forested Lowland (113.36 acres)

Characteristic Plant Species

- Silver maple (*Acer saccharinum*)
- Eastern cottonwood (*Populus deltoides*)
- American elm (*Ulmus americana*)
- Green ash (*Fraxinus pennsylvanica*)
- Common hackberry (*Celtis occidentalis*)
- Black walnut (*Juglans nigra*)
- Box elder (*Acer negundo*)
- River birch (*Betula nigra*)
- Sedges (*Carex* spp.)
- Reed canary grass (*Phalaris arundinacea*) – invasive
- Garlic mustard (*Alliaria petiolata*) – invasive
- Creeping Charlie (*Glechoma hederacea*) – invasive
- Spotted touch-me-not (*Impatiens capensis*)

Other Plant Community Characteristics

- Low-lying woodlands that may or may not experience intermittent flooding or shallow water tables for a period of time.
- Usually have mineral soil (as opposed to organic, mucky soils typical of swamps).

Soil and Slopes

- Occurs in low-lying areas and in a broad range of soils.

Historical Conditions

- Some Forested Lowlands still experience unaltered groundwater and floodplain dynamics and resemble historical forests, but others have changed due to hydrological alterations (e.g., dams, levees).



Forested Lowland, north section of Terrell Mill Park.

9. Shrub-Scrub Lowland (24.16 acres)

Characteristic Plant Species

- Silver maple (*Acer saccharinum*)
- Black willow (*Salix nigra*)
- Sandbar willow (*Salix exigua*)
- American elm (*Ulmus americana*)
- Roughleaf dogwood (*Cornus drummondii*)
- Elderberry (*Sambucus canadensis*)
- Buttonbush (*Cephalanthus occidentalis*)
- Riverbank grape (*Vitis riparia*)
- Sedges (*Carex* spp.)
- Reed canary grass (*Phalaris arundinacea*) – invasive

Other Plant Community Characteristics

- Shrub-dominated wetland community.
- Often contains highly invasive reed canary grass (*Phalaris arundinacea*), which can completely dominate the ground layer.

Soil and Slopes

- Occurs in saturated or groundwater-fed soils, usually in shallow, inundated depressions or along edges of lakes, ponds, marshes, and some streams and rivers.

Historical Conditions

- Some Lowland Shrub-Scrub areas represent historical conditions, while others developed after woody plants invaded wet meadows following drainage and the cessation of haying or grazing.



Shrub-Scrub Lowland, center of Sycamore Greenway.

10. Herbaceous Lowland (54.46 acres)

Characteristic Plant Species

- Black willow (*Salix nigra*)
- Sandbar willow (*Salix exigua*)
- Sedges (*Carex* spp.)
- Fowl mannagrass (*Glyceria striata*)
- Reed canary grass (*Phalaris arundinacea*) – invasive
- Swamp milkweed (*Asclepias incarnata*)
- Virginia wild rye (*Elymus virginicus*)
- Blue flag iris (*Iris versicolor*)
- Beggar ticks (*Bidens* spp.)
- Blue vervain (*Verbena hastata*)
- Common ironweed (*Vernonia fasciculata*)
- Narrow-leaved and hybrid cattail (*Typha angustifolia*, *T. x glauca*) – invasive
- False aster (*Boltonia asteroides*)
- Bulrushes (*Scripus* spp., *Schoenoplectus* spp., *Bolboschoenus* spp.)
- Spikerushes (*Eleocharis* spp.)
- Rushes (*Juncus* spp.)

Other Plant Community Characteristics

- Herbaceous wetlands.
- Most in Iowa City are dominated by the invasive, non-native reed canary grass and/or invasive cattails. Purple loosestrife and giant reed are two additional invasive plants found in Herbaceous Lowlands. These species often spread throughout a wetland, reducing vegetation diversity and habitat value.

Soil and Slopes

- Occurs in depressions and at edges of lakes, ponds, marshes, and some streams and rivers. It is found in saturated soils and sometimes in shallow water.

Historical Conditions

- Many Herbaceous Lowlands depend on a predictable, though not static, hydrologic regime, sometimes including damming by beavers. The seasonal water level changes in response to spring runoff, May-June rains, and late summer dry periods sustained the large variety of plants in historical wet meadows. Currently, many Herbaceous Lowlands across the Midwest have been converted to a simple plant community dominated by invasive reed canary grass and/or non-native cattails. This was due to the introduction of aggressive strains of reed canary grass for pasture, as well as draining to facilitate haying and cropping. Sediment and nutrient inputs greatly favor reed canary grass, as does fixed water levels resulting from dams and berms. In dry periods, Herbaceous Lowlands were subject to fire, but the plants, including the shrubs, survived such fires and resprouted.
- Invasion by cattails and other aggressive species have resulted in the dramatic degradation of wetter Herbaceous Lowlands throughout the Upper Midwest. Hydrological regimes were dynamic but predictable historically. With the current shunting of excessive runoff from roads, pavement, rooftops, and agricultural fields, marshes experience water level fluctuations out of the normal range that the historical vegetation can tolerate. Both narrow-leaved and hybrid cattail grow well with this overly-dynamic flooding regime; these species also use the higher phosphorus concentrations in most marshes receiving stormwater runoff to develop dense, tall stands.



Herbaceous Lowland, southeast corner of Landfill Wetland.

11. Open Water (174.13 acres)

Characteristic Plant Species

- Broadleaf arrowhead (*Sagittaria latifolia*)
- White water lily (*Nymphaea odorata*)
- Broadleaf pondweed (*Potamogeton natans*)
- Lesser duckweed (*Lemna minor*)
- Giant bur-reed (*Sparganium eurycarpum*)

Other Plant Community Characteristics

- Open Water areas often contain a variety of floating and/or submerged aquatic plants. Aquatic habitats in the Iowa City park system are affected by urban stormwater runoff and likely have been impacted by aquatic invasive species (AIS) such as zebra mussel (*Dreissena polymorpha*) and common carp (*Cyprinus carpio*), especially the Iowa River and adjacent waterbodies.

Soil and Slopes

- Occurs in lakes and ponds, containing mineral or organic soils.

Historical Conditions

- Many Open Water areas represent historical conditions (e.g., natural lakes, rivers, and open water wetlands), while some represent constructed stormwater ponds.



Open Water, south end of Sycamore Greenway.

4.3.2 Cultural Land Covers

12. Woodland with Turf (32.59 acres)

Many of Iowa City's parks contain areas with mature to young trees underlain by mowed turf grass. Trees may be mature remnant oaks of historical savannas and woodlands, or they may be more recently planted deciduous and coniferous species, including ornamentals. Some of the of the City's Woodland with Turf may be underutilized by people and could be transitioned to more natural landscapes.



Woodland with turf, southern section of City Park.

13. Recreation Area (343.06 acres)

Recreation areas include open and maintained sports fields, lawns, and other turf areas. Tree canopy is less than 50 percent – often considerably less. These areas receive full or nearly full sun, which provides an opportunity to introduce sun-requiring plants.



Mowed turf, northwest edge of Villa Park.

14. Building (7.02 acres)

Iowa City parks contain many buildings. These range from small shelters to larger facilities. While roof runoff from these buildings did not appear to be causing conspicuous erosion problems, this runoff could be managed better by using techniques such as rain gardens. Rain gardens can be designed to not clash with the formal aesthetics of the building, and provide opportunities not only for rainwater management but for interpretation and demonstration projects as well. Another approach is simply to direct downspouts away from pavement and toward turf.



Sewage treatment building, northeast section of Iowa City Kickers Soccer Park

15. Other Impervious Cover (80.22 acres)

Impervious cover in City parks consists primarily of roads and parking areas. Impervious cover is a primary contributor to urban runoff – a major stressor on surface water resources such as lakes and streams. Some of the City’s parking areas may be underutilized and could be converted to some form of vegetation, especially at locations where runoff from impervious cover is causing erosion or water quality issues. Rain gardens or other localized stormwater best management practices (permeable pavers, bioswales, tree planters, and created wetlands) can be used to better manage runoff from impervious surfaces.



Impervious Cover (gravel parking lot), east side of Ryerson’s Woods.

4.4 Invasive Species

In its natural areas, Iowa City is no different than every other city in the country—removing invasive species is one of the main management activities. The natural areas of Iowa City are dramatically and negatively affected by several invasive plant species, and threatened by a new insect pest, the emerald ash borer.

Invasive species often establish and thrive in disturbed habitats, usually crowding out native plants and animals. They typically have the following characteristics:

- Tolerant of a variety of habitat/environmental conditions
- Grow and reproduce rapidly, with good seed dispersion
- Compete aggressively for resources, such as nutrients, water, and (for plants) sunlight
- Lack natural enemies or effective competitors

Invasive plants suppress native plants, degrade wildlife habitat, and lessen the resilience of ecosystems to recover from disturbances and environmental change. Invasive animals also can have adverse effects, as the emerald ash borer is demonstrating. Some invasive species cannot be removed or cost-effectively controlled. In these cases, managing the effects of an invasive species, rather than trying to eradicate it, is the best course of action. Invasive species warranting control during ecological restoration and management are highlighted with red font in Appendix C.

Iowa City has been actively managing invasive plants for years. In 2010, the City published “Invasive Species Control in Natural Areas” (Iowa City 2010), providing detailed management recommendations for 28 invasive species or plant groupings (including some native species). Because invasive plant control depends to a large extent on the proper and safe application of herbicides, in 2016 the City enacted a policy, “Vegetation Control Chemicals on City Property.” This administrative rule is intended to minimize the use of herbicides on public land which could impinge on the use of public spaces.

During park management, including implementing ecological restoration and management, invasive species may accidentally be introduced or spread across a site. Appendix D provides guidelines developed by the Minnesota Department of Natural Resources to avoid such introduction or spread of invasive species.

Many invasive plant species were observed in the city’s natural areas (see Appendix B species lists). Johnson County has identified the most aggressive invasive plant and animal species in the county (Table 3). Most of these were observed by AES field staff. AES staff also found a few aggressive invasive plants not on Johnson County’s list and added those to the list below. Based on field observations and experience with each species, AES rated each invasive plant as to its level of infestation in City-owned natural areas and its ecological effect if not controlled.

Table 3. Invasive species in Johnson County and Iowa City, Iowa.

Common Name	Scientific Name	Level of Infestation in Iowa City ¹	Ecological Effect if Uncontrolled ²	Fact Sheet Available ³
Plants				
Bush Honeysuckles	<i>Lonicera maackii</i> , <i>L. morrowii</i>	Major	Major	Yes
Reed Canary Grass	<i>Phalaris arundinacea</i>	Major	Major	Yes
Narrow-leaf and Hybrid Cattail	<i>Typha angustifolia</i> , <i>Typha x glauca</i>	Major	Major	No
Smooth Brome	<i>Bromus inermis</i>	Major	Major	Yes
Wild Parsnip	<i>Pastinaca sativa</i>	Major	Major	Yes
Yellow and White Sweet Clover	<i>Melilotus officinalis</i> , <i>M. alba</i>	Moderate	Major	Yes
Canada Thistle	<i>Cirsium arvense</i>	Moderate	Moderate	Yes
Crown Vetch	<i>Securigera varia</i>	Moderate	Moderate	Yes
Birdsfoot Trefoil	<i>Lotus corniculatus</i>	Moderate	Moderate	No
Garlic Mustard	<i>Alliaria officinalis</i>	Moderate	Moderate	Yes
Common and Glossy Buckthorn	<i>Rhamnus cathartica</i> , <i>Frangula alnus</i>	Low	Major	Yes
Japanese Knotweed	<i>Polygonum cuspidatum</i>	Low	Major	Yes
Oriental Bittersweet	<i>Celastris orbiculatus</i>	Low	Major	Yes
Japanese Hop	<i>Humulus japonicus</i>	Low	Moderate	No
Multiflora Rose	<i>Rosa multiflora</i>	Low	Moderate	Yes
Japanese Barberry	<i>Berberis thunbergii</i>	Low	Moderate	Yes
Black Locust	<i>Robinia pseudoacacia</i>	Low	Moderate	Yes
Common Teasel	<i>Dipsacus fullonum</i>	Low	Moderate	No
Purple Loosestrife	<i>Lythrum salicaria</i>	Low	Moderate	Yes
Tree of Heaven	<i>Ailanthus altissima</i>	Low	Moderate	Yes
Plumeless and Musk Thistle	<i>Carduus acanthoides</i> , <i>C. nutans</i>	Low	Low	Yes
Autumn Olive	<i>Eleagnus umbellata</i>	Low	Low	Yes
Common Reed Grass	<i>Phragmites australis</i> , <i>P. communis</i>	Minor	Moderate	Yes
Chinese Bush Clover	<i>Lespedeza cuneata</i>	Minor	Moderate	Yes
Leafy Spurge	<i>Euphorbia esula</i>	Minor	Moderate	Yes
Animals				
Emerald Ash Borer	<i>Agrilus planipennis</i>	Low	Major	Yes
Brown Marmorated Stink Bug	<i>Halyomorpha halys</i>	Not found, but potential	Not found, but potential	Yes
Large Aspen Tortrix Moth	<i>Choristoneura conflictana</i>	Not found, but potential	Not found, but potential	Yes

¹ Infestation: Based on AES field observations. Major - common to abundant in most of its preferred habitats; Moderate - present in most of its preferred habitats, but with low cover; Low - occasionally encountered, or large but few populations exist; Minor - rarely encountered, usually in small populations.

² Effect: Major - significantly alters vegetation structure and plant diversity, prevents regeneration of native plants; Moderate - noticeably affects vegetation structure and plant diversity, but some native plant regeneration occurs; Low - a noticeable member of the vegetation structure and diversity, but normal ecological processes are operating; Minor - vegetation structure, native plant diversity, and normal ecological processes are largely unaffected

³ Fact sheet available for invasive plants from http://www.johnson-county.com/dept_sec_roads.aspx?id=19642; for ash borer from <http://www.extension.iastate.edu/psep/EmeraldAshBorer.html>; for other insects from <https://www.eddmaps.org/tools/recordsbysubject.cfm>.

4.5 Wildlife

Wildlife surveys were not conducted as part of this Natural Areas Plan. Wildlife surveys conducted by others and AES's incidental wildlife observations during fieldwork are reported in each site's management brief (Appendix B). In addition, bird surveys conducted in some of the City's parks and natural areas are accessible at the Iowa Ornithologists' Union (2017) website: <http://www.iowabirds.org/birds/DataSets.aspx>.

Based on AES's incidental observations and familiarity with the region, there appears to be a moderate variety and abundance of wildlife using Iowa City's parks and natural areas. However, many of these species are considered "generalists." While not problems in themselves, an abundance of animals that are generalists indicates that natural areas are lower quality, smaller, and more isolated than natural areas where generalists are not as common. Generalists persist and even thrive in cities, suburbs, farmland, and degraded natural areas. Generalists do not have narrow habitat and dietary needs only satisfied by high quality or large natural areas; this lets them build up large populations using resources inadvertently supplied by people. By contrast, "specialists" are wildlife species that have specific environmental needs, such as particular habitat, dietary, or breeding requirements. (We include species that need large areas in this category.) Specialists are less common than generalists, more often found in larger and higher quality habitats, and are more sensitive to environmental change. Often, specialist wildlife species are classified as Species of Greatest Conservation Need, discussed below. As natural areas are improved, connected, and shielded from the damaging effects of adjacent lands, specialist species appear and increase in abundance. Specialists are therefore a good indicator of the success of conservation efforts.

4.5.1 Species of Greatest Conservation Need

Species of Greatest Conservation Need is a wildlife classification for regional conservation purposes; many of these species are classified as specialists, and they are commonly found in higher quality or large core habitats. Species of Greatest Conservation Need include state-listed species and non-listed species that are regionally rare or in decline, often as a result of habitat loss. While most are not yet endangered, they may become so in the future unless people become aware of and manage for them. The STAR goal "Biodiversity and Invasive Species (NS-2)" supports conservation of biodiversity. This would be accomplished through wildlife habitat restoration within the City's parks and natural areas, which support Species of Greatest Conservation Need.

The Iowa DNR publication, *Securing a Future for Fish and Wildlife: A Conservation Legacy for Iowans* (Iowa DNR 2015) presents a statewide analysis of Species of Greatest Conservation Need, including their major habitat types. Table 4 lists statewide Species of Greatest Conservation Need by habitat class. Due to the near-elimination across Iowa of native grasslands and wetlands and, more recently, even pastures and hay meadows, declines in Species of Greatest Conservation Need that use grasslands and wetlands exceed those of other habitats. Rivers and streams have suffered widespread elimination of natural vegetation and associated aquatic animal species have declined concurrently. Forested areas in Iowa have actually increased over the past 150 years due to forest succession occurring in grassland, savanna, and abandoned fields. However, this early successional forest does not offer quality habitat for most Species of Greatest Conservation Need, and their numbers are also declining.

Table 4. Summary of Habitat Preferences of Species of Greatest Conservation Need Statewide by Habitat Class (Iowa DNR 2015)

Habitat Class	Amphibians	Reptiles	Birds	Butterflies	Crayfish	Dragonflies & Damselflies	Fish	Mammals	Mussels	Terrestrial Snails	Total
Terrestrial Habitat Classes	28	55	149	56	2	8	2	35	0	5	340
Forests	7	10	29	11	-	-	-	12	-	5	74
Shrubland	1	3	14	-	-	-	-	2	-	-	20
Grasslands	8	21	34	26	1	-	-	11	-	-	101
Wetlands	8	13	47	13	1	8	2	6	-	-	98
Agricultural Lands	4	8	25	6	-	-	-	4	-	-	47
Aquatic Habitat Classes	23	47	88	5	9	46	126	10	54	0	408
River	4	13	34	-	3	9	48	5	34	-	150
Stream	5	10	29	5	5	17	38	5	14	-	128
Lake, Reservoir, Impoundment	6	8	23	-	-	6	18	-	2	-	63
Backwater/Oxbow	2	7	-	-	-	1	16	-	-	-	26
Pond	6	9	2	-	1	13	6	-	4	-	41
Total	51	102	237	61	11	54	128	45	54	5	748

Note: Individual species are assigned to more than one habitat type if appropriate, so the total number of species exceeds the total number of Species of Greatest Conservation Need.

Iowa City's parks and natural areas support habitat used by Species of Greatest Conservation Need (Exhibit 3 and Table 4). While some sites are dominated by forest (e.g., Ryerson's Woods, Hickory Hill Park), others are dominated by grasslands (e.g., Waterworks Prairie Park, Sand Prairie) or have significant open water (e.g., the constructed lake at Terry Trueblood Recreation Area). Other Species of Greatest Conservation Need habitats of Shrubland, Wetlands, Agricultural Lands, and most Aquatic Habitats are less common in the City's parks and natural areas. While these habitats exist in Iowa City today, they could be expanded, restored, and connected with management.

A primary strategy to conserve Species of Greatest Conservation Need is to, "Protect and enhance existing habitats that benefit Species of Greatest Conservation Need." Although wildlife surveys were not conducted as part of this study, AES ecologists identified the following Species of Greatest Conservation Need at Iowa City parks and natural areas:

- **Dickcissel** – observed at 420th St Wetland, Sturgis Ferry Park, and Wetherby Park
- **Eastern Meadowlark** – observed at 420th St Wetland, Sand Prairie and Terry Trueblood Recreation Area
- **Field Sparrow** – observed at Peninsula Park and Sand Prairie

Implementing the recommendations in this Natural Areas Plan is expected to significantly improve the City's natural habitats, and in turn attract and support more of the region's Species of Greatest Conservation Need. Increases in Species of Greatest Conservation Need over time will indicate that restoration and management efforts are succeeding.

4.6 Rare Natural Features

4.6.1 Federally-Tracked Natural Features

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website is used to identify federally-tracked species within a project area. A query of IPaC (USFWS 2017a) indicated the following

federally-listed species may potentially be affected by activities within Iowa City (Table 5). The complete IPaC report is provided in Appendix E.

In short, AES did not detect any of the listed plants in appropriate habitat of City-owned natural areas. The freshwater mussel species is found in the Iowa River which the City has little influence over due to the large upstream watershed. Only the bumblebee and two bats may occur, as the City has appropriate habitat for all three and is in their range. As AES did not conduct specialized surveys to document insects and bats, or any other wildlife, their presence is not confirmed in City-owned natural areas.

Table 5. Federally-Listed Species Potentially Affected by Activities in Iowa City, Iowa.

Common & Scientific Name	Federal Status & Recovery Plan Status	Habitat	Presence in Iowa City	Potential for Positive Effect by Iowa City's Actions
Rusty patched bumble bee (<i>Bombus affinis</i>)	Endangered (Plan not started)	Grasslands with flowering plants from April through October; for nesting sites, underground and abandoned rodent cavities or clumps of grasses above ground; undisturbed soil for hibernating queens to overwinter.	Possibly present in prairies, but survey has not been done; reportedly observed at City Hall plantings, but no specimens collected	After a survey to confirm presence, floral resource-rich habitat could be expanded
Indiana bat (<i>Myotis sodalis</i>)	Threatened (Draft plan being revised)	Small stream corridors with well developed riparian woods; upland forests (foraging); hibernates in caves and mines ("hibernacula")	Possibly roosting and foraging in floodplain forests of Ralston Creek and other small rivers; a survey has not been done; hibernacula not known to occur in city	After a survey to confirm presence, roosting and foraging habitat could be improved in quality and expanded
Northern long-eared bat (<i>Myotis septentrionalis</i>)	Threatened (Plan not started)	Roosts and forages in upland forests and woods; hibernates in caves and mines, and autumn swarming occurs in surrounding wooded areas.	Possibly roosting and foraging in the larger forests of the city, but a survey has not been done; hibernacula not known to occur in city	After a survey to confirm presence, roosting and foraging habitat could be improved in quality and expanded
Prairie bush-clover (<i>Lespedeza leptostachya</i>)	Threatened (Final plan complete)	Dry to mesic prairies with gravelly soil	Not detected in natural resource inventory of City lands	None
Eastern prairie fringed orchid (<i>Platanthera leucophaea</i>)	Threatened (Final plan complete)	Mesic to wet prairies	Not detected in natural resource inventory of City lands	None
Western prairie fringed orchid (<i>Platanthera praeclara</i>)	Threatened (Final plan complete)	Wet prairies and sedge meadows	Not detected in natural resource inventory of City lands	None
Higgins eye pearly mussel (<i>Lampsilis higginsii</i>)	Endangered (Final plan being revised)	In bottom sediment of big rivers: Iowa, Mississippi, Wapsipinicon	Only potential in Iowa City is in the Iowa River	None

Rusty patched bumble bee. This recently-listed federally-endangered insect historically occupied grasslands and tallgrass prairies. It has been identified as having two "High Potential Zones" as well as a larger "Primary Dispersal Zone" within Johnson County; the southern High Potential Zone is located in Iowa City. Therefore, for Endangered Species Act (ESA) review purposes, it should be assumed that this species is present in Iowa City.

Rusty patched bumble bees' habitat requirements include mesic to dry-mesic prairie used for food (nectar and pollen from flowers), nesting sites (underground and abandoned rodent cavities or clumps of grasses above ground), and overwintering sites for queens (undisturbed soil).

Impacts and threats to rusty patched bumble bees are:

- Habitat loss and degradation, e.g. loss of native prairie
- Intensive farming and associated loss of crop diversity, hedgerows, and pastures
- Disease and pesticides
- Climate change, which can increase disease and loss of habitat elements at a critical time

Indiana bat. The Indiana bat is a federally-endangered species. Johnson County (including Iowa City) is near the northwest edge of the range of Indiana bat (USFWS 2015); its presence in Iowa City is unknown. The Iowa DNR's Indiana bat guidelines (Iowa DNR, no date) defines suitable summer habitat for Indiana bat as having the following conditions met within a certain distance of a location:

1. Forest cover of 10 percent or greater within one-half mile
2. Permanent water within one-half mile
3. Roost trees ranked as moderate or high for peeling or loose bark within one mile

Some City parks and natural areas meet criteria 1 and 2 and likely contain trees that meet criteria 3. The Indiana bat has shown a preference for lowland forests with streams, which is an ecosystem found within Iowa City. During the winter, Indiana bats hibernate in caves or, occasionally, in abandoned mines. They may travel over two hundred miles between summer and winter habitats. The presence or absence of Indiana bat in City parks or natural areas can be determined using the U.S. Fish and Wildlife Service summer survey guidance (USFWS 2016c).

Impacts and threats to Indiana bats are:

- White-nose syndrome (discussed below), a severe and immediate threat to this and other cave-hibernating bat species
- Impacts to hibernacula where they spend the winter, such as access changes, microclimate changes, and human disturbances
- Loss or degradation of summer forest habitat and roost trees
- Wind farm operations (turbines can kill bats)

U.S. Fish and Wildlife Service guidelines (USFWS 2016b) recommends that tree-cutting in suitable habitat should not occur from April 1 through September 30, with the pup-rearing season (June 1 through July 31) being critical, especially in the white-nose syndrome zone, discussed below. This federal guidance suggests that tree clearing at City parks and natural areas, even for ecological restoration, should occur from early October through March. This is the typical period for tree removal in ecological restoration projects.

White-nose Syndrome. White-nose syndrome is a fungus that kills hibernating bats in North America. It has spread rapidly across the U.S. since its discovery in New York state in 2006. It is a major concern for bat conservation because it kills all or nearly all bats using overwintering caves and other hibernacula. Iowa City is in the white-nose syndrome zone (USFWS 2017b).

Northern long-eared bat. This federally-threatened mammal is a medium-sized bat with long ears that uses forested areas for summer roosting. This bat species overwinters in caves and mines (called hibernacula) with constant temperatures, high humidity, and no air currents. This species may travel over a hundred miles between summer and winter habitat, but journeys of fifty miles are more common. Northern long-eared bat has similar summer habitat requirements as Indiana bat, but tends to use upland forests more often. This ecosystem is common in Iowa City. As of May 2016, the U.S. Fish and Wildlife Service did not have any records of Northern long-eared bat roost trees or hibernacula in Johnson County (USFWS 2016a); however, use of Iowa City parks or natural areas by Northern long-eared bat cannot be ruled out. Impacts and threats to Northern long-eared bat are the same as those listed above for Indiana bat.

Due to habitat overlap, the same restrictions on tree cutting recommended for Indiana bat apply to the Northern long-eared bat. Tree clearing should be restricted to early October through March.

Prairie bush clover. This federally-threatened prairie plant is found only in the tallgrass prairie region of four Midwestern states (Illinois, Iowa, Minnesota, and Wisconsin). Given the lack of native prairie remnants in Iowa City's natural areas, it is unlikely that this species occurs in the study area.

Eastern prairie fringed orchid. This federally-threatened orchid, known to occur in Johnson County, grows in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. However, given the lack of high quality native prairie and wetland remnants in Iowa City's natural areas, it is unlikely that this species occurs in the study area.

Western prairie fringed orchid. Similar to the Eastern prairie fringed orchid, the Western prairie fringed orchid is a federally-threatened orchid, known to occur in Johnson County. It grows in moist to wet native prairie areas. Given the lack of high quality native prairie in Iowa City's natural areas, it is unlikely that this species occurs in the study area.

Higgins eye pearlymussel. This federally-endangered bivalve is a freshwater mussel, up to 4 inches long, typically found in large rivers, including the Iowa River. Seven Iowa City parks and natural areas are adjacent to the Iowa River.

Higgins eye is endangered due to habitat loss and degradation, as well as Zebra mussel, which attaches to its shell and prevents normal feeding and behavior. Impacts and threats to Higgins eye are:

- Impoundment of rivers and subsequent changes in flow, substrates, and host fish
- Municipal, industrial, and farm runoff that degrade water quality
- Dredging and waterway traffic that produce siltation

Land alteration and management actions taken on uplands can affect the habitat of this aquatic species; therefore, City projects (including ecological restoration and management) should be conducted in a way that does not cause erosion into the river (since this can stress or kill Higgins eye pearlymussel). At the same time, the issues facing the Iowa River and affected freshwater mussels originate in the massive upstream watershed.

Other Rare Species and Habitats

In addition to federally-tracked listed species, the U.S. Fish and Wildlife Service tracks migratory bird species of particular concern and other habitats. The IPaC report identifies 24 migratory bird species of particular concern potentially found in Iowa City (see Appendix E for species listing). The IPaC report did not identify critical habitats, wildlife refuges, or fish hatcheries in Iowa City.

4.6.2 State-Tracked Natural Features

The Iowa Natural Areas Inventory tracks records of rare plant and animal species, including those that are endangered, threatened, or special concern. A query of the Iowa Natural Areas Inventory (Iowa DNR 2017b) identified the following rare natural features occur in Johnson County (number of species in parentheses):

- Mammals (2)
- Birds (4)
- Reptiles (6)
- Fish (2)
- Insects (4)
- Freshwater mussels (9)
- Plants (59)

Appendix F contains a more detailed list of these state-listed species.

Iowa City contacted the Iowa DNR and acquired digital Iowa Natural Areas Inventory data pertaining to rare natural features as well as mapped high quality natural communities within the City. The only rare natural feature records within the City are five species of freshwater mussels (located in the Iowa River) and one

cultivated specimen of smooth black-haw (*Viburnum prunifolium*). This Natural Areas Plan is focused on plant communities and not on the restoration of large river habitats; therefore, the rare animal records are not particularly applicable to this plan. Likewise, the presumably planted smooth black-haw is also not of particular conservation interest.

In addition to the uncommon wildlife species discussed in Section 4.5.1, AES ecologists identified the following listed plant species at Iowa City parks and natural areas:

- **Anise Hyssop** (*Agastache foeniculum*), Iowa endangered – observed at ESRC Biocells
- **Nodding Wild Onion** (*Allium cernuum*), Iowa threatened – observed at ESRC Biocells
- **Queen of the Prairie** (*Filipendula rubra*), Iowa threatened – observed at Fire Station 4 Biocell and Longfellow Nature Trail
- **Serviceberry** (*Amelanchier alnifolia*), Iowa special concern – observed at ESRC Biocells
- **Wild Blue Indigo** (*Baptisia australis*), Iowa special concern – observed at ESRC Biocells and Waterworks Prairie Park
- **Smooth Clustered Sedge** (*Carex aggregata*), Iowa special concern – observed at Terry Trueblood Recreation Area
- **Fringed Sedge** (*Carex crinita*), Iowa special concern – observed at 420th St Wetland
- **Common Rush** (*Juncus effusus*), Iowa special concern – observed at 420th St Wetland, Makada Wetland Mitigation, and Whispering Meadows Wetlands
- **Prairie Dock** (*Silphium terebinthinaceum*), Iowa special concern – observed at ESRC Biocells, Longfellow Nature Trail, Rohret Road Prairie, Ryerson's Woods, Sycamore Greenway, and Wetherby Park
- **Black Haw** (*Viburnum prunifolium*), Iowa special concern – observed at Benton Hill Park

High quality natural communities are a basic building block of this Natural Areas Plan. High quality natural areas (as identified by the Iowa DNR) occur in the City; two of these are in City parkland (Table 6) and others are mapped by the Iowa DNR.

Table 6. High Quality Natural Communities in City Parks (adapted from Iowa DNR data)

Site Name	Community	Protection Status	Acres
Hickory Hill Park	Woodland	Protected	191.41
Ryerson Woods	Woodland	Protected	49.22

Often, the greatest conservation gains are achieved by the protection and management of large, continuous natural areas, such as the large areas listed in Table 6 and shown in Exhibit 4. These are referred to as *core habitats*, which are important to many sensitive wildlife species, depending on the animal group. Insects, small mammals, reptiles and amphibians are more likely to find core habitat for breeding in such areas, while larger mammals and many species of sensitive birds may not. Enlarging, buffering, and connecting core habitats are other important conservation opportunities, discussed in the following section.

5 ECOLOGICAL RESTORATION AND MANAGEMENT CHALLENGES AND CONSIDERATIONS

As described above, land use changes across the City have created a number of challenges to restoring healthy, diverse natural areas. These and additional considerations that influence restoration and management planning are discussed below.

5.1 Core Habitat, Edge Effects and Connections

As mentioned in Section 4.5, generalist wildlife species (crows, starlings, raccoons, etc.) are animals that are common and can tolerate and even thrive in altered and developed lands and waters. These species are typically not a focus of conservation since their populations are usually stable or increasing. In contrast, specialist wildlife species are often rare or have declining populations due to special habitat needs. Many specialist wildlife species require large, diverse and high quality habitat blocks to sustain their numbers. These areas are called *core habitats*. Protecting and managing core habitats in the City will improve the likelihood that uncommon and declining animal species will persist, including Species of Greatest Conservation Need (discussed in Section 4.5.1).

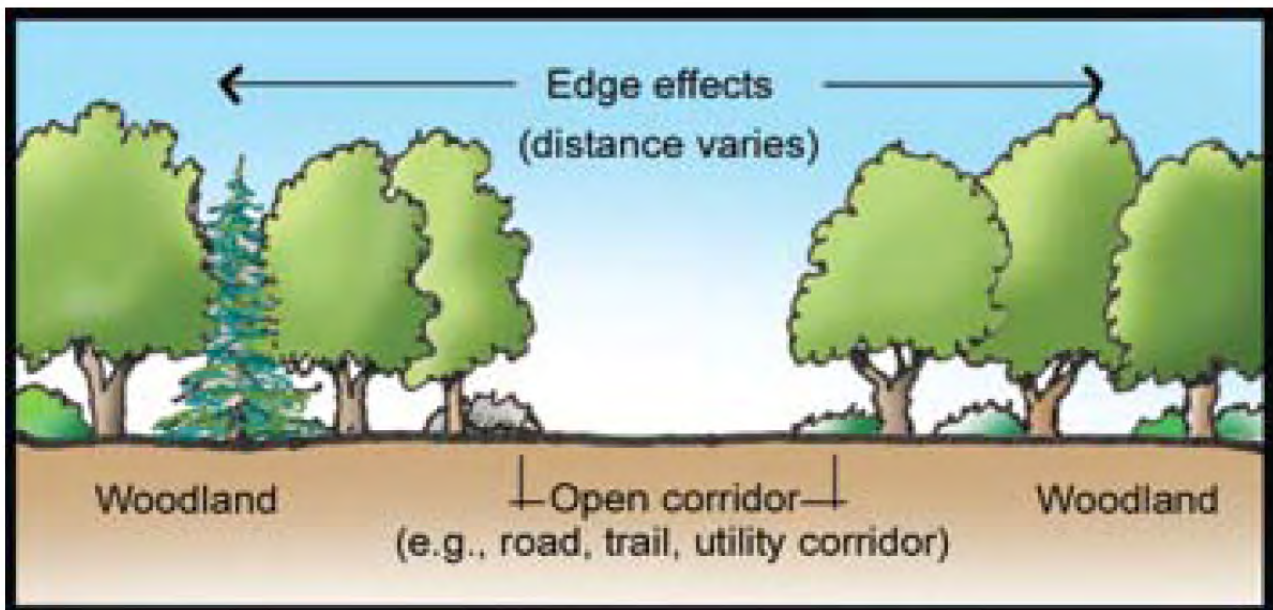
The effect of converting natural areas to cropland and residential developments, with its resulting habitat loss, has been well documented. Less obvious are long-term effects from increasing the amount of habitat edge. Smaller and narrower habitats have more edge than larger, rounder ones (Figure 3).

Figure 3. Core (interior) habitats and edge habitats (Bentrup 2008)



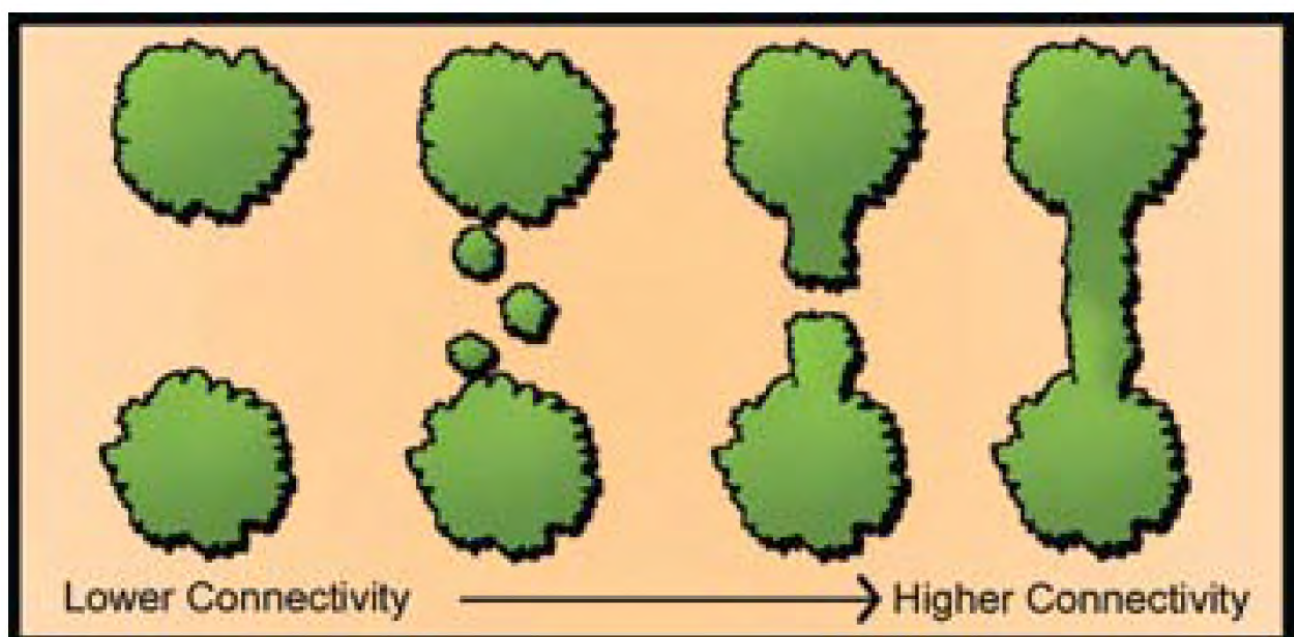
More edge and less interior habitat pose significant threats to wildlife that need core habitat. A variety of scientific papers and other sources have documented how edge effects penetrate into adjacent natural habitat. For instance, birds and other wildlife can be flushed by people walking on trails up to a distance of 150 feet away. Mid-sized predators (raccoon and feral house cats) will travel several hundred feet into forests and grasslands to prey on birds, small mammals and other wildlife. Invasive plants move from edges where they grow into interior areas. Traffic noise, warm and dry air, dust from gravel roads, pesticide drift, and many other damaging influences enter wildlife habitat from their edges (Figure 4). Management can reduce edge effects. Enlarging existing habitats, eliminating encroachments, and installing and maintaining native vegetative screens and buffers all help.

Figure 4. Edge effects from development and disturbance (Bentrup 2008).



Connecting core habitats (Figure 5) allows wildlife to retreat to different, more favorable areas, without being exposed to the hazards of travel. Generally speaking, only the largest natural areas will support the City's most sensitive vertebrate species. Some of these species require corridors of several hundred to thousands of feet in width to move among large habitat cores. It is more practical in developed and farmed landscapes to consider core habitats of 200 to 2,000 acres, with 200-foot to 2,000-foot wide corridors connecting the large cores. Larger habitat areas and connections also benefit many types of smaller animals. On the other hand, small habitat areas can sustain many invertebrate species which have small home ranges. Native vegetation can also benefit from connectivity as seed dispersal can be facilitated; however, this becomes a problem when invasive plants take advantage of these connections. Due to all of these variables, greenways (an important method of increasing connectivity) should be designed and managed thoughtfully to maximize ecological benefits and minimize adverse effects.

Figure 5. Gradients of ecological connectivity (Bentrup 2008).



The concepts of core habitats, edge effects and connectivity can be used to help conserve the City's full spectrum of biodiversity. Protecting, connecting and restoring large areas of natural vegetation to minimize fragmentation and edge effects are critical to many Species of Greatest Conservation Need in the City. Section 11.1 discusses some of the opportunities for improving natural area connectivity in Iowa City.

5.2 Pests and Diseases

Natural resources, such as forests, can also be affected by a variety of pests and diseases. Some of these occur as natural components of an ecosystem, but others have migrated into the region by accident or by intentional human transport. The main pests and diseases that may affect Iowa City's natural resources include:

- **Emerald ash borer (EAB).** First identified in Iowa City in 2016, this pest is anticipated to have a devastating effect on the many mature ash trees growing throughout the region. Removed ash trees warrant special handling to prevent spread of the borer.
- **Oak wilt.** Present in Iowa City, warranting special management of oak trees especially red oak species.
- **Gypsy moth.** Not yet detected in Iowa City, but plans should be made for special handling of cut wood and other surfaces where eggs may be found.

5.3 Climate Change Implications for the City's Natural Resources

People have seen the beginning effects of climate change in Iowa. A recent study of climate change impacts on the state (Iowa Climate Change Impacts Committee 2011) identified the following changes that may affect Iowa City's natural areas:

- A long-term upward trend in precipitation;
- An increase in extreme heavy precipitation in summer in the last 40 years, consistent with regional changes, and a shift in seasonal distribution; more precipitation now comes in the first half of the year, and less in the second half;
- A larger precipitation increase in eastern Iowa than in western Iowa;
- Increased streamflow and the potential for more frequent and greater flooding in coming years;
- Long-term winter temperatures have increased six times more than summer temperatures;
- Nighttime temperatures have increased more than daytime temperatures since 1970;
- Since 1970, daily minimum temperatures have increased in summer and winter; daily maximum temperatures have risen in winter, but declined substantially in summer;
- Humidity has risen substantially, especially in summertime;
- Higher monthly rainfall and increased transpiration from crops coupled with reduced winds have created favorable conditions for survival and spread of many unwanted pests and pathogens;
- Delayed planting and associated yield loss, especially critical in poorly drained soils;
- Increased replanting of damaged croplands;
- Increased soil erosion and water runoff;
- Increased tile drainage, leading to greater nitrate-nitrogen loss and water quality degradation;
- Increased challenges associated with manure applications that are timely, nutrient-use efficient, and environmentally benign;
- Changes in Iowa's climate will force native plants and animals, including fish and game species, to adapt or move;
- Climate change will stress interactions among animals, plants, and their environment;
- Coldwater game fish such as trout and smallmouth bass (which depend on cool groundwater and clear, sediment-free streams) could be vulnerable to rising temperatures and, with more intense rainstorms, to increased sediment from eroding fields; and

- Ducks that nest in the prairie pothole wetlands of United States and Canada may experience population declines due to future drought in the west and loss of habitat to agriculture in the east.

The Third National Climate Assessment (Pryor et al 2014) reports that, given current trends, spring and winter precipitation in the Midwest is expected to increase 10 to 20 percent over the next century, while temperature will increase approximately 3.8 to 4.9°F by 2065. Despite more rainfall, one climate model suggests that higher air temperatures may increase the frequency of drought in the Midwest over the next century. These climate projections could alter Iowa City's natural resources and require adjustments in their management.

The City's forests will likely change in composition, productivity, diseases, and pest infestations. Many current forests are dominated by oak and black cherry, species that are expected to thrive in the future climate scenario for Iowa. Ranges of species with more southerly distributions—shrubs like buttonbush, American bladdernut and eastern wahoo, and trees like Kentucky coffeetree, honey locust, swamp white oak, black oak, and chinquapin oak—may increase in abundance. On the other hand, species at the southern edge of their range, such as white pine, will diminish.

Annual forest growth is expected to increase due to increases in carbon dioxide, precipitation and temperature. However, such conditions will also tend to favor exotic weeds, pests and diseases that thrive in warmer climates. Pests such as emerald ash borer and gypsy moth, and aggressive invasive plants such as kudzu and other honeysuckles, will most likely range northward. Drought episodes may become more frequent and severe, promoting a shift from mesic and wet prairie species to those adapted to drier conditions. Planting more native prairie and savanna would be a beneficial strategy to capitalize on this trend.

Natural resource management will need to adapt to climate change in the following ways:

- Change the timing and frequency of prescribed fire and invasive plant management;
- Increase efforts to respond to greater invasive species pressure;
- Change the timing of seeding and planting;
- Consider using species and genetic plant material from more southern areas such as Missouri, Illinois, western Kansas, and southeastern Nebraska;
- Address the implications of changing community and species ranges and composition; and
- Respond to the range of options related to persistence versus change.

Surface waters also will be affected. The City's water resources already are exposed to excessive runoff and high nutrient loading. Evidence of active erosion is evident in ravines. Precipitation trends are likely to accelerate this erosion and increase nutrient loading to lakes and rivers. This, in combination with warmer water temperatures, can stimulate potentially toxic blue-green algae blooms. Shoreline erosion around larger lakes and ponds may increase due to the greater frequency and severity of large storms and droughts. Erosion can lead to sedimentation and reduction in lake storage volume, which may already be occurring in some of the City's shallow lakes. Sediment can also bury or damage aquatic vegetation and gravel stream beds that are important in the life cycle of many fish and macroinvertebrates.

Water management strategies that can compensate for climate change are:

- Design stormwater best practices to reduce the erosive effect of intense precipitation events
- Reduce runoff volume by spreading many strategies across the landscape (e.g., cisterns, rain barrels, rain gardens, bioswales, infiltration basins)
- Infiltrate as much clean runoff as possible to recharge aquifers
- Increase shading of stormwater basins and cold-water streams
- Plan holistically at the watershed level. This could include developing watershed plans for the City's larger creeks, working cooperatively with upstream municipalities to find dispersed, cost-effective, and when possible, naturalized solutions to better manage existing and future projected runoff.

This Natural Areas Plan will help provide supporting data for Iowa City's ongoing Climate Action and Adaptation Plan.

6 REVIEW OF CITY POLICIES, ORDINANCES AND STAR GOALS

This section presents two approaches to assess the City's success in protecting, restoring and managing natural resources and the environment. The STAR Community Rating System is run by the U.S. Green Building Council (see <http://www.starcommunities.org>), with a focus on sustainability of all aspects of a city. The Codes and Ordinance Worksheet is provided by the Center for Watershed Protection (CWP; see <https://owl.cwp.org/mdocs-posts/codes-ordinance-worksheet>) and is designed to highlight areas where changes in urban design and operations will improve water resources and natural lands. In 2016 Iowa City was certified as a 4-Star Community, but is taking steps to become a 5-Star Community. The City is doing the Center for Watershed Protection Codes and Ordinance Worksheet for the first time here; scores are usually low for first-time communities, but always improve over time once issues are identified and addressed. Both programs indicate that City policies and ordinances can be revised to further improve natural resources and the environment. See Section 16 for recommendations.

6.1 STAR Community Rating System

In 2016 Iowa City assessed its performance in several areas that characterize a vibrant, healthy, and sustainable community. The results, published in a Certification Results Report (STAR 2016) earned the City four out of five stars. The City performed weakly, however, in the Natural Systems category, chiefly due to a poor showing in the area of Biodiversity and Invasive Species (NS-2) and Natural Resource Protection (NS-3). Although better in the category of Water in the Environment (NS-5), the City could do more. The STAR rating system gives the following guidance to improve performance in these categories.

- **Biodiversity and Invasive Species (NS-2).** Adopt a robust, comprehensive invasive species plan, educate residents about the importance of using native plants, and adopt a native plant ordinance. (Biodiversity outcomes were added to this category after the City did its STAR assessment.)
- **Natural Resource Protection (NS-3).** Submit data on preservation targets for natural areas and wetlands, and submit data on making connections among and restoring natural areas.
- **Water in the Environment (NS-5).** Develop and adopt a watershed management plan to improve the health of the City's water bodies. The City failed to meet STAR standards for biological and chemical integrity of the City's water bodies. (This is typical of most Midwestern communities.)

STAR revised its requirements in 2016 (Version 2.0 at <http://www.starcommunities.org/get-started/download>). This Natural Areas Plan gathered data that can help the City address these deficits in the STAR assessment, discussed in Section 16 of this report.

6.2 Center for Watershed Protection Codes and Ordinance Worksheet

The Center for Watershed Protection Codes and Ordinance Worksheet (CWP 1998a) was developed by a widely respected research organization dedicated to improving our nation's waters and natural resources. Completion of the worksheet (Appendix G) gave Iowa City a score of 62 out of 100. While a low score, it is usual for cities to score low when first completing the worksheet. It is a learning tool to identify where changes in policies and ordinances will have the greatest effect on water and natural resources. As cities learn how to protect natural resources and green infrastructure, policies and ordinances change and scores improve. This is no different than trying to improve economic performance of a business by implementing better work processes and watching for improvement in the bottom line. Iowa City is trying to improve the overall health of ecosystems and the environment by implementing better natural resource and water management practices, as indicated by its Center for Watershed Protection score.

The Center for Watershed Protection Worksheet assesses development practices in:

- Residential Streets & Parking Lots,
- Lot Development, and
- Conservation of Natural Areas.

Residential streets and parking lots, with their accelerated and polluting runoff, strongly influence water quality and the health of aquatic ecosystems. Certain ways of platting lots in a development can be less environmentally damaging than others. Conservation or open space design is a development style that preserves open space; is efficient with lot shapes, lot sizes, sidewalks, and driveways; and provides for good management of open space. Lastly, conserving natural areas means not damaging water bodies, soils or important trees, and not consuming a disproportionate amount of land.

Points are awarded in each category for various criteria. The scoring can be adjusted. For example, Iowa City follows the federal guidelines for Americans with Disabilities Act (ADA) trail width, which is five feet. The Center for Watershed Protection guidance suggests trails should be four feet wide. The City was given full credit here because a federal law takes precedence over Center for Watershed Protection's criterion. In two cases, AES documented where a City score should be higher due to circumstances outside its control (Appendix G). On a 100 point scale, a score of 60 to 80 suggests ordinance revisions are advisable. In Section 16, AES suggests policy recommendations to increase the Center for Watershed Protection Worksheet score. Improving the worksheet score will also improve the STAR rating.

7 SUMMARY OF FINDINGS

7.1 Vegetation

- Woodlands and forests are important plant communities in the City's natural areas. The highest quality City-owned forest is Ryerson's Woods, and the largest City-owned forest is Hickory Hill.
- While prairie used to be the dominant plant community throughout the region, this habitat is now rare. City-owned prairie remnants (historical prairies, as opposed to prairie restorations) are limited to Sand Prairie. The City's larger prairie restorations include Oxeye Prairie (at Iowa City Kickers Soccer Park), Waterworks Prairie Park, and two large patches of prairie restored at Hickory Hill Park.
- Wetlands exist in many of Iowa City's natural areas, but generally don't occupy a significant portion of the City.
- Invasive plants harm the City's plant communities and wildlife by displacing native plants in groundcover, reducing pollinator nectar and pollen, reducing fruit and seed foods, preventing native tree regeneration in forest, and contributing to soil erosion on slopes.
- Lack of regular disturbance (e.g., fire) over several decades has significantly reduced the area of former prairie and savanna.
- Turf, roads, parking areas, and buildings have reduced the size of contiguous natural areas, shrinking wildlife habitat.
- Opportunities exist to increase the size and improve the quality of plant communities through restoration and management (e.g., removal of invasive plant species and establishment of diverse native vegetation) as well as providing ecological buffering and improved connectivity.
- No federally-listed plants were identified during AES's field assessment. Ten state-listed plants (endangered, threatened, or special concern) were observed (Section 4.6.2 and Appendices B and C).

7.2 Wildlife

- The most abundant species in the City's natural areas appear to be generalists.
- City natural areas support, or have the potential with restoration to support, core habitat for a broad range of forest, woodland, savanna, prairie, and wetland wildlife.
- No federally-listed animals were identified during AES's field assessment. One state-listed animal (ornate box turtle, threatened) and three additional Species of Greatest Conservation Need species were observed (dickcissel, Eastern meadowlark, and field sparrow).

7.3 Water and Hydrology

- The Iowa River flows through the center of Iowa City and abuts several of the City's natural areas. Likewise, many City parks are adjacent to tributaries such as Ralston Creek, Snyder Creek, and Willow Creek.
- Several large water bodies exist within the City's natural areas, including the lake at Terry Trueblood Recreation Area, ponds at Waterworks Prairie Park, and open water portions of Sycamore Greenway.
- Land use changes in Iowa River's large watershed (e.g., agricultural practices) have reduced water quality and caused bank erosion. At a more local scale, concentrated runoff from roads, parking, roofs, and turf is causing mild to severe erosion in tributary streams, affecting many of the City's natural areas.
- Water quality and erosion challenges are often best addressed at a watershed scale. Given the large watershed of the Iowa River (almost entirely outside of the City limits), the City has the greatest opportunity to improve watershed and stream conditions in the City's tributary streams.

8 ECOSYSTEM MODEL FOR RESTORATION AND MANAGEMENT

8.1 What is an Ecosystem Model and Why is it Useful?

Ecosystem models are useful planning tools, which consider past conditions, influences over time, projected future conditions, and the implications for ecological restoration and management. Elements of an ecosystem model include plant species composition and structure, associated wildlife, natural disturbance regimes, plant successional pathways, responses to human use, and predicted future conditions given different restoration and management activities as well as environmental changes, such as increasing temperature and rainfall. Most of these conditions are represented by, or reflective of, the site's plant communities.

Without regular disturbances, plant communities lose species and become less resilient (i.e., less able to change as environmental conditions change). Conserving biodiversity depends on retaining plant species and thus making plant communities more resilient. By restoring native ecosystems and establishing a sustainable management regime (including disturbances such as prescribed fire), program goals can be achieved.

Wildlife species also respond to plant community biodiversity, persisting or disappearing as plant communities change. Numbers of pollinators, for example, rise and fall with the amount of flowering that happens. Where few plants flower from April through October, few pollinators find sufficient nectar and pollen to sustain populations. Even with disturbances that sustain them, ecosystems can change if overwhelming change happens, such as the loss of species due to a northward shift in species ranges (e.g., see Chen et al. 2011). On the other hand, when new plants migrate into a plant community that is losing species, resilience may be improved. Fortunately, Iowa City's parks and natural areas contain a variety of plant communities, which may allow plant species to move within and between parks, instead of depending on migration from more distant natural areas.

The ecosystem model developed for Iowa City considers the distant past, conditions in the recent past and current time, and predicted future scenarios considering disturbance regimes and other factors that influence the city's plants and animals. This informs the general restoration approach and the long-term management needed to replace natural disturbances that formerly maintained the biodiversity of city natural areas, stabilized the soils and slopes, and allowed for plants and animals to gradually change as the environment changed—ensuring resilience despite future changes.

8.2 Conditions of the Distant Past (before the early 1800s)

Iowa City is located in a historically fire-influenced region. While lightning can start natural wildfires, fires were often ignited intentionally by Native Americans to clear woodlands and brush, open up land for cultivation, create habitat for game species and berry- and nut-producing plants, and clear sight-lines for self-defense and security. These fires are documented to have occurred annually to every few years in the region's larger open landscapes (Stewart 2002 and Pyne 1982). The extensive fires often reached and ignited most of the dry south- and west-facing slopes. Plant species requiring moderate to full sunlight (e.g., prairies and savannas) inhabited the ecosystems that burned frequently. Areas in the City that were moister, such as ravines and north- and east-facing slopes, were less prone to burning. Steep topography and water bodies also protected areas from fire. These moist and protected areas were characterized by woodlands and forests of nearly continuous tree canopies.

The early settlers of European descent, arriving in eastern Iowa in the early 1800s, came into a landscape inhabited and modified by indigenous peoples for thousands of years. Those original indigenous inhabitants, integrated into the workings of the ecosystems, continually modified their environment by deliberately using fire, building dwellings, tending cropland, and transporting from distant locations plants for food, medicine, and ceremonies. In short, the indigenous people were an active force in shaping what we today term original, native, historical, or pre-settlement vegetation.



Frederic Remington's painting, "The Grass Fire" (1908).

A landscape's vegetation pattern at any moment is dictated by its geomorphology, the greater landscape context, and disturbance, both human (farming, tree-cutting, grazing, construction) and natural (wildfire, windthrow, wildlife grazing). The type and depth of bedrock, the aridity or moisture of soils, and a site's topography also come into play. Vegetation is profoundly influenced by topography, the steepness and aspect of slopes (aspect is the direction a slope faces).

Iowa City lies in an area of weathered glacial drift, deposited over 130,000 years ago. Erosion over the centuries has resulted in a rolling to hilly landscape with ravines and dendritic stream systems. Before 1800, extensive prairies covered the majority of the southern two-thirds of the city; the northern portion of the County and the Iowa River valley contained oak barrens, a sparsely treed grassy and brushy landscape (Exhibit 5). Depending on the frequency and timing of fires over many years, some prairies would have scattered trees and brush; today such areas would be called savanna. In frequently burned areas bur and other oaks would continuously sprout from roots, known to the white settlers as "oak grubs," and if fire did not return for a decade or more, rapid colonizers such as red cedar, pin cherry, and choke cherry would establish. On slopes facing south, west and southwest, drier conditions often allowed the long-term persistence of grassy plant communities termed bluff or goat prairies. Woodlands and forest areas would have occupied slopes facing north to east, protected from intense fires by steep topography and moister conditions. Exhibit 5 shows that a large "field" formerly existed in the southern portion of the City, in the Iowa River floodplain. In addition, the original land surveyors identified a few small patches of "grove" and "thicket", a small pond in the northwest portion of the City, and a large tract of "timber" extending beyond the northwest corner of the City.

8.3 Recent Historical and Present Conditions (early 1800s to 2017)

Since the early 1800s, European settlement and fire suppression eliminated the critical disturbance of regular burning. By the late 1800s, forests in many City parks and natural areas had increased dramatically with an equal decrease in prairie and savanna. Tillable prairies were immediately converted to crops and others on steeper slopes became pastures. Prairie that was not cropped or grazed was colonized by early successional trees and shrubs, such as red cedar, cherries, hackberry, sumac, and dogwood. Prairies with oak grubs and shrubs grew, over 20-30 years, to oak woodland and forest, which lacked a prairie groundcover because of the dense shade. If livestock were allowed to graze, many prairie plants persisted among the trees and shrubs. Overall, however, the landscape was transformed to a forest-dominated ecosystem with sun-requiring prairie and savanna plants retreating to the driest or regularly—though not severely—disturbed places. The 1930s aerial photograph of Iowa City (Exhibit 6) shows more open tree canopies and clearings than are evident today.

Other changes in Iowa City's natural areas include the establishment and spread of invasive shrubs, especially Asian honeysuckles and buckthorn. Brought by horticulturalists and gardeners as hedgerow and decorative shrubs, these fire-intolerant species have invaded the City's forests and woodlands, competed with native shrubs and saplings, inhibited oak regeneration, and extirpated many ground layer species by casting dense

shade. Other aggressive plants have also invaded City natural areas, changing species composition, structure, and ecological functions. Exhibit 7 illustrates the City's existing conditions.

8.4 Anticipated Future Conditions (2050 Without and With Intervention)

In developing this Natural Areas Plan, Iowa City made a commitment to better understand and more proactively restore and maintain its natural areas. Exploring likely outcomes using two possible scenarios—with and without intervention—the City will better understand the importance of strategic investments in natural resources.

8.4.1 Without Intervention

Without ecological restoration and management in the City's natural areas, and assuming current climate trends continue, the following changes would be expected over the coming decades.

- Invasive and shade-tolerant woody plants will increase in dominance in all plant communities in both the tree canopy and understory, reducing overall plant species diversity through shading and root competition.
- Sensitive & specialist wildlife species will decrease.
- Forests may be less suitable for migratory passerine birds.
- Erosion will worsen given sparse groundcover in many of the City's forests and trends of increasing precipitation, resulting in greater damages to natural areas and nearby infrastructure.
- If future climate predictions are realized, the City will experience more droughts, possibly encouraging drought-resistant plants, especially on dry, southerly to westerly exposures. These would be species of prairies and savannas – both native and invasive species.

8.4.2 With Intervention

- Species diversity will be higher than today in all plant communities.
- Nectar and pollen resources will be more abundant than today due to the provision of continuous blooming from April to October, providing nectar and pollen during the entire growing season.
- Sensitive and specialist wildlife species will find more acres of habitat.
- Migratory habitat for passerine birds will be of high quality.
- Erosion and associated infrastructure damages will be reduced, and therefore more affordable, despite precipitation trends.
- Plant communities will be more open in canopy and understory, especially if predicted drought patterns occur.

Restoration Potential

Fortunately, many of the City's natural areas contain plant communities that already possess a significant native element. This considerably reduces the effort required to restore and manage these habitats. Rather than beginning a restoration with turf or cropland, most restoration of City natural areas will involve "enhancement". Existing plant communities are typically enhanced through removal of invasive vegetation, followed by seeding and planting to increase biodiversity, stabilize soils, and facilitate sustainable management.

9 ECOLOGICAL RESTORATION AND MANAGEMENT IN IOWA CITY

9.1 Proposed Native Plant Communities

Proposed native plant communities are those largely self-sustaining ecological combinations of species that are expected to develop at a site as a result of implementing ecological restoration and management activities. Given the current condition of City natural areas, we recommend that the majority of these plant communities be enhanced, and only limited areas undergo conversion to a truly new vegetation community.

For example, existing Dry-Mesic Forest/Woodland will remain as such, but would be enhanced by removal of invasive species, selective thinning of aggressive native trees and shrubs, and with limited plantings to diversify the canopy, understory, and ground layer vegetation and improve wildlife habitat (including for pollinators). Complete replacement of vegetation could occur in select areas of parks, where turf grass could be replaced by native, short-statured, prairie and savanna grasses and wildflowers. Where native vegetation abuts pavement, a mowed strip should be retained to separate it from the pavement and to prevent vegetation from over-hanging the pavement. Site-specific management briefs (Appendix B) present recommended enhancements to native plant communities for each natural area.

Section 10 discusses the restoration and management tasks needed to establish healthier native plant communities in the City's natural areas. If possible, native plant materials used in ecological restorations should have a source-origin within 200 miles of the project area, and only native, wild-type species should be used, not cultivars and horticultural varieties. Substitutions for specified seed and plant materials may be necessary in response to availability and pricing of native plant materials. Every effort should be made to substitute unavailable species with those that match the ecological purpose of unavailable species. Appendix H provides recommended native live plant and seed lists for the City's natural areas.

9.2 Species-Specific Goals

The STAR program encourages the protection of federal threatened and endangered species as well as the eradication or control of harmful invasive species. These goals are described in Section 16.1.1.

10 RESTORATION AND MANAGEMENT TASKS

10.1 Remove Invasive Woody Vegetation

Many native plant communities can be enhanced by removing invasive woody vegetation. First and foremost, this should entail removal of invasive woody species such as non-native honeysuckle and Siberian elm. Selectively thinning dense or aggressive native woody species in the understory may also be warranted, depending on restoration goals. Removing invasive and aggressive woody vegetation opens opportunities to plant native trees and shrubs, which increase the variety of food and material for wildlife. If limited resources require that some areas are treated first, invasive vegetation management should focus on the highest quality areas or areas with the rarest nature features; this is because early invasions are more easily controlled than dense infestations. Removal of invasive woody vegetation typically includes the following tasks.

- Where present, cut and stump-treat with a contact herbicide all invasive non-native woody vegetation. If limited resources require a less expensive method, basal bark application of herbicide can be used and shrubs and trees left standing.
- Conduct selective thinning of remaining aggressive woody vegetation (e.g., box elder) in the understory. Typically, forest canopy should be maintained to reduce subsequent invasion and growth of non-native honeysuckle, but thinning the understory and occasional canopy gaps will allow filtered sunlight to reach the ground and promote native plant and pollinator-habitat diversity.
- Woody plant clearing should be done when the ground is frozen to minimize soil disturbance. Remove large cut trees from forests where removals are dense. In less densely cut areas, trim branches so the trunk lies near the ground surface to promote decay and provide habitat.
- Cut material can be stacked and burned in City-approved locations, transported off-site for biomass-to-energy burning, used as firewood, or used in bioengineering projects. Care should be taken to not spread invasive plant propagules (e.g., honeysuckle berries) during removal. Handling and transport of cut wood should follow all state and federal recommendations to minimize the potential transfer of pests such as Emerald Ash Borer, Gypsy Moth, etc.
- Retain and protect existing desirable native woody and herbaceous vegetation; this may require avoiding the use of forestry mowers and other general removal machinery. Steep slopes may prevent the use of mechanized woody plant removal.
- Treat invasive woody vegetation seedlings and re-sprouts with foliar herbicide in the growing season following cutting, preferably late in the summer or early fall (to avoid collateral damage to native vegetation).

10.2 Control Invasive Herbaceous Vegetation

- Use a combination of spot herbiciding, spot mowing, and/or prescribed burning to remove and control invasive herbaceous vegetation. Prescribed burning for long-term management is discussed below under Section 10.6.
- Retain and protect existing desirable native woody and herbaceous vegetation by appropriate timing, chemical selection, application method, and prescribed burning methods. Selective herbicides, either broad-leaved or grass-specific depending on circumstances, may be appropriate to minimize collateral damage to desirable plants.
- A minimum of two (and possibly three) herbicide treatments will be required to control established perennial weeds.
- As these invasive plants have created a seedbank which could produce seedlings for several years, increasing the coverage of competing native vegetation is the most effective way in the long term to reduce invasive plant germination.

10.3 Install Herbaceous Vegetation

- Following initial removal of invasive species, and if the native seedbank does not respond sufficiently in variety or coverage, seed with local ecotype native plants. Sample native live plant and seed lists for different plant communities are provided in Appendix H; however, site-specific factors should be considered to refine seed lists and/or live plant lists. In many instances, at a minimum a native grassy cover crop is recommended to create competition with invasive seedlings to give the existing native plants time to expand. Areas can later be overseeded with other forb species to increase diversity and habitat quality. In addition, volunteers can collect native seed and hand sow them in sparse or low diversity areas. Over time, as the ground layer develops, it will help stabilize soils, prevent new invasion by invasive and weedy plants, and restore the site's ecological composition, structure, and function.
- Seeding is less expensive than installing ("plugging") live plant plugs, but seeding requires more time for establishment. Enhancement plugging can be conducted in select areas if additional species diversity is desired.

10.4 Install Woody Vegetation

- Install ecologically appropriate and local ecotype native trees and shrubs. Appendix H provides species lists for native tree and shrub species appropriate for Iowa City parks and natural areas. Protection from deer browsing may be necessary. Native woody plantings can help stabilize and diversify forests, woodlands, and savannas, provide vegetative screening for sensitive wildlife, and initiate a trajectory towards a more natural structure and healthier ecological community.
- Direct seeding (e.g., acorns) may be effective in certain areas, but most woody plantings should be bare root or saplings.
- Often it is best to not install woody vegetation in the first year or two of restoration and management (see Appendix B, Management Briefs for individual site guidance). Native trees and shrubs can be added after invasive management is completed, if this is needed to create the desired habitat or establish vegetative screening.

10.5 Ecological Monitoring

Monitor natural areas response to restoration/enhancement activities so management activities are adjusted accordingly. Monitoring the restoration and management activities at the site will help define the best management schedule and techniques. Monitoring can range from more rapid/simple assessments to more quantitative surveys with detailed reporting. Monitoring costs presented in the management briefs assume an annual walkabout to inspect work, with a brief annual report.

10.6 Prescribed Burning

Prescribed burning is an important and cost-effective ecological restoration and management tool – and one that is appropriate for more than just prairie. Many of Iowa City's natural areas are fire-dependent ecosystems – savanna, woodland, wet meadow – and these areas are most cost-effectively managed with well planned and executed prescribed burns.

Prairies should typically be burned approximately every three years. Varying burn units and burn seasons will help maintain the natural heterogeneity of the landscape – patches of light and shade, areas free of brush, and other microhabitats. The City's Dry-Mesic Forest/Woodland is also a fire-dependent system. Many of these wooded areas have abundant oak leaf litter that will carry a low-intensity surface fire, generally only two to three feet in height. These surface fires help remove excess leaf litter and organic duff, control invasive plants not adapted to fire, and stimulate the growth of a multi-functional assemblage of native plants. All together this creates high quality wildlife habitat for pollinators, reptiles, amphibians, and birds to name a few groups that benefit. The City's Dry-Mesic Forest/Woodland should be burned every two to four years, depending on the vegetation and wildlife response to restoration and management. A longer rotation may be possible after the initial restoration work is done. Even the City's Mesic Forest would benefit from infrequent low-intensity surface fires; however, burning these areas is more challenging due to steep slopes and less important in the short-term because the denser shade here helps to exclude invasive plants.

Prior to any burning, the City should secure the necessary permissions, issue community notifications, and take appropriate precautions to protect desired vegetation and infrastructure. Due to fixed costs associated with burn coordination, site preparation, and execution, small burns are more expensive on a per-acre basis. Fixed costs include mowing burn unit breaks, other burn preparation work, and mobilization of a burn crew.

10.7 Convert Turf to Native Vegetation

Some of the City park turf areas may be converted to native prairie or savanna groundlayer vegetation. This conversion of herbaceous vegetation from turf grass to prairie/savanna grasses, sedges, and wildflowers will entail multiple herbicide treatments to kill the existing turf grasses prior to installation of native seed.

- Use broadcast herbicide to kill existing lawn and other undesired vegetation. A minimum of two (and likely three) herbicide treatments will be required to control the turf species and achieve performance standards.
- Retain and protect existing desirable vegetation, especially the mature native trees, such as oaks.
- Once turf species are removed satisfactorily, seed with local ecotype native seed. Appendix H provides sample native seed lists.
- Seeding is less expensive than installing live plant plugs, but seeding requires more time for establishment, and some prairie and savanna species are slow to develop. Therefore some species are best installed as live plants. If additional species diversity is desired, enhancement plugging can be conducted in select areas, such as along roads and paths, and near buildings, signage, and other park amenities.

While opportunities exist at many parks and natural areas for turf to native groundlayer conversion, the management briefs (Appendix B) do not detail specific conversion locations, acreages and costs. Unit costs provided in Table 9 can be used for estimating the price of these conversions at the level of individual sites.

10.8 Streambank and Ravine Stabilization

While streambank and ravine erosion are often seen as localized features, they usually are the result of larger issues upstream or upslope. Impervious cover (roads, parking lots, rooftops, etc.) as well as certain land uses such as lawns (often with compacted soil) and agricultural fields (often containing drain tiles and ditches) can result in rapid runoff. The volume of water, and the rate at which it flows, can cause downcutting of streambeds, bank erosion, and development of head cuts in ravines. For this reason, it is often most effective and sustainable to use a watershed approach to address such erosion problems. While some erosion issues may warrant prompt and localized attention (such as when infrastructure is imminently threatened), stream and ravine stabilization projects can be very costly and may “push the problem downstream” such that erosion is increased elsewhere.

A considerable length of ravines, streams, and rivers flow through Iowa City’s parks and natural areas. Streambank stability assessments were conducted by others for the majority of the City’s creeks, including portions of Ralston, Snyder, and Willow Creeks. Some of these findings are illustrated in the site-specific management brief figures (Appendix B). AES recommends that the City look at their flowing water resources, particularly those they have the most control over, such as smaller creeks, and complete watershed plans to identify the source of these erosion problems and develop holistic, sustainable, multi-functional solutions to alleviate future erosion. Stormwater best practices that can help address erosion follow.

- Runoff source reduction, which restrains, stores, re-uses, and infiltrates runoff; this can be accomplished by techniques such as rain barrels, cisterns, rain gardens, and bioswales.
- Break up connected impervious surfaces to allow runoff to infiltrate and be filtered; rooftop downspouts can be redirected to lawns, for example, rather than to driveways which drain directly to street gutters and inlets.
- Create stormwater treatment trains, consisting of sequences of best practices; for example, bioswales to vegetated infiltration basins, to created wetlands; at each step of the train different pollutants are removed and quantities of water managed.

- Provide naturalized stormwater storage facilities, such as stormwater wetlands and ponds; other flood-compatible open space can be designed for temporary runoff storage (e.g., out of play portions of golf courses).
- In conjunction with storage areas above, provide rate control to reduce peak flow rates; impervious cover and agricultural drainage increases the frequency of water level rises in streams, a major source of streambank erosion.
- Protect or restore floodplains to allow flood storage and to slow flow rates; both measures can reduce downstream flooding.

Management briefs provide general information on streambank stability at each site; however, stabilization designs and costs are not addressed.

11 OPPORTUNITIES FOR IMPROVED CONNECTIVITY

11.1 Potential Natural Area Connections

Iowa City's parks and natural areas represent the City's best and most protected natural habitat. A natural area is land and water that exists in a natural condition, with human use largely limited to foot traffic. Natural areas vary greatly in size, the type of vegetation they contain, and the connections to other natural areas—connections that let species to persist over time. Exhibit 8 illustrates clusters of and potential connections between the City's parks and natural areas. Site-specific management briefs (Appendix B) list opportunities for connecting each site to nearby natural areas.

Some of the City's larger natural areas (e.g., Hickory Hill Park, Waterworks Prairie Park, Peninsula Park, and Terry Trueblood Recreation Area) already represent large mosaics of natural habitats. Exhibit 8 shows four additional "Natural Area Complexes," consisting of natural areas in close proximity to one another. Improved connectivity between natural areas can benefit native plants and wildlife, and can complement local and regional trails and greenways enjoyed by people. Connections should be designed to minimize the spread of invasive species (e.g., weed seeds are often dispersed along trail corridors). These connections could be improved over time through partnerships, easements, and fee-title acquisition.

11.2 Potential Waterway Connections

Waterways often represent opportunities for connecting natural areas. Waterways, together with their associated, wider floodplain, represent linear aquatic and riparian habitats, and often flow between larger patches of upland natural habitats. Iowa City is fortunate to have numerous watercourses, including many parks and natural areas along them. Exhibit 8 shows several "Waterway Connections," which connect City parks along the Iowa River, Ralston Creek, Willow Creek, and Snyder Creek. The connections between these natural areas could be enhanced through a variety of strategies, including but not limited to:

- Daylighting creeks - taking piped sections of flowing water and restoring them to surface flowing waters
- Establishment, enhancement, and/or widening of riparian corridors
- Developing ecologically-sensitive trails along waterways to create multi-functional greenways that benefit regional stormwater management, recreational opportunities, and habitat travel corridors.

As with the natural area connections discussed above, waterway connections should be designed to minimize the spread of invasive species; enhanced watercourse connections could facilitate the spread of aquatic invasive species, including plants and animals.

12 MONITORING, ADAPTIVE MANAGEMENT AND TRAINING

12.1 Ecological Monitoring and Adaptive Management

Monitoring of vegetation, wildlife, and areas prone to erosion provides information to evaluate and justify proposed changes to the restoration and enhancement program, including implementation of stormwater best practices. As discussed previously, this “adaptive management” sets in motion a cycle of evaluation, adjustment, and refinement to make maintenance activities most effective. It is important that adaptive management begins when restoration and enhancement projects begin. It requires upfront planning and baseline data collection. Monitoring should be simple and relatively easy to implement, although plant or animal identification skills are usually required. Ecological monitoring provides an objective measurement of project-specific performance standards. It feeds data into the adaptive management plan for the site. Monitoring and reporting should be done more frequently at the onset of project implementation, after which frequency can be reduced over time to an intermittent level.

12.2 Specialized Training

Regarding implementation of field restoration and management activities, specialized training, oversight, and guidance often involves licensing or certification where required by local, state, or federal law. Personnel involved in ecological restoration and management, especially prescribed burning, herbicide application, brush control, seed collection, erosion control, and ecological monitoring should receive training commensurate with the activity in which they would be involved. Training is especially important for those activities that may have risk and safety implications to people, property, and sensitive cultural resources.

While useful data can be collected by amateurs, ecological monitoring protocols often require a moderate level of expertise to implement accurately and consistently. Implementing monitoring programs may require expertise in plant and wildlife identification, as well as a working understanding of erosion processes and potential solutions. The City may wish to partner with the University of Iowa, other educational institutions, state agencies, the Johnson County Conservation District, Iowa Ornithologists Union, or other partners to assist with monitoring and reporting. Consulting ecologists can also be used to provide these services.

13 USE OF VOLUNTEERS FOR MONITORING OR MANAGEMENT

Many benefits can arise from engaging volunteers in a City's natural resources management program.

- The public learns about natural resources, increasing their awareness and appreciation of natural areas and the natural world
- Valuable data can be collected for baseline and trend monitoring
- Cost-savings to the City through volunteer labor and in-kind match for grants
- Building community

Volunteer efforts may involve physical labor (e.g., planting trees, removing invasive species) or monitoring/research (e.g., field observations, data collection, and data analysis). Many volunteer activities require oversight by trained volunteers, City staff, or outside experts. Volunteer monitoring/research advances knowledge and builds public support for natural resource programs. One form of citizen engagement that has benefitted many communities is organizing and conducting a "bioblitz." A bioblitz is a 24-hour period when volunteers, supported by experts, document all living species in a given area (e.g., a park). Bioblitzes help gather baseline data on plants and animals, while letting people discover the natural world around them. It also gives participants an opportunity to participate in scientific research. Bioblitzes also bolster more systematic monitoring of vegetation, water and wildlife resources.

Volunteers can assist in a variety of tasks, and with additional training and oversight they can accomplish even more. Some volunteer tasks may be one-time events, and other tasks may be repeated over time by dedicated volunteer stewards. Table 7 summarizes natural resource management tasks for which volunteers can provide assistance.

Table 7. Use of Volunteers for Different Management Tasks.

Management Task	Volunteer Role		
	Generally Appropriate	Appropriate with Training & Oversight	Generally Not Appropriate
Native seed collection & sowing	X		
Installation of live trees, shrubs, herbaceous plugs	X		
Hand-pulling invasive plants	X		
Dragging buckthorn/brush	X		
Cutting buckthorn/brush		X	
Simple ecological monitoring		X	
Management mowing		X	
Herbicide application			X
Prescribed burning			X
Slope stabilization			X
Construction of water projects and best practices			X
Technical ecological monitoring			X

Although assistance by volunteers has no direct cost, the staff time for organizing, training, equipping, and supervising volunteer events is a cost, as are materials (e.g., tools, safety equipment, food and beverage). Thoughtfully planned and executed volunteer programs will help reach the desired audience of potential volunteers, engage them in safe and productive work, and have them return to volunteer with the City again.

14 RESTORATION AND MANAGEMENT PRIORITIZATION, PHASING AND COSTS

14.1 City-wide Restoration and Management Priorities and Costs

There are many ways to approach prioritization of natural areas management. Priorities can be based on sites of great interest, such as high-use parks or high-value natural areas. They can focus on plant communities, such as addressing forests before grasslands, or target the worst invasive species threats, such as Amur honeysuckle. Working closely with Iowa City staff, priorities for executing management tasks are in the following order:

1. Manage areas where natural resource investments have already been made by the City;
2. Address early invasions of the highest quality natural areas;
3. Expand invasives management to moderate quality natural areas; and
4. Restore and enhance remaining natural areas, first attending to “Go Wild” parks, then other non-park natural areas.

Planning and implementing ecological restoration and management requires an understanding of cost. Through discussions with the City, it was decided that the following scenario be explored: a budget of approximately \$100,000/year for 10 years, which assumes the City contributes approximately \$75,000/year and the remaining \$25,000/year is acquired through grants or other sources. We also assumed a 2 percent annual rate of inflation.

Appendix I summarizes the outcome of the above City-wide prioritization and funding scenario, including a preliminary schedule and opinions of probable cost for initial restoration and perpetual management through 2027. As indicated in the appendix, using the \$100,000/year budget, restoration and management efforts can only begin in a portion of the City’s top priority natural areas during the coming decade. However, because 20 of the sites are about three acres or smaller, it is feasible that City staff, interns, and volunteers could address those areas, making progress on additional sites in the short-term.

Many assumptions are embedded in the opinions of probable cost presented in Appendix I. These costs should therefore be viewed as preliminary estimates. Costs presented represent those if private, specialized ecological contractors and consultants performed the restoration and enhancement work. Volunteers, partnerships with other organizations, donation of materials, and use of City staff time can reduce these costs. Regardless of the implementation approach, close supervision of all steps (including material acquisition, installation, and management) is prudent to ensure work is done properly and restoration and enhancement goals are achieved. Changes in approach, the response of plant communities, funding cycles, partnership goals, volunteer involvement, and emerging opportunities may justify modification of scope and schedule. As always, adaptive management should be used to provide the best, most cost-effective results.

14.2 Site-scale Restoration, Management Units, Phasing and Costs

As mentioned previously, a site-specific management brief for each of the 42 sites is included in Appendix B. Each management brief includes initial restoration and management recommendations and an associated opinion of probable cost. At an individual site scale, ecological restoration and management is often conducted in a given area or “management unit.” Small sites may be treated as a single management unit, but larger sites are often subdivided to facilitate implementation of restoration/management tasks in areas with similar management needs and proposed uses. Management units are also used to phase projects over time, often necessitated by annual budgets, or to provide refuges for invertebrates during and after prescribed fires. Management units often consist of a single plant community type (like forest), but they may contain a variety of plant communities. Management unit boundaries are typically delineated along existing roads/trails, plant community edges, or topographic breaks. Management units have not been defined for the City’s 42 parks and natural areas identified in this report, but many of the smaller parks and natural areas could be managed easily as a single unit. Defining management units in larger natural areas would be done when more detailed site-specific natural resource management plans are completed.

Restoration and short-term management tasks generally include site preparation, brushing and thinning (in wooded communities), weed control, native seeding and planting, and ecological monitoring and reporting. For illustration purposes, Table 8 shows a typical restoration and short-term management program for the initial three-year establishment of a given restoration project. However, restoration within a particular management unit will require a more detailed scope and will often follow a slightly different schedule.

Table 8. Generalized Restoration and Management for a Given Project Area

Task	Description/Subtask	Year 1				Year 2				Year 3			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Site Preparation (all zones)	Broadcast herbicide, till, spot herbicide, and/or mow												
Brushing & Thinning (upland zones)	Cut & stump treat invasive woody plants												
	Remove or selectively thin aggressive native woody plants												
Weed Control (all zones)	Optional prescribed burn (prep burn either late Summer, Fall or Spring)												
	Spot herbicide and/or spot mow												
	Foliar herbicide non-native woody re-growth												
Seeding & Planting (all zones, where weed control adequate; if weed control achieved sooner, plantings can be installed sooner)	Install native seed												
	Install live woody plants when dormant												
	Install live herbaceous plants												
Ecological Monitoring & Reporting (all zones)	Assess/document site, and prepare year-end summary report												

While there are many variables that can significantly influence unit costs (e.g., size of area being addressed, existing site conditions, slopes), Table 9 generalized costs for professionally contracted work are provided for early planning purposes. Some of these costs also relate to perpetual management tasks, discussed below.

Table 9. Generalized Ecological Restoration & Management Unit Costs

Task	Unit	Unit Cost Range
Brushing (cut and stump treat)	acre	\$1,500-\$3,500
Foliar spray young woody brush	acre	\$200-400
Broadcast herbicide	acre/trip	\$175-300
Spot herbicide	acre/trip	\$200-400
Mowing	acre/trip	\$150-350
Prescribed burn (min. 3 ac)	acre	\$300-700
Tilling	acre	\$150-350
Native seed (material only)	acre	\$200-\$1,100
Native seeding (no-till drill, labor only)	acre	\$200-500
Native seeding (hand-broadcast, labor only)	acre	\$300-600
Straw mulch (spread and crimp)	acre	\$600-900
Installed live herbaceous plant plug	each	\$3-7
Installed shrub (2-gallon pot)	each	\$25-40
Installed shrub (5-gallon pot)	each	\$45-60
Installed tree (10-gallon pot or 2" ball & burlap)	each	\$150-250, \$300-600

15 PERPETUAL MANAGEMENT

15.1 Perpetual Management Tasks

Perpetual management is essential to restoring and maintaining the composition, structure, and function of healthy native ecosystems. Perpetual management begins after initial restoration work is completed. The two primary perpetual management tasks are:

Weed Control

- Control invasive, non-native herbaceous vegetation, primarily with appropriate spot herbicide applications. Cutting of invasive woody vegetation may also be necessary in some areas. Plant communities proposed for prairie restoration may employ haying or mowing if prescribed burning is not feasible. Mowing is less effective than haying because it does not remove plant material; over time the accumulated organic matter results in nutrient enrichment, which can favor invasive plants.

Prescribed Burning

- Prescribed burning is a very cost-effective management tool for many native plant communities, including not only prairies but also wet meadows and some woodlands and forests. Generally, perpetual management burns are conducted on a rotational basis, beginning with the fall or spring following the third full year of growth after seeding. In order to mimic natural fire regimes, burns should extend across habitat gradients (e.g., burning from prairies into adjacent wetlands) when feasible.

15.2 Perpetual Management Schedule

Perpetual management tasks (Table 10) are repeated at different intervals for different plant communities to ensure that healthy restored plant communities are maintained over the long term. The following table provides general guidelines regarding the frequency of different management tasks in different plant communities.

Table 10. Perpetual Management Schedule

Plant Community	Task Frequency (once every X years)			
	Prescribed Burning	Weed Control (Spot Herbicide)	Remedial Seeding/ Planting	Detailed Monitoring & Reporting
Upland Forest/Woodland	3-5	3-4	5	1
Lowland Forest/Woodland	NA	2-3	5	1
Savanna/Prairie	2-3	2-3	3-5	1
Wet Meadow	2-3	1-2	3-5	1
Marsh	2-3	2-3	3-5	1
Open Water (Pond)	NA	NA	NA	NA

NA = not applicable

Schedule assumes that prescribed burning will be employed as a restoration and management technique. If prescribed burning is not employed, haying should be used in prairie areas to remove accumulating plant material.

16 CITY POLICY AND ORDINANCE RECOMMENDATIONS

This section makes recommendations to improve Iowa City's STAR Rating and revise its policies and ordinances. The two assessment methods, STAR and the Center for Watershed Protection's Worksheet, are complementary, but each calls for somewhat different recommendations. The City's ordinances that regulate development and protect natural resources can be viewed at http://www.sterlingcodifiers.com/codebook/index.php?book_id=953.

16.1 Recommendations for Improving the STAR Rating

16.1.1 Biodiversity and Invasive Species (NS-2)

This category is intended to prevent extinctions of native species and to control invasive species that negatively affect natural communities. The City is to identify three federally threatened or endangered species and three highly invasive and problematic species to work on and achieve the three outcomes. The outcomes are specified by the STAR Rating System.

- **Outcome 1. Threatened Species.** This outcome is focused on helping federal endangered and threatened species. The U.S. Fish and Wildlife Service reports that Johnson County potentially harbors seven federally-listed species (Table 5). Of those, three may be present in the City and the City can directly affect them through its own actions: rusty patch bumble bee (*Bombus affinis*), Indiana bat (*Myotis sodalis*), Northern long-eared bat (*M. septentrionalis*).

STAR offers options to achieve each outcome. AES recommends STAR's Option A because it is straight-forward, while Option B requires a completed Species Recovery Plan, which is lacking for these species. To earn full credit under Option A, one threatened or endangered species should reach an "optimal population size" any time in the last five years. A rule of thumb in population biology is that a species with 200 interbreeding individuals (plus non-essential extras, like bachelors) has a high probability of persisting for 100 years. Also for Option A, STAR requires annual monitoring of one threatened or endangered species to detect whether its population is increasing, stable, or decreasing in the City. The City will implement option A in the following way.

1. Complete a survey of potential habitat for rusty patch bumble bee to determine if it is present and what its abundance is at locations where it occurs. The rusty patched bumble bee uses sunny, forb-rich areas, like diverse prairies and wet meadows.
2. Use a metric to record abundance, such as number of bees seen on a transect, and conduct the survey each year for five years at the optimal flight time.
3. Assess whether abundance has increased, decreased, or remained stable. Improvement in the species will come as prairie acres increase and quality improves in the City.
4. In time the City can complete a survey for the bats. The Natural Areas Plan identified the large, better quality upland forest areas in the City, which is the most likely habitat for Northern long-eared bat. This bat flies through forests gleaning and hawking insects from understory trees and shrubs. Forests along Ralston Creek and other waterways may harbor the Indiana bat, which forages for insects in forests and at forest edges in the vicinity of streams.

Outcome 2. Habitat Conservation and Connectivity. This outcome also helps threatened and endangered species. The STAR program asks that the City document in a five-year period no net loss in the acres of habitat used by one of the threatened or endangered species discussed above. Adequately restored habitat may be included in the total. Alternately, the City can increase connections among habitats. AES recommends that the City start by documenting that habitat is not being lost before beginning work on connecting habitats. The City will implement the effort in the following way.

1. The Natural Areas Plan used a 2016 baseline aerial photo to map and describe all plant communities on select City parks and natural areas. The City would identify the plant communities used by rusty patched bumblebee.

2. In 2021 obtain a new aerial photo and re-map the plant communities used by this species.
3. Compare the size of habitat for the target species in the 2016 to 2021 photos. If the habitat is stable or increasing, this outcome will be achieved.

Outcome 3. Invasive Species Management. This outcome manages invasive species in order to protect and restore the City's ecosystems. The STAR program requires that one invasive species among the three top candidates be in decline or eradicated over a 5-year period within critical areas or habitats.

The Natural Areas Plan identified the presence of 31 invasive plant species, most of which invasive plants in Johnson County. Of the invasive plants, several are widespread and pernicious in their effects on natural areas (see Table 3). The City chose Amur honeysuckle as the top invasive plant to work on, which the City already is doing. Two other species the City chose to address as part of the STAR efforts in the future are wild parsnip and Japanese hops. The City will implement this effort in the following way.

1. Use the Natural Areas Plan as the baseline to document changes in the abundance of Amur honeysuckle. The AES abundance class for Amur honeysuckle in a plant community and the quality rank of the plant community in which it grows is a metric of this plant's current status at a site.
2. As control measures are implemented, revisit those locations in five years and to re-score the plant community for the abundance of Amur honeysuckle and the quality rank. If the abundance is lower and the quality rank higher, the control effort was successful.
3. Aggregate these for all locations where Amur honeysuckle is a problem to arrive at a City-wide assessment of trends. Changes in abundance over a five-year period can be shown in a table and on a map.

STAR Local Actions for Biodiversity and Invasive Species. The STAR Rating System requires that local actions be taken for biodiversity and invasive species in the following ways:

Action 1: Plan Development

The City's Natural Areas Plan satisfies this action. Its main components are a high-level system-wide natural resources management plan, and Natural Resource Management Briefs for all 42 City properties studied. The Natural Areas Plan, when implemented, will minimize damage from invasive plants, enhance biodiversity, and improve ecosystem services in City natural areas.

Action 2: Policy and Code Adjustment

STAR policy and code adjustments for Biodiversity and Invasive Species (NS-2) are supported by the Natural Areas Plan. Recommendations for policy and code changes addressing STAR requirements are below.

Rusty patched bumble bee habitat

- Promote the protection, expansion, and improvement of forb-rich prairies and native plantings on public land.
- Encourage private efforts to protect, expand, and improve forb-rich prairies and native plantings.
- Avoid use of neonicotinoid pesticides and other chemicals known to harm bees.

Indiana bat and Northern long-eared bat protection

- Prohibit removal of potential roosting trees in potential habitat on public land.
- In new developments on private land, and on all public land, protect known roost trees and trees within 150 feet of a known roost from June 1 through July 31; this will prevent the death of mothers with young bats at the roost.

Invasive species control

- Prohibit the sale or distribution of the 31 invasive plants within the City limits; many are noxious weeds due to the harm they cause to agriculture and forestry; public safety is an issue (e.g., screening issues along paths, skin rashes from wild parsnip), and protecting the public's capital investment in natural areas, including restored areas, is good policy. Phase in the prohibition on the sale of invasive honeysuckles.

Use of native plant species

- Require the use of native plants and non-spreading horticultural plants in new developments.
- Require that projects on public lands only use natives and non-invasive horticultural plants in landscaping.
- Educate residents on the importance of native plants and the problems of invasive plants.
- Complete a comprehensive invasive species plan for the City, focusing on the three plant species discussed above.
- Specify how to track invasive plant control efforts and enforce a native plant ordinance.
- Modify the weed control ordinance to increase the height allowed in tall native plantings on individual lots to 4 feet, as long as the plantings are maintained to a standard of quality.

16.1.2 Natural Resource Protection (NS-3)

This Natural Areas Plan accomplishes the STAR program's preliminary step of identifying all natural resource areas on public lands. Those on private lands have yet to be identified.

Outcome 1. Natural Resource Areas. The STAR program targets are to have 20 acres of natural resource areas per 1,000 residents, or 11.5 percent of the City's land surface in natural resource areas. Within the 42 parks and natural areas included in this study, there are approximately 1,060 acres of natural land cover (Table 2). Given Iowa City's population of approximately 75,000 people, the goal STAR goal equates to 1,500 acres of natural resources. Given the natural areas outside of this project's study area (including forests in the northern portion of the City), it appears that Iowa City exceeds this goal.

Outcome 2. Wetlands, Streams, and Shoreline Buffers. No net loss is the goal for these natural systems. This Natural Areas Plan documented wetlands on City lands, as well as some streams. Shorelines refer to lakes in the STAR Rating System, which are not present on in the City's natural areas. As described for endangered species habitat tracking above, maps of these areas can be created from the Natural Areas Plan data, and the acres tracked over a 5-year period.

Outcome 3. Connectivity. This STAR program outcome depends on the City developing a city-wide conservation plan identifying the regional natural system network of large natural areas and connectable natural lands nearby or between them. With the majority of the City developed, these connections will primarily be along river and stream corridors and in ravines. Small natural areas can be included if they can be connected.

The Natural Areas Plan provides information on the large natural areas on City land, to which must be added those on private lands for a complete picture of the natural landscape. Exhibit 8 illustrates some of the City's natural areas and potential connections. The STAR program asks that this natural system network be increased or restored over a 5-year period from a baseline. The City will implement this outcome in the following way.

1. Complete a city-wide conservation plan, including both public and private lands.
2. Create a baseline map of the natural system network and a table of acres in the network.
3. In five years, after working on connecting the system or restoring portions of the system, obtain a current aerial photograph and re-draw the system, as described for threatened species habitat changes. Acres can be calculated and compared to 2016 data.

Outcome 4. Restoration. The STAR program used a complicated metric to determine if the amount of restored land in the City is increasing. AES recommends using Option A because it is supported by the Natural Areas Plan and slightly easier to calculate. The City will implement the outcome in the following way.

1. Tally the acres of plant communities from maps of natural areas and subtract areas that are excellent to good quality (A and B);
2. Identify and tally lands already under regular management; the STAR program may consider that a form of restoration and give the City credit for it.
3. For plant communities with a moderate or poor quality rank (C or D), use management to increase the quality rank to good-moderate (BC). These are the City's restoration targets.
4. In five years, revisit areas being managed, assign a new quality rank, and compare to the 2016 quality rank; these two ranks for all areas re-visited can be submitted to STAR as verification of Outcome 4.

STAR Local Actions for Natural Resource Protection. The STAR Rating System requires that local actions be taken for natural resource protection in the following ways:

Action 1: Plan Development

The Natural Areas Plan, with the identification and quality ranking of natural plant communities, is the foundation for a city-wide conservation plan. Natural plant communities on private lands, connections among natural areas, and protective buffers are included in a city-wide conservation plan.

Action 2: Policy and Code Adjustments

STAR policy and code adjustments for Biodiversity and Invasive Species (NS-2) are supported by the Natural Areas Plan. Recommendations for policy and code changes addressing STAR requirements are below.

- Expand the City's stream buffer ordinance to include all wetlands, streams and lake shorelines in the City.
- Include in the ordinance an update of wetlands mapping for the City.
- Under the ordinance, establish a vegetated water quality buffer, averaging 25 feet wide, around all wetlands, streams and lake shorelines.
- Review stream buffer ordinances from other municipalities for ideas on how to improve the existing City ordinance.
- To improve water quality on public lands, reduce mowing to twice a year for brush removal and invasive plant control near bodies of water.

Action 3: Partnerships and Collaboration

A Parks Commission should be designated and take on the role of an advisory board to inform land conservation and restoration activities, which is the intent of this action. Natural Areas Plan data will help the Parks Commission set priorities, determine and improve restoration and management approaches, and identify and secure resources to carry out the work.

16.2 Recommendations for Improving the Center for Watershed Protection Worksheet Score

The Center for Watershed Protection Worksheet is a tool to identify ways the City can adjust its policies and ordinances to achieve the goal of protecting natural resources and green infrastructure. In only three instances (out of many indicators), Iowa City's policies and practices do not allow for measures called for in the Center for Watershed Protection Worksheet. Over time, however, the City can implement other measures which will both improve water quality and natural resources and also increase the Center for Watershed Protection score.

16.2.1 Natural Area and Significant Tree Protection

These recommendations focus on reducing the loss of and damage to natural vegetation and large trees in the City during new development and redevelopment projects.

General Development Pattern

- Establish incentives for developers to conserve and privately manage non-regulated land,
- Give developers incentives and flexibility to meet regulatory and conservation requirements, such as:
 - Give a density bonus of extra lots for designs that protect natural areas and improve water quality,
 - Make conservation design and low-impact development (LID) applications no more difficult than conventional applications,
 - Allow developers to average buffer widths rather than requiring a fixed width everywhere;
- Incentivize and increase density in designated areas of the City,
- Support conservation design and LID communities in the City's comprehensive plan.

Lot Development

The ways that lots are designed can reduce losses to natural vegetation and significant trees. The City already allows open space design, which is a proven approach to protect natural vegetation and significant trees.

Measures to promote environmentally compatible lot development are:

- Ensure that submittal and review of open space design is no more complicated than for traditional design,
- Allow open space design by right and not solely as an overlay district,
- Establish enforceable associations to manage open space,
- Require that a minimum percentage of the developed site be managed by the developer in natural conditions, and
- Allow natural space to be protected by third parties under terms of an easement and management plan.

Conservation of Natural Areas

The City's approach to protecting natural areas could be enhanced by:

- Requiring the preservation of natural vegetation at residential sites, and
- Establishing and enforcing the limits of disturbance during construction.

Other Natural Area Protections

The City has a general requirement that wooded areas be protected in development projects, and that trees intended to be retained be protected from collision and root compaction within a tree's drip line during the construction process. Other measures to protect natural areas and significant trees are:

- Set preservation targets for natural areas and wetlands in a City-wide conservation plan,
- Identify and protect areas to buffer and connect natural areas,
- Incentivize the restoration of natural areas on public and private lands,
- Expand the existing prairie burning ordinance to allow prescribed burns in other habitats if a natural resource management plan has been written, and
- Implement a tree management ordinance that requires the protection and replacement of a proportion of the mature tree canopy removed by development.

16.2.2 Vegetation Management

These recommendations focus on existing developments and natural lands in the City and promote management of disease, pests and undesirable plants.

Removing Disease-Prone and Disease Vector Trees and Shrubs

All individuals of all species of elm and ash (*Ulmus* spp., *Fraxinus* spp.) are susceptible to early death due to fungal disease and insect pests. Young individuals of these trees generally are less susceptible, but in time often succumb. Other tree species are affected by disease and pests to a lesser extent, or the disease is not fatal to all individuals of the species. In these cases, individual stands of trees may be affected, while other stands remain healthy. This includes oak wilt and bur oak blight, each caused by a fungus, as well the butternut canker, another fungal disease. Drought, damage to the tree trunk, and compaction of the tree rooting zone can precipitate or exacerbate an infection by weakening a tree.

One should not over-react to information about tree diseases and pests. The forestry community is concerned with and diligently tracks tree diseases and pests because of potential damages to tree regeneration and production. Yet trees have co-existed with fungal diseases and insect pests for millennia in North America. Pest and fungal species such as a gypsy moth, emerald ash borer, and elm blight are another matter because native trees did not co-evolve with these introduced diseases and pests. The Iowa DNR maintains a website with up-to-date information on forest diseases and pests (<http://www.iowadnr.gov/Conservation/Forestry/Forest-Health>).

Some plant species are alternate hosts of fungal diseases affecting crops. Japanese barberry (*Berberis thunbergii*) harbors the wheat rust, which can devastate wheat crops in its vicinity. Common buckthorn is the alternate host for the oat crown rust and the alfalfa mosaic virus.

Policy and ordinance changes that could reduce these problems are:

- Establish a trapping program to detect the presence of emerald ash borer and gauge the level of infestation,
- Prohibit the planting of ash as street and park trees,
- Direct the City to diversify the species used in street tree plantings,
- Form a partnership with the Iowa DNR to create a plan to remove ash trees from public lands before the borer becomes an issue, and
- Mandate the removal of barberry and buckthorn from public lands in the vicinity of traditional wheat and oat production areas.

Controlling Invasive and Noxious Plants and Weeds

These recommendations focus on managing plants which damage natural vegetation, are declared noxious weeds in Johnson County, or are viewed as weeds in the City. The City allows well-managed prairies on private property, but has weed height restrictions. Invasive plants are addressed by the STAR program, discussed below.

Policy and ordinance changes that could address this issue are:

- Mandate control of the most invasive plants on public lands,
- Mandate control of noxious weeds on public lands, and
- Specify the percent of invasive or noxious weeds allowable in a prairie restoration in the City to qualify for an exemption under the weed height ordinance.

16.2.3 Stream and Waterway Protection

These recommendations focus on reducing the effect of impervious cover, a major cause of stream and waterway degradation, and on protecting streams with adequate buffers.

Residential Streets and Parking Lots

Reducing the extent and effects of impervious cover is the most effective way to protect streams, waterways, and other bodies of water. Center for Watershed Protection guidance suggests the City can improve by:

- Reducing the standard street width to 18 to 22 feet or less for roads with fewer than 500 average daily trips (ADT),
- Reducing the overall street length through layout efficiencies,
- Reducing turning ratios for cul-de-sacs,
- Identifying areas where vegetated swales could be used rather than curb and gutter,
- Reducing parking ratios for office buildings and making parking requirements minimum needed rather than maximum anticipated,
- Allowing shared parking arrangements and stall reductions where shared parking is allowed or mass transit is provided. A mass transit option is available with buses operated by Iowa City transit; this is an easy change to adopt and would encourage people to make alternative transportation choices,
- Requiring that more than 30 percent of spaces at large commercial parking lots be dedicated to compact cars,
- Allowing pervious materials for spillover parking areas used only during peak-use days,
- Encouraging structured parking,
- Requiring that a minimum percentage of the parking lot area be landscaped. Landscaping will both mitigate the heat island effect and allow room for best stormwater practices to be installed.

Lot Development

The City performed well in the required setbacks and frontages, but should consider reducing side setbacks to eight feet or less. The City could improve ordinances related to sidewalks, driveways, and lot drainage. The City's Complete Streets policy, Americans with Disabilities Act (ADA) compliance measures, and traditional practices do not allow for sidewalk widths of less than five feet, sidewalks on one side of a street, and sloping of sidewalks away from the street and towards front lawns, as recommended in the Center for Watershed Protection Worksheet.

- Allow non-paved trails as part of the sidewalk network,
- Reduce minimum driveway widths to nine feet for single lanes and 18 feet for two-lanes,
- Allow shared driveways and "two track" designs, and
- Modify drainage requirements to allow temporary ponding of driveway runoff on front yards or rooftops, rather than shunting it directly to the street.

Conservation of Natural Areas and Streams. In new developments there are several measures which can increase the conservation of natural areas and protection of streams. The City's existing stream buffer requirements could be expanded to increase protection of water quality and riparian habitat.

- Increase the stream buffer width to at least 75 feet,
- Require that at least part of stream buffers be maintained in native vegetation,
- Describe allowable uses for stream buffers,
- Specify enforcement and educational mechanisms,
- Require that stormwater be treated for quality before discharge to water bodies by using stormwater treatment trains and stormwater best practices, as described in the Iowa Stormwater Manual; and
- Complete a watershed management plan for each of the City's major watersheds; the City's MS4 permit now requires an element of watershed planning, but project implementation to achieve reductions in runoff volume and sediment and nutrient inputs to the City's waters will require more in-depth study of issues on a watershed by watershed basis.

17 PUBLIC OUTREACH & INTERPRETATION

Many of Iowa City's parks and natural areas provide important opportunities to capitalize on public outreach and interpretation. Several strategies can simultaneously address both of these goals. Some strategies that have been used effectively in similar cities follow.

17.1 Outreach Strategies

- **Partnerships.** The City's location and goals for its natural areas present many opportunities for partnering. Some suggestions follow.
 - University of Iowa, Coe College, other nearby colleges, and local schools (use the Park as a living laboratory, for research, and repeat monitoring)
 - Johnson County Conservation District
 - Develop a friends group for specific parks (such as the existing Friends of Hickory Hill Park)
 - Iowa Ornithologists' Union
 - Iowa Native Plant Society
 - The Xerxes Society (butterflies)
- **Bioblitz.** Many communities have collected valuable data by sponsoring a bioblitz. A bioblitz is typically a 24-hour period when professionals and volunteers document all living species within a given area, such as a public park. A bioblitz helps to gather important baseline and ongoing monitoring data on plants and animals in a specific area, while also engaging people in discovery of the natural world and scientific research in the company of experts. Holding a bioblitz at City parks (phased in over time) could be an effective way of engaging the community and collecting valuable baseline data for comparison with post-restoration data.
- **Art.** Select artists to install temporary or permanent works of art celebrating the natural and cultural history of Iowa City and its natural resources. Outdoor art (e.g., sculptures) could be installed in highly visible locations, and other art (e.g., paintings, photography) could be displayed inside more sheltered/secure City facilities.
- **Internet.** The City could expand its parks web page to include more, and regularly-updated, content (e.g., "What's blooming at Ryerson's Woods this week").

17.2 Interpretation Strategies

- Interpretive signage or interactive kiosks, addressing:
 - Regional natural history: Iowa River Valley, glacial history of the region, and watersheds;
 - History of individual parks and natural areas;
 - Cultural history: Native Americans, early white ethnic groups, agricultural communities;
 - Native ecosystems: Specifically those being restored to the site—forest, woodland, savanna, and prairie;
 - Ecological restoration and management practices;
 - Wildlife and their habitats; and
 - Naturalized stormwater treatment train.
- Tree and plant identification signs
- Raptor and other bird silhouettes and information at observation points
- Environmental day camp
- Geocaching

18 STAFFING RECOMMENDATIONS AND FUNDING OPPORTUNITIES

18.1 Staffing Recommendations

Based on Iowa City's existing natural areas and natural resources staff capacity, AES recommends one new full-time Natural Resources Specialist be hired to move this restoration and management plan forward. This individual should have training and certification in herbicide application and prescribed burning, and the ability to organize and manage volunteers. In addition to existing seasonal staff, the full-time Natural Resources Specialist should have the full use of two or more seasonal assistants from mid-May through mid-September.

Full-time staff and seasonal assistant compensation is not included in the opinions of probable cost presented in Appendix I. Those costs assume that private ecological contractors execute the work. Cost savings can be achieved by conducting work with City staff/equipment, volunteers, and partners.

18.2 Funding Opportunities

Securing financial resources – both for initial restoration efforts and perpetual management – is critical to the long-term success of any restoration plan. To augment the City's existing financial resources, the following entities or programs may provide funds to help the City implement this plan.

Iowa Department of Natural Resources

- **Resource Enhancement and Protection (REAP) – City Parks and Open Spaces.** State grant program for planning, conservation, restoration and management of natural areas. More information is available at: www.iowadnr.gov/conservation/reap/reap-grants/
- **Land & Water Conservation Fund (LWCF).** Federal program administered by the state, requiring a 1:1 match, which can be met using other grant funds, including REAP. More information is available at: <http://www.iowadnr.gov/About-DNR/Grants-Other-Funding/Land-Water-Conservation-Fund>
- **State Revolving Fund (SRF) Sponsorship Project.** State low-interest loan program with large funds available. More information is available at: <http://www.iowadnr.gov/Environmental-Protection/Water-Quality/Wastewater-Construction/State-Revolving-Fund>
- **Wildlife Diversity Program.** The Iowa DNR's Wildlife Diversity Program provides grants through its Habitat Management Grants Program and Small Grants Program. More information and grant application instructions can be found at: <http://www.iowadnr.gov/Conservation/Iowas-Wildlife/Wildlife-Diversity-Program/Wildlife-Grant-Opportunities>

National Fish and Wildlife Foundation (NFWF)

- **Five Star and Urban Waters Restoration Grant.** This partnership grant focuses on water quality issues in priority watersheds, such as erosion due to unstable streambanks, pollution from stormwater runoff, and degraded shorelines caused by development. More information is available at: <http://www.nfwf.org/fivestar/Pages/home.aspx>
- **Pulling Together Initiative.** Modest grants to help local communities effectively manage invasive vegetation. More information is available at: <http://www.nfwf.org/pti/Pages/home.aspx>
- **Monarch Butterfly Conservation Fund.** A recently initiated program to protect and increase habitat for monarch butterflies on the breeding grounds and along their migration routes, and to educate people about this incredible species. More information is available at: <http://www.nfwf.org/monarch/Pages/home.aspx>

Federal and State Agencies with Watershed-Related Grants

- **Watershed Improvement Funding Sources.** A variety of programs can help fund watershed improvement projects. Programs most applicable to Iowa City ecological restoration and management include: Iowa Watershed Protection Program, Farmable Wetland Program, Grassland Reserve Program, Wetlands Reserve Program, Targeted Watershed Grants, and Section 319 Clean Water Act. More information is available at:

<http://www.iowadnr.gov/portals/idnr/uploads/water/watershed/files/fundinglist.pdf?amp;tabid=762>

Trees Forever

- **Trees Forever Project Funding.** This Iowa-based conservation nonprofit provides several programs that assist with environmental projects. More information is available at:

<http://www.treesforever.org/fund>

Public-Private Initiatives

- **Private Recognition.** Iowa City may want to explore opportunities for private individuals or entities (e.g., corporations) to fund restoration work in exchange for recognition (e.g., naming rights, plaques).

19 CONCLUSION

Iowa City is fortunate to have over 1,500 acres of parks and natural areas, harboring several high quality, large examples of ecosystems native to central Iowa. These parks and natural areas are valuable amenities for the community, and provide important ecosystem services. On the other hand, land alteration, erosion, and colonization by invasive species have compromised the functions and value of the City's natural resources. The ecological restoration and management tasks described in this plan can reverse that situation and help achieve the City's conservation goals.

Next steps in the implementation of this management plan would be:

- Confirm the City's prioritization of projects that will be undertaken over the coming decade (Appendix I);
- Refine the details of priority projects to the extent necessary to solicit bids;
- Form a bid package development team of the City and any project partners;
- Identify a City project coordinator in charge of producing, releasing, awarding, and managing the bid and subsequent oversight of task execution by the selected contractor;
- Determine the phases of construction, including tasks to be performed by City staff, other partners, low-cost labor, and volunteers;
- Develop and release bid package(s) based on the tasks, acres, and performance standards customized for individual projects; prime vendors should be sought with demonstrable and extensive experience in ecological restoration and stormwater best practice construction;
- Award the contract(s) and oversee the work;
- After the first year of restoration work, collect subsequent monitoring data for comparison with baseline data (data to support STAR scoring should also be collected for five years);
- Conduct an annual walk-about to inspect and evaluate the restoration work;
- Write a first year restoration monitoring report at the end of 2018, and compare data to baseline data collected in 2017; the report should document all problems, propose solution, and schedule tasks for the 2019 growing season (STAR reporting occurs at the end of the fifth year); and
- Hold a celebration of progress and initial success.

This Natural Areas Inventory and Management Plan, carried out by qualified restoration specialists and evaluated annually through ecological monitoring and adaptive management, will help to ensure that the City will create and pass on to future generations healthy ecosystems and wildlife populations for the enjoyment of all and the benefit of nature. This experience with the restoration of natural areas may be helpful to move restoration of other urban green spaces ahead, including on private lands, and over time elevate all the green spaces of the City to greater ecological functionality and resilience, to the benefit of the entire community.

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Iowa City Natural Areas Inventory and Management Plan

Exhibit 1
Regional Context

 City Limits

Data Sources:
- City of Iowa City
- ESRI Basemap
- StreetMap USA

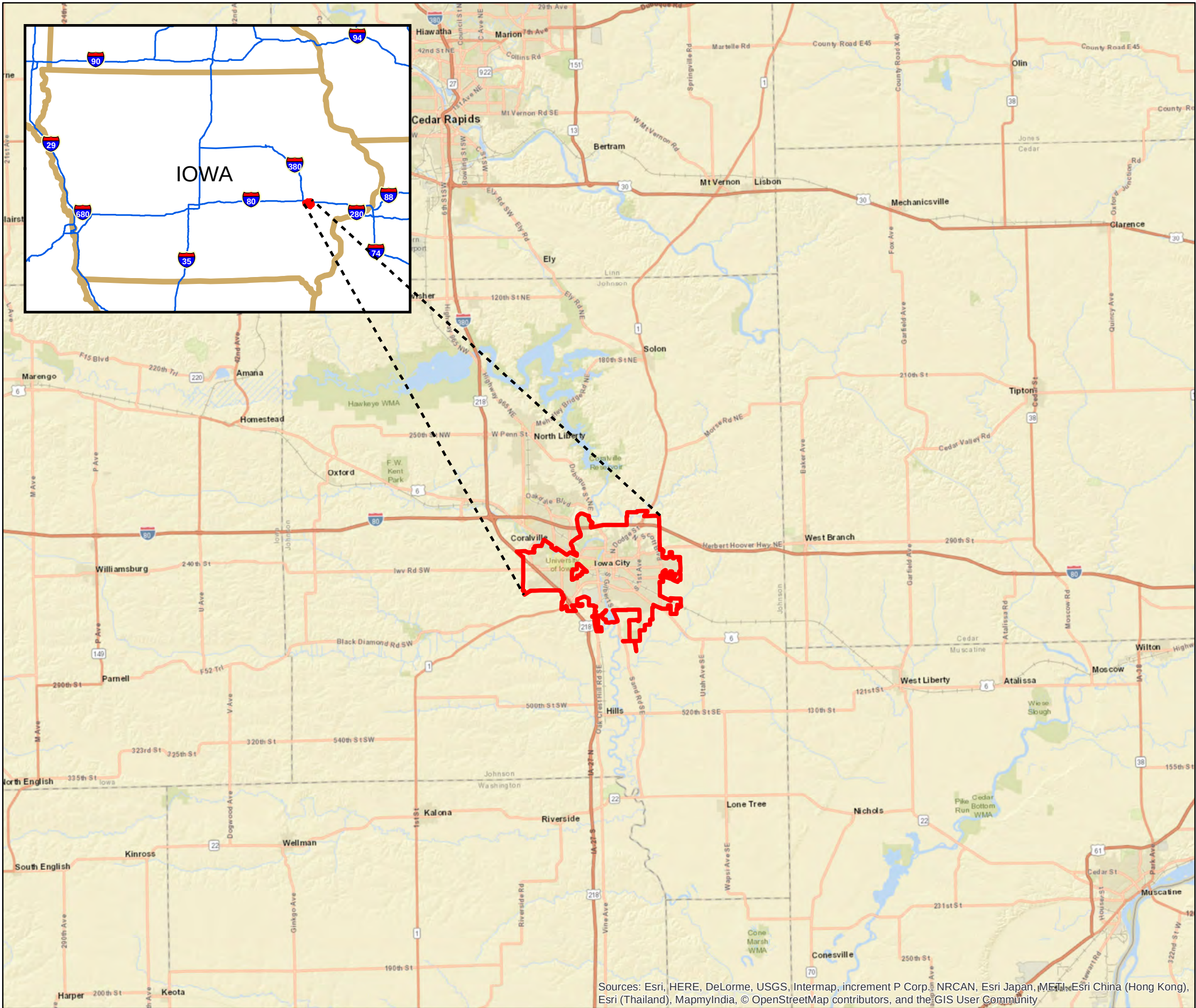
AES Project Number: 16-0777
Date: 1/3/18
File Name: 1 IA City_Reg Context_2018-01-03



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Prior Lake, MN 55372
952-447-1919
www.appliedeco.com

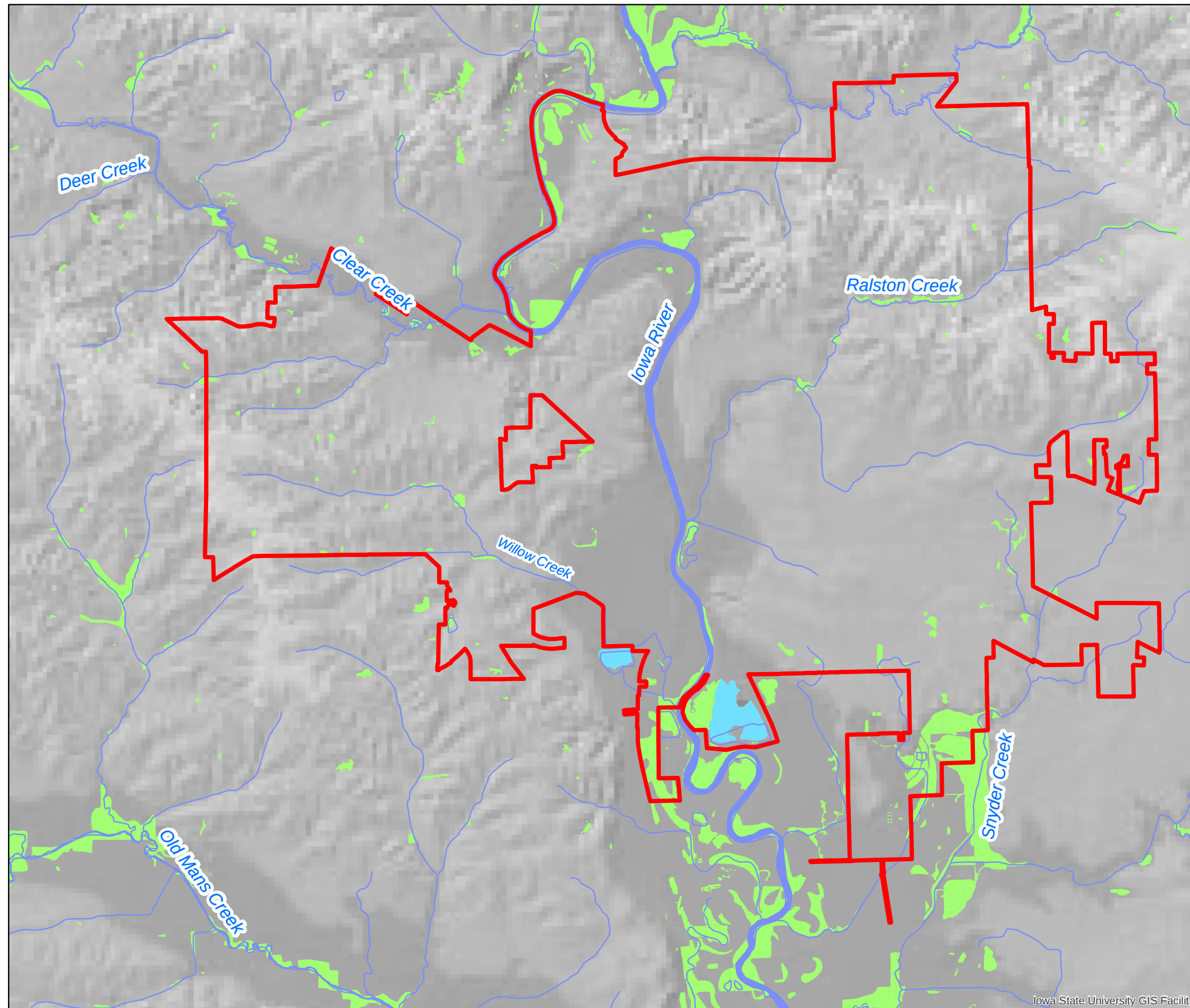


Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Iowa City Natural Areas Inventory and Management Plan

Exhibit 2 Landforms and Water Features



-  City Limits
-  Watercourse

National Wetlands Inventory (NWI)

-  Lacustrine
-  Palustrine
-  Riverine

Data Sources:
- City of Iowa City
- Johnson County
- Iowa State ImageServer

AES Project Number: 16-0777
Date: 1/3/18
File Name: 2 IA City_Landforms Water_2018-01-03



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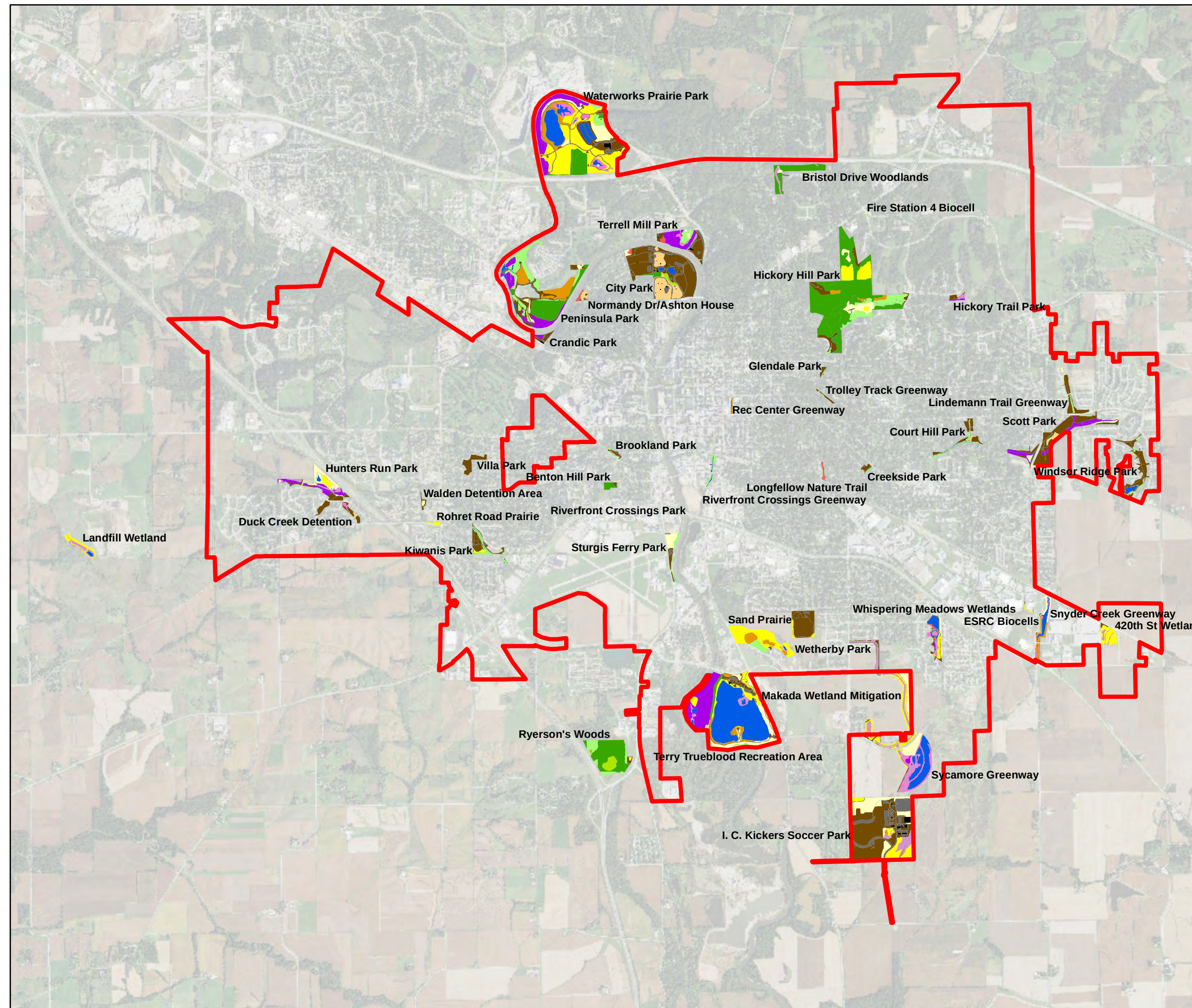
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Iowa State University GIS Facility

Iowa City Natural Areas Inventory and Management Plan

Exhibit 3 Existing Land Cover of Parks and Natural Areas



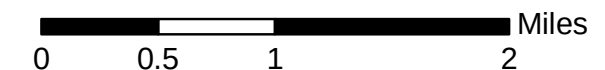
- City Limits
- Existing Land Cover**
- Dry-Mesic Forest/Woodland
- Mesic Forest
- Altered Forest/Woodland
- Savanna
- Shrub/Scrub
- Prairie
- Non-native Grassland
- Forested Lowland
- Shrub/Scrub Lowland
- Herbaceous Lowland
- Open Water
- Woodland with Turf
- Recreation Area
- Building or Structure
- Other Impervious Cover

Data Sources:
 - City of Iowa City
 - Johnson County

AES Project Number: 16-0777
 Date: 1/3/18
 File Name: 3 IA City_Existing LC_2018-01-03

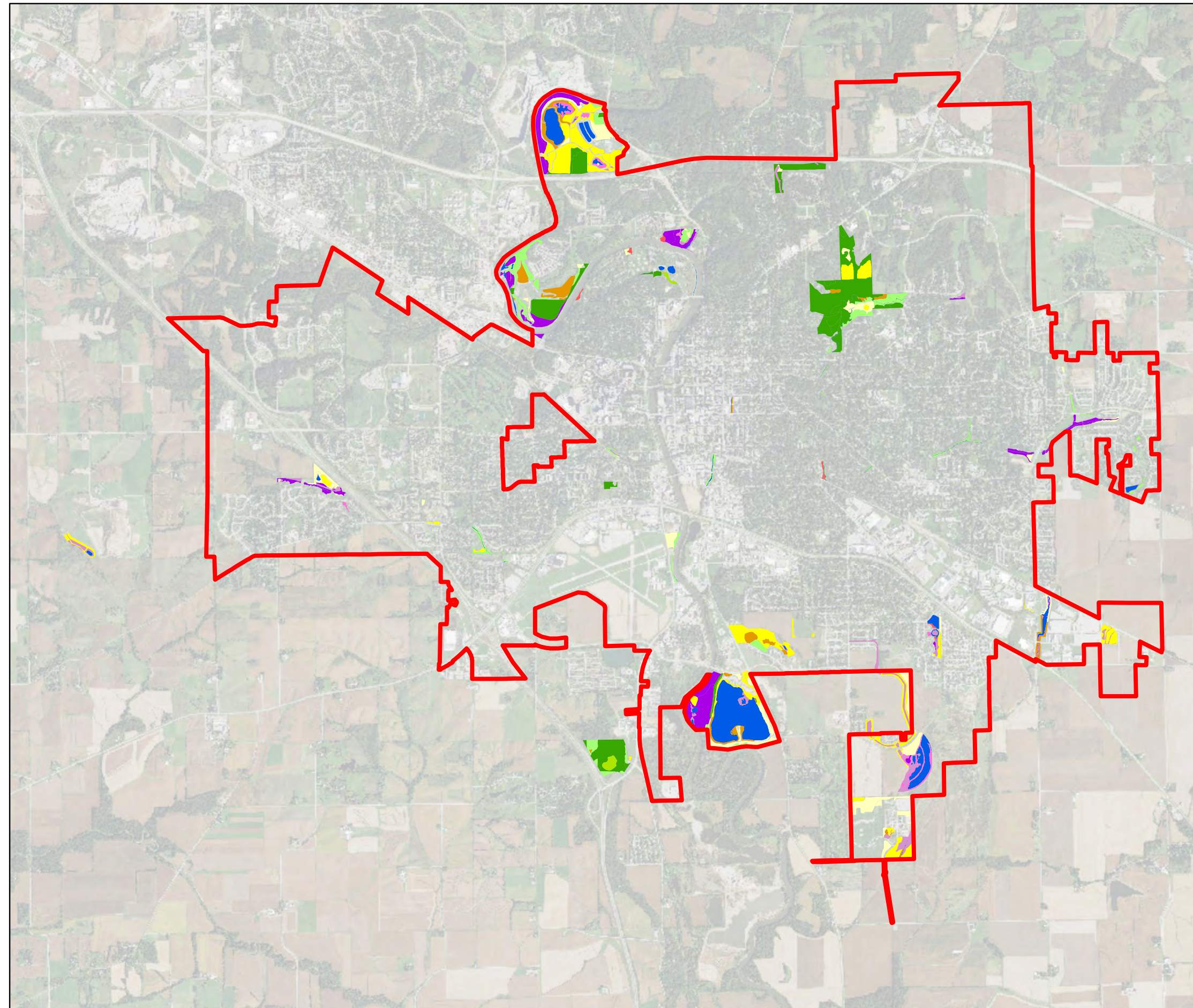


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Iowa City Natural Areas Inventory and Management Plan

Exhibit 4 City-Owned Natural Areas

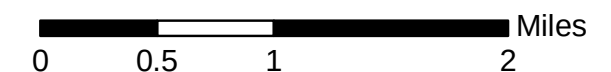


Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 1/3/18
File Name: 4 IA City_City Natural Areas_2018-01-03

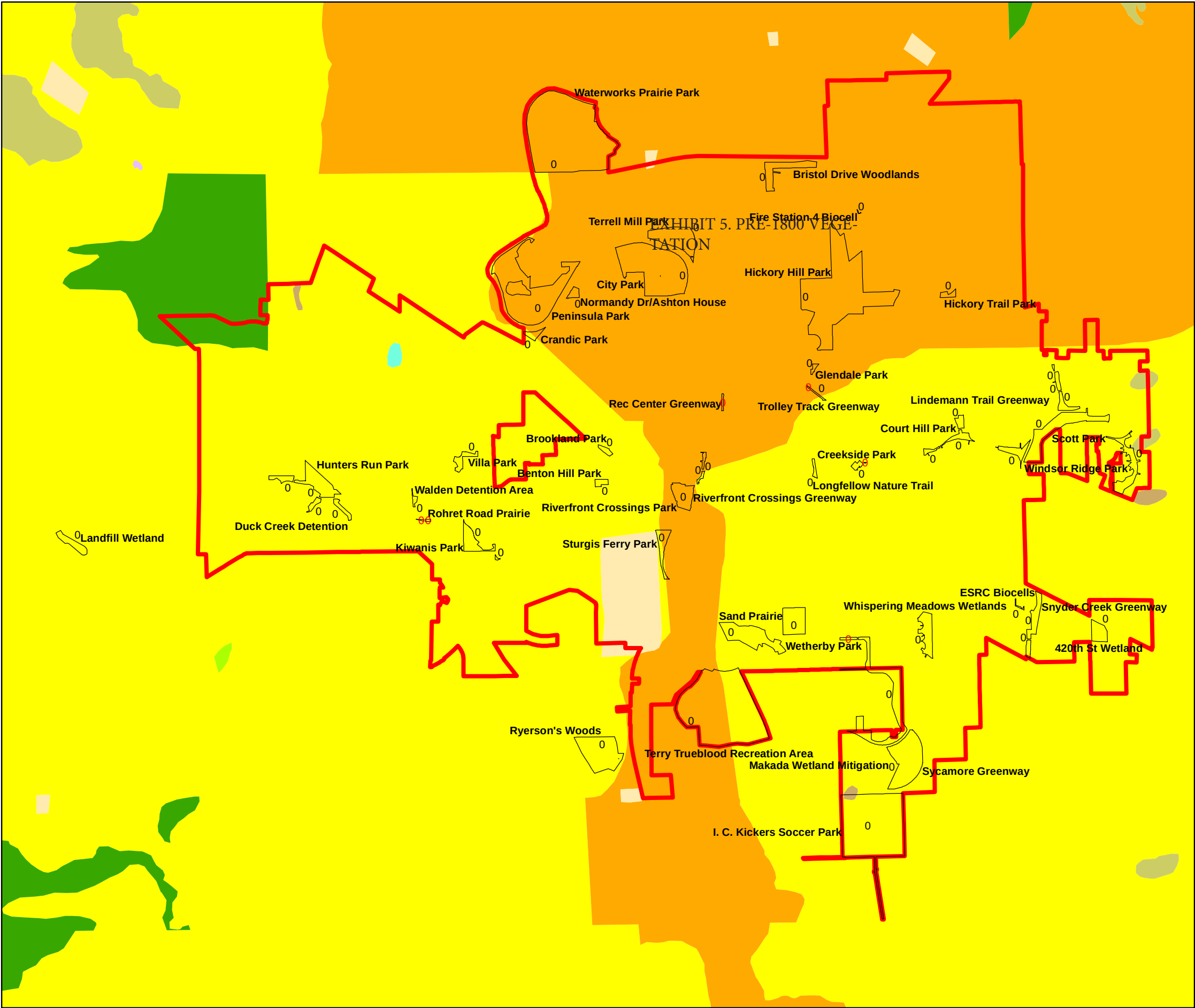


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Iowa City Natural Areas Inventory and Management Plan

Exhibit 5
Pre-1800 Vegetation



- City Limits
- Iowa City Park or Natural Area

Historical Vegetation

- Field
- Grove
- Lake
- Marsh
- Oak barrens
- Pond
- Prairie
- Ravine
- Slough
- Swale
- Thicket
- Timber
- Wetland

Data Sources:
- City of Iowa City
- Iowa DNR

AES Project Number: 16-0777
Date: 1/3/18
File Name: 5 IA City_Pre-1800 Veg_2018-01-03



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Iowa City Natural Areas Inventory and Management Plan

Exhibit 6 1930s Aerial Photograph



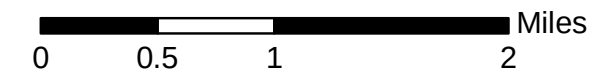
- City Limits
- Iowa City Park or Natural Area

Data Sources:
 - City of Iowa City
 - Johnson County

AES Project Number: 16-0777
 Date: 1/3/18
 File Name: 6 IA City_1930s Aerial_2018-01-03

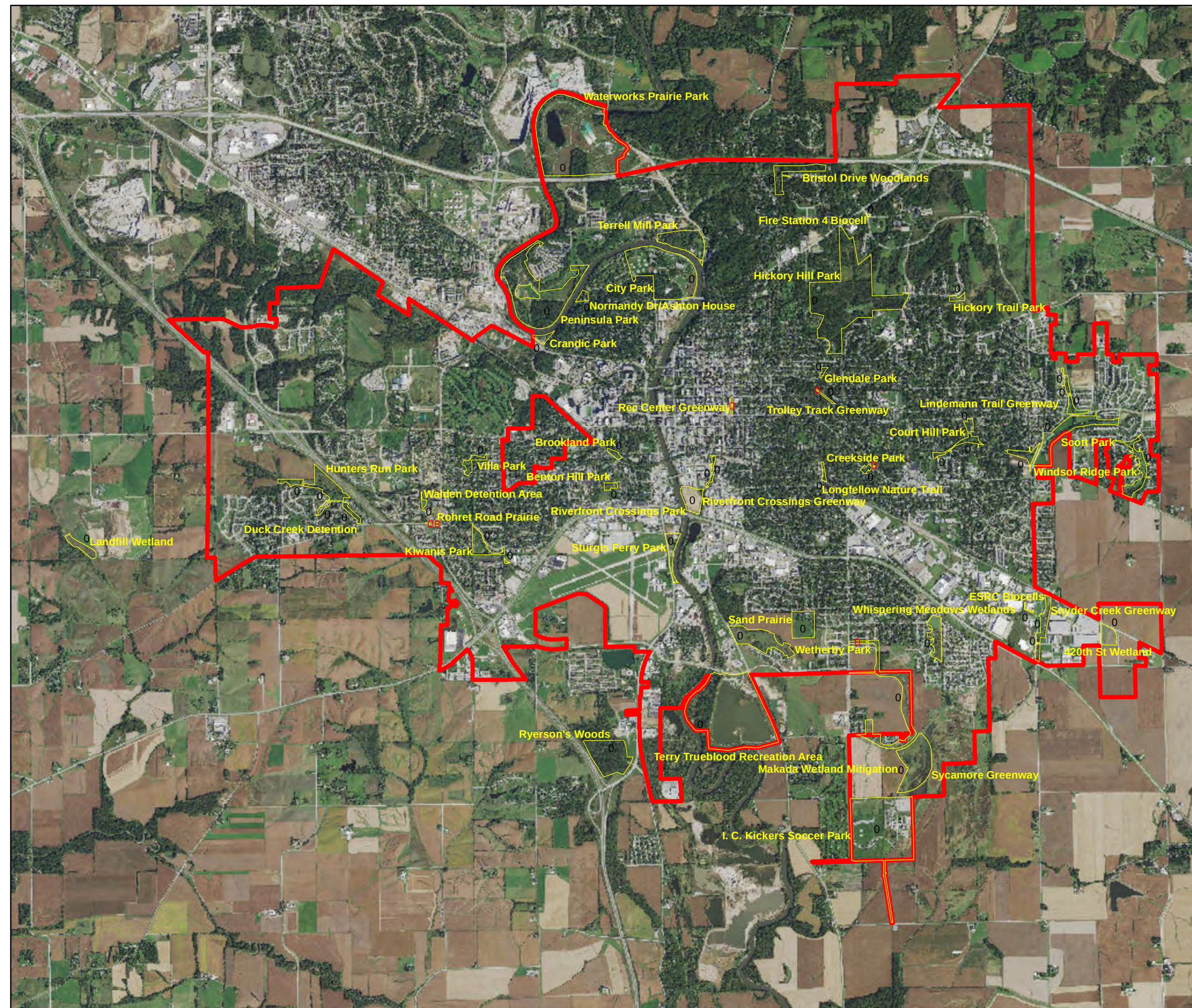


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Iowa City Natural Areas Inventory and Management Plan

Exhibit 7 2015 Aerial Photograph



- City Limits
- Iowa City Park or Natural Area

Data Sources:
 - City of Iowa City
 - Johnson County

AES Project Number: 16-0777
 Date: 1/3/18
 File Name: 7 IA City_2015 Aerial_2018-01-03

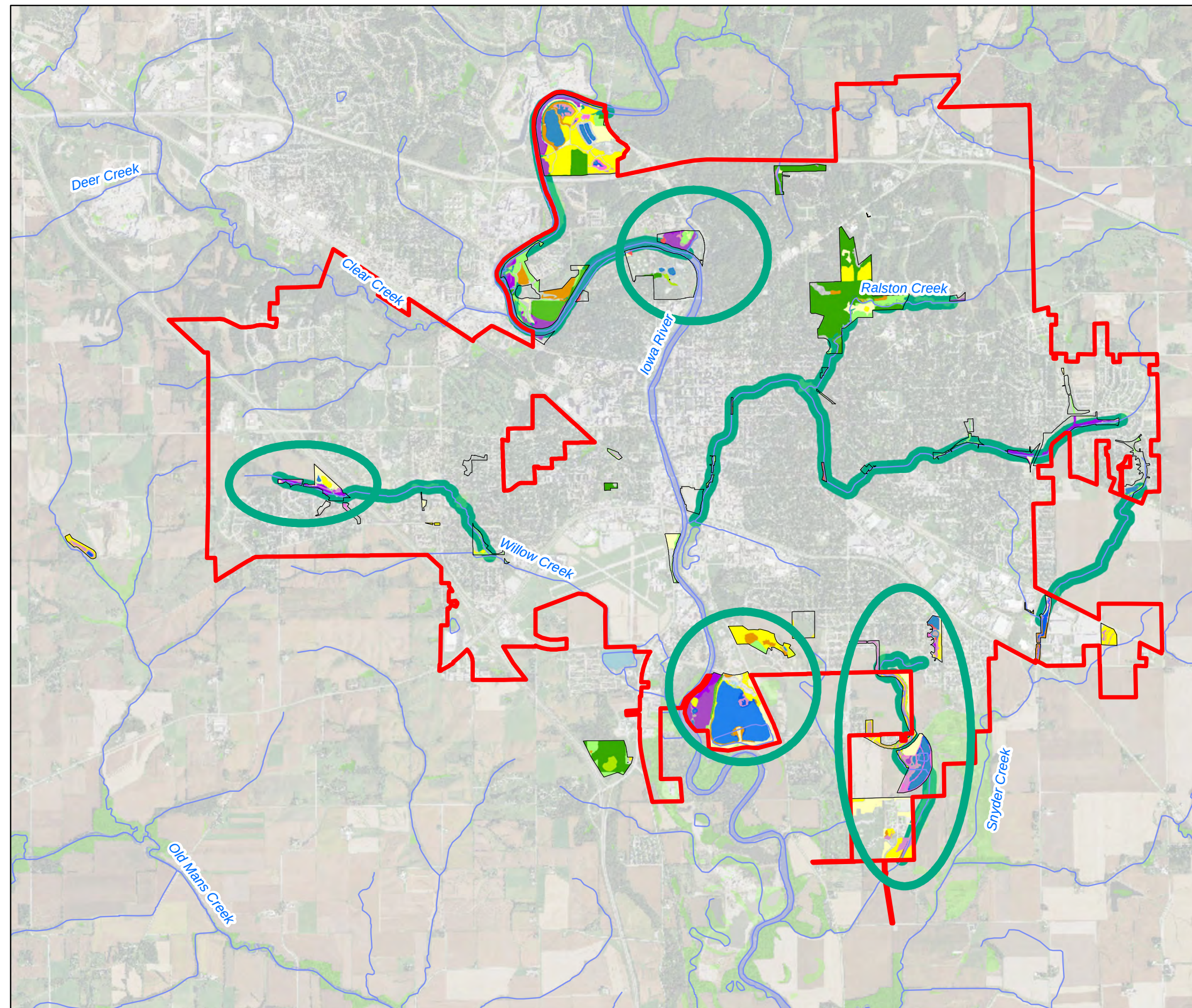


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Iowa City Natural Areas Inventory and Management Plan

Exhibit 8 City Natural Areas and Connections



- City Limits
- Iowa City Park or Natural Area

City Parks Natural Land Cover

- Dry-Mesic Forest/Woodland
- Mesic Forest
- Altered Forest/Woodland
- Savanna
- Shrub/Scrub
- Prairie
- Non-native Grassland
- Forested Lowland
- Shrub/Scrub Lowland
- Herbaceous Lowland
- Open Water
- Watercourse

National Wetlands Inventory (NWI)

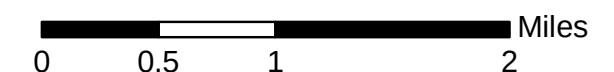
- Lacustrine
- Palustrine
- Riverine
- Natural Area Complex
- Waterway Connection

Data Sources:
 - City of Iowa City
 - Johnson County
 - Iowa State ImageServer

AES Project Number: 16-0777
 Date: 1/3/18
 File Name: 8 IA City_Connections_2018-01-03



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Appendix A. Glossary

Appendix A. Glossary

Adaptive Management	Structured decision making in the face of uncertainty, with an aim to reducing uncertainty over time by a cycle of implementation, monitoring, evaluation, and adjustment.
Bioblitz	Typically a 24-hour period when professionals and volunteers document all living species within a given area, such as a public park.
Biodiversity	The variety of life in a particular habitat or ecosystem, including plants and animals.
Climate Moderation	Less extreme fluctuations in temperature.
Ecological Restoration	Improving the natural environment by stabilizing and enhancing biodiversity, resilience, and ecosystem services.
Ecological Stewardship	Refers to responsible use and protection of the natural environment through conservation and sustainable practices.
Generalist Wildlife Species	Animal species that can live in many different types of environments and have a varied diet and broad habitat requirements.
Habitat Fragmentation	Habitat fragmentation is the process by which habitat loss results in the division of large, continuous habitats into smaller, more isolated remnants.
Invasive Species	Aggressive species whose introduction does or is likely to cause economic or environmental harm or harm to human health.
LiDAR	<i>Light Detection and Ranging</i> (LiDAR) is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. It is most commonly used for elevation contour mapping.
Migration Corridor	Area of habitat connecting wildlife populations separated by human activities or structures (such as roads, development or logging).
Native Plants	Plants indigenous to a given area in geologic time. This includes plants that have developed, occur naturally, or existed for many years in an area.
Non-invasive Species	Species that are not likely to cause economic or environmental harm.
Sensitive Natural Areas	Type of designation for an area that needs special protection because of its landscape, wildlife or historical value.
Specialist Wildlife Species	Animal species that have specific environmental needs related to habitat, diet or another environmental factor, without which they cannot sustain their populations.

Appendix B. Individual Site Management Briefs

Appendix B. Individual Site Management Briefs

CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN 420TH STREET WETLAND MANAGEMENT BRIEF

Natural Area Name: 420th Street Wetland

Natural Area Size (ac): 11

Natural Area Location (address, nearest street intersection, or other major geographic feature): North of Highway 6 along east side of Compass Drive, north of 420th Street

Park/Natural Area Class: Constructed/mitigation wetland

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Mitigation Report (Dec. 2016)	X	X					Mitigation site completed Oct. 2011; veg cover map

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Tributary/wetland to N could be restored and connected (across RR tracks) to site

Dominant Soils Upland: Tama silt loam (2-5% slopes)

Lowland: Muscatine silt loam (0-2% slopes), Colo-Ely complex silty clay loam (0-5% slopes), and Sperry silt loam, depressional, (0-1% slopes)

Hydrology Features: Unnamed tributary flows from northeast to southwest through southeast corner of site; wetland generally does not retain standing water for extended periods of time, in part because local watershed has not been fully developed as was planned; sports complex and development proposed to north

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Wetland mitigation site; City staff have maintained the site intermittently, including mowing and physical removal of invasive vegetation; native overseeding conducted in 2013

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	C	8.95	78.6%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	C	1.86	16.3%
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.56	4.9%
14. Building		0.01	0.1%
15. Other Impervious Cover			
Totals		11.38	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Carex crinita*, *Juncus effusus*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Dickcissel ¹ Eastern Meadowlark ¹ Swamp Sparrow	None observed	None observed

¹ State Species of Greatest Conservation Need

Issues and Opportunities:

- Invasive vegetation, especially in prairie (Kentucky bluegrass, dandelion, ground clovers, etc.)
- State SGCN Dickcissel and Eastern Meadowlark seen at site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

420th Street Wetland Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Canopy Stratum</i>				
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Herbaceous Stratum</i>				
<i>Acorus americanus</i>	American Sweet Flag	Native		1
<i>Andropogon gerardii</i>	Big Bluestem	Native	4	2
<i>Anemone canadensis</i>	Canada anemone	Native	1	
<i>Asclepias incarnata</i>	Swamp Milkweed	Native		1
<i>Aster pilosus</i>	Hairy White Oldfield Aster; Frost Aster	Native	3	
<i>Baptisia alba</i>	Wild White Indigo	Native	1	
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native		2
<i>Bouteloua curtipendula</i>	Sideoats Grama	Native	1	
<i>Bouteloua hirsuta</i>	Hairy Grama	Native	1	
<i>Bromus japonicus</i>	Japanese Brome	Not Native	1 cf	
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1	
<i>Carex crinita</i>	Fringed Sedge	Native		1
<i>Carex hystericina</i>	Porcupine Sedge; Bottlebrush Sedge	Native		1
<i>Carex scoparia</i>	Broom Sedge; Lance-Fruited Oval Sedge	Native		1
<i>Carex stricta</i>	Tussock Sedge; Upright Sedge	Native		1
<i>Carex vulpinoidea</i>	Fox Sedge	Native		2
<i>Cephalanthus occidentalis</i>	Buttonbush	Native		1
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native		1
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1	
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native	1	
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	1	2
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	1	

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywillly	Native	1	
<i>Geum aleppicum</i>	Yellow Avena	Native	1	
<i>Glyceria maxima</i>	Reed Mannagrass; Great Mannagrass	Not Native		1
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native		2
<i>Helenium autumnale</i>	Sneezeweed	Native		2
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native	1	
<i>Hibiscus moscheutos</i>	Swamp Rose Mallow; Crimson-Eyed Rose Mallow	Native		1
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native	1	1
<i>Iris versicolor</i>	Harlequin Blue Flag Iris	Not Native		1
<i>Juncus effusus</i>	Common Rush; Soft Rush	Native		1
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native		1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	1 pd	
<i>Medicago lupulina</i>	Black Medic	Not Native	1 cf	
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf	
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	1 cf	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		1 cf
<i>Physostegia virginiana</i>	Obedient Plant	Native	1	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	2 ed
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native		1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	2	
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1	
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native	1	
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native		1
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		2
<i>Senecio pauperculus</i>	Ragwort	Native	1	1
<i>Silphium laciniatum</i>	Compass Plant	Native	1	

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Solidago canadensis</i>	Canada Goldenrod	Native	3	2
<i>Solidago riddellii</i>	Riddle's Goldenrod	Native	1	
<i>Sparganium eurycarpum</i>	Broadfruit Bur-Reed; Giant Bur-Reed	Native		1
<i>Spartina pectinata</i>	Prairie Cordgrass	Native		1
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native		1
<i>Sporobolus asper</i>	Rough Dropseed	Native	1	
<i>Symphotricum lanceolatum</i>	Panicked Aster; Lance-Leaved Aster	Native	1	
<i>Taraxacum officinale</i>	Common Dandelion	Not Native	2 cf	
<i>Trifolium hybridum</i>	Alsike Clover	Not Native		2 pd
<i>Trifolium pratense</i>	Red Clover	Not Native	1 pd	
<i>Trifolium repens</i>	White Clover	Not Native	2 pd	
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native		1 pd
<i>Vernonia fasciculata</i>	Common Ironweed; Prairie Ironweed; Smooth Ironweed	Native		2

420th Street Wetland Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action						
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Land Cover Type (ac)	Forest/Woodland and Forested Lowland					
	Savanna/Brushland and Shrub/Scrub Lowland					
	Grassland and Herbaceous Lowland		10.81		10.81	10.81
	Total Acres	0	10.81	0	10.81	10.81
	Unit Cost (for 3 yrs)		\$ 2,000		\$ 300	NA
Opinions of Probable Cost ¹	\$ -	\$ 21,620	\$ -	\$ -	\$ 3,243	\$ 4,000
Total Opinion of Probable Cost¹		\$	28,863			

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed prairie and herbaceous lowland with diverse natives as warranted (costs not included in table above).

Iowa City Natural Areas Inventory and Management Plan

420th St Wetland

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Herbaceous Lowland
 - Recreation Area
 - Building or Structure
 - Contour (5ft interval)
 - Trail
 - Drainageway

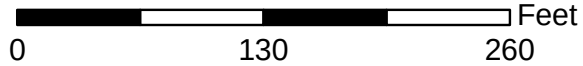
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

BENTON HILL PARK MANAGEMENT BRIEF

Natural Area Name: Benton Hill Park

Natural Area Size (ac): 3

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, southwest of intersection of Benton Street and Miller Avenue

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North to forest stand and Brookland Park

Dominant Soils **Upland:** Fayette silt loam (5-9% slopes)
 Lowland: NA

Hydrology Features: NA

Historical Vegetation: Prairie

Past Land Uses: Farmstead and cropland

Current Use and Management: Pocket park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	CD	2.75	83.1%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.46	13.9%
14. Building		0.01	0.3%
15. Other Impervious Cover		0.10	3.0%
Totals		3.31	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Viburnum prunifolium*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, buckthorn, privet, Oriental bittersweet, dame's rocket, etc.)
- Small site
- Forest enhancement opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Benton Hill Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland
<i>Canopy Stratum</i>			
<i>Carya ovata</i>	Shagbark Hickory	Native	1
<i>Celtis occidentalis</i>	Hackberry	Native	3
<i>Fraxinus americana</i>	White Ash	Native	1
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	4
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 pd
<i>Prunus serotina</i>	Black Cherry	Native	1
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native	1
<i>Quercus macrocarpa</i>	Bur Oak	Native	1
<i>Quercus rubra</i>	Red Oak	Native	1
<i>Quercus velutina</i>	Black Oak	Native	1
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	2 pd
<i>Celtis occidentalis</i>	Hackberry	Native	2
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native	1
<i>Ligustrum vulgare</i>	Common Privet	Not Native	2 pd
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	3 ed
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Not Native	3 pd
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 pd
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	4
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	2 pd
<i>Viburnum prunifolium</i>	Black Haw	Native	1
<i>Herbaceous Stratum</i>			
<i>Ageratina altissima</i>	Common White Snakeroot	Native	2
<i>Agrimonia gryposepala</i>	Tall Agrimony; Hairy Agrimony; Common Agrimony	Native	1
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native	1

Species name	Common name	Origin	Dry-Mesic Forest/Woodland
<i>Anemone virginiana</i>	Thimbleweed; Tall Anemone	Native	1
<i>Campsis radicans</i>	Trumpet Creeper	Not Native	1
<i>Carex normalis</i>	Greater Straw Sedge; Spreading Oval Sedge	Native	1
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native	1
<i>Dactylis glomerata</i>	Orchardgrass	Not Native	4
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	Native	1
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	4
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native	1
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	4
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	2 pd
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native	2
<i>Lactuca floridana</i>	Woodland Lettuce	Native	1
<i>Lathyrus odoratus</i>	Sweet Pea	Not Native	2
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 pd
<i>Phlox paniculata</i>	Garden Phlox	Native	1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	1
<i>Rubus occidentalis</i>	Black Raspberry	Native	1
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	2
<i>Silphium perfoliatum</i>	Cup Plant	Native	1
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native	1
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1

Benton Hill Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	2.75	2.75	2.75	2.75	2.75	
	Savanna/Brushland and Shrub/Scrub Lowland						
	Grassland and Herbaceous Lowland						
	Total Acres	2.75	2.75	2.75	0	2.75	
	Unit Cost (for 3 yrs)	\$ 3,500	\$ 1,500	\$ 1,000	\$ 500	NA	
Opinions of Probable Cost ¹		\$ 9,625	\$ 4,125	\$ 2,750	\$ -	\$ 1,375	\$ 2,000
Total Opinion of Probable Cost ¹		\$	19,875				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Benton Hill Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

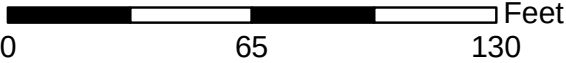
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

BRISTOL DRIVE WOODLANDS MANAGEMENT BRIEF

Natural Area Name: Bristol Drive Woodlands

Natural Area Size (ac): 20

Natural Area Location (address, nearest street intersection, or other major geographic feature): North of Bristol Drive and south of I-80

Park/Natural Area Class: Forest/wetland

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South-southeast to Hickory Hill Park
- Southwest to Terrell Mill Park

Dominant Soils **Upland:** Fayette silt loam (5-9% and 25-40% slopes)
Lowland: NA

Hydrology Features: South tributary of Rapid Creek flows through western portion of site

Historical Vegetation: Oak barrens

Past Land Uses: Pasture

Current Use and Management: Unknown

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	CD	16.75	82.7%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.69	3.4%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	D	2.34	11.6%
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.30	1.5%
14. Building			
15. Other Impervious Cover		0.18	0.9%
Totals		20.25	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, privet, Oriental bittersweet, poison ivy, reed canary grass, etc.)
- Linear site
- Forest and wetland enhancement opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Bristol Drive Woodlands Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Non-Native Grassland	Herbaceous Lowland
<i>Canopy Stratum</i>					
<i>Carya ovata</i>	Shagbark Hickory	Native	3		
<i>Prunus serotina</i>	Black Cherry	Native	2		
<i>Quercus macrocarpa</i>	Bur Oak	Native	1		
<i>Quercus velutina</i>	Black Oak	Native	2		
<i>Salix nigra</i>	Black Willow	Native	1		2
<i>Ulmus americana</i>	American Elm	Native	2		
<i>Shrub/Vine/Sapling Stratum</i>					
<i>Acer nigrum</i>	Black Maple	Native	1		
<i>Carya ovata</i>	Shagbark Hickory	Native	2		
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	3 ed		
<i>Crataegus crus-galli</i>	Cockspur Hawthorn	Native	1		
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native	1 cf		
<i>Fraxinus americana</i>	White Ash	Native	2		
<i>Gleditsia triacanthos</i>	Honey Locust	Native	2		
<i>Ligustrum vulgare</i>	Common Privet	Not Native	2 cf	1 cf	1 pd
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native		1 pd	1 pd
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	3 ed	1 cf	1 pd
<i>Ostrya virginiana</i>	Ironwood; Eastern Hop Hornbeam	Native	2		
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native			1 pd
<i>Rosa multiflora</i>	Multiflora Rose	Not Native		1 cf	1 pd
<i>Rubus allegheniensis</i>	Allegheny Blackberry; Common Blackberry	Native			1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	3 ed		
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	2		
<i>Herbaceous Stratum</i>					
<i>Acer ginnala</i>	Amur Maple	Not Native	1 cf		
<i>Ageratina altissima</i>	Common White Snakeroot	Native	2		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Non-Native Grassland	Herbaceous Lowland
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd		
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native	2		1
<i>Anemone canadensis</i>	Canada anemone	Native		1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf		
<i>Asclepias syriaca</i>	Common Milkweed	Native			1
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	1 cf		
<i>Bidens frondosa</i>	Common Beggartick; Devil's Beggartick	Native			1
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native	2		
<i>Carex gracillima</i>	Graceful Sedge	Native	1		
<i>Carex pensylvanica</i>	Pennsylvania Sedge	Native	3		
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native	2		
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	1		
<i>Cirsium arvense</i>	Canada thistle	Not Native			1 cf
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native		1	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 pd	1 pd	
<i>Desmodium cuspidatum</i>	Hairy-Bracted Tick Trefoil; Large-Bracted Tick Trefoil	Native	1	1	
<i>Dichanthelium implicatum</i>	Rosette Panic Grass	Native	1		
<i>Dodecatheon meadia</i>	Shooting Star	Native	1		
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native	1		
<i>Equisetum sylvaticum</i>	Wood Horsetail; Woodland Horsetail	Native			1
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1	1
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	Native	1		
<i>Eupatorium perfoliatum</i>	Boneset	Native			1
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	1		
<i>Festuca arundinacea</i>	Tall Fescue	Not Native		2 cf	
<i>Festuca subverticillata</i>	Nodding Fescue	Native	2		
<i>Fraxinus americana</i>	White Ash	Native	2		
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	2	2	
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	1		
<i>Geum canadense</i>	White Avens; Canada Avens	Native	2		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Non-Native Grassland	Herbaceous Lowland
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native	1		2
<i>Hackelia virginiana</i>	Stickseed	Native	1		
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native		1	1
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native			1
<i>Leersia virginica</i>	Whitegrass; White Cutgrass; Virginia Cutgrass	Native	2		
<i>Leucanthemum vulgare</i>	Oxeye Daisy	Not Native		1	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		1 cf	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native		2	
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	2		
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	2		
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf	2 pd	4 ed
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native		2 pd	
<i>Polemonium reptans</i>	Jacob's Ladder	Native	2		
<i>Pycnanthemum pilosum</i>	Hairy Mountain Mint	Native		1	1
<i>Pycnanthemum virginianum</i>	Common Mountain Mint; Virginia Mountain Mint	Native		1	
<i>Quercus velutina</i>	Black Oak	Native		1	
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf		
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf		
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1		
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native			1
<i>Securigera varia</i>	Crown Vetch	Not Native		1 cf	
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native	2		
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1	4	
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native		2	2
<i>Solidago ulmifolia</i>	Elm-Leaf Goldenrod	Native	2		
<i>Taraxacum officinale</i>	Common Dandelion	Not Native	1 cf		
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native			1
<i>Thalictrum thalictroides</i>	Rue Anemone	Native	2		
<i>Toxicodendron radicans</i>	Poison Ivy	Native	2 pd		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Non-Native Grassland	Herbaceous Lowland
<i>Trifolium repens</i>	White Clover	Not Native	1 pd	2 pd	
<i>Triosteum perfoliatum</i>	Horse Gentian; Feverwort	Native		1	
<i>Verbena urticifolia</i>	White Vervain	Native		1	
<i>Vernonia missurica</i>	Missouri Ironweed	Native	1	1	

Bristol Drive Woodlands Restoration/Management Recommendations and Opinion of Probable Cost

Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland	16.75	16.75			16.75	
Savanna/Brushland and Shrub/Scrub Lowland						
Grassland and Herbaceous Lowland		0.69	0.69		3.03	
Total Acres	16.75	17.44	0.69	0	19.78	0
Unit Cost (for 3 yrs)	\$ 3,000	\$ 1,000	\$ 1,000		\$ 200	
Opinions of Probable Cost ¹	\$ 50,250	\$ 17,440	\$ 690	\$ -	\$ 3,956	\$ -

Total Opinion of Probable Cost¹	\$ 72,336
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed non-native grassland following weed removal.

Wetland enhancement lower priority due to size and location (costs not included in table above).

Iowa City Natural Areas Inventory and Management Plan

Bristol Drive Woodlands

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Non-native Grassland
 - Herbaceous Lowland
 - Recreation Area
 - Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway



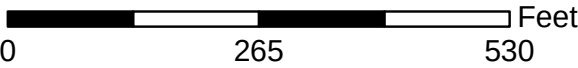
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

BROOKLAND PARK MANAGEMENT BRIEF

Natural Area Name: Brookland Park

Natural Area Size (ac): 3

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, southwest of curve from Melrose Court to Myrtle Avenue

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South to Benton Hill Park

Dominant Soils **Upland:** Fayette silt loam (9-14% slopes)
 Lowland: Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Unnamed tributary flows through center of site

Historical Vegetation: Prairie

Past Land Uses: Pasture

Current Use and Management: pocket park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.89	31.3%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.12	4.2%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	D	0.33	11.6%
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		1.21	42.6%
14. Building			
15. Other Impervious Cover		0.28	9.9%
Totals		2.84	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (Siberian elm, honeysuckles, buckthorn, reed canary grass, etc.)
- Small site
- Drainageway enhancement in 2005
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Monitor drainageway enhancement and improve if needed

Brookland Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Non-Native Grassland	Herbaceous Lowland
<i>Canopy Stratum</i>						
<i>Acer saccharinum</i>	Silver Maple	Native	1			
<i>Celtis occidentalis</i>	Hackberry	Native	1			
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2			1
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1			
<i>Juglans nigra</i>	Black Walnut	Native	2			
<i>Picea sp.</i>	Unknown Spruce	Not Native	1			
<i>Prunus serotina</i>	Black Cherry	Native	1			
<i>Salix babylonica</i>	Weeping Willow	Not Native				1 cf
<i>Ulmus pumila</i>	Siberian Elm	Not Native	2 pd	2 cf		
<i>Shrub/Vine/Sapling Stratum</i>						
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1			
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native				1
<i>Celtis occidentalis</i>	Hackberry	Native		1		
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	1	1	1
<i>Gleditsia triacanthos</i>	Honey Locust	Native			1	
<i>Humulus japonicus</i>	Japanese Hop	Not Native		1 cf		1 cf
<i>Juglans nigra</i>	Black Walnut	Native	1			
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf			
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 pd	2 pd		
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native		1 cf		
<i>Malus sp.</i>	Unknown Apple	Undetermined	1			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf	1 cf		
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1			
<i>Picea sp.</i>	Unknown Spruce	Not Native	1			
<i>Prunus serotina</i>	Black Cherry	Native	1			
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	2 pd	1 pd		1 cf

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Non-Native Grassland	Herbaceous Lowland
<i>Ribes missouriense</i>	Missouri Gooseberry	Native		1		
<i>Rubus idaeus</i>	Red Raspberry	Not Native	1			
<i>Sambucus canadensis</i>	Elderberry	Native	1	1		
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 pd			
<i>Ulmus americana</i>	American Elm	Native				1
<i>Ulmus</i> sp.	Unknown Elm	Undetermined			1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1			
Herbaceous Stratum						
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf			
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native			1	
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1			
<i>Asclepias incarnata</i>	Swamp Milkweed	Native				1
<i>Asclepias syriaca</i>	Common Milkweed	Native				1
Asteraceae	Unknown Aster	Undetermined				1
<i>Bromus inermis</i>	Smooth Brome	Not Native		1 cf		
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native				1
<i>Campanula americana</i>	Tall Bellflower	Native	1			
<i>Carex hystericina</i>	Porcupine Sedge; Bottlebrush Sedge	Native			1	
<i>Carex</i> spp.	Unknown Sedges	Native	1			1
<i>Carex vulpinoidea</i>	Fox Sedge	Native				1
<i>Cirsium arvense</i>	Canada thistle	Not Native				1 cf
<i>Conium maculatum</i>	Poison Hemlock	Not Native		1 cf		1 cf
<i>Cryptotaenia canadensis</i>	Honewort	Native	1			
<i>Elymus repens</i>	Quackgrass	Not Native				1 cf
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	1			
<i>Festuca arundinacea</i>	Tall Fescue	Not Native			2 pd	
<i>Galium</i> sp.	Unknown Bedstraw	Undetermined	1			
<i>Geum canadense</i>	White Aven; Canada Aven	Native	1			
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	1 cf	1 cf	1 cf	1 cf
<i>Hackelia virginiana</i>	Stickseed	Native	1			

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Non-Native Grassland	Herbaceous Lowland
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native				1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native		1 cf		
<i>Humulus japonicus</i>	Japanese Hop	Not Native				1 cf
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native		1	1	
<i>Impatiens pallida</i>	Yellow Jewelweed; Pale Jewelweed; Pale Touch-Me-Not	Native				1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native				1 cf
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native			1 cf	1 cf
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1			1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	1	1	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		1 cf	2 pd	2 pd
<i>Pheum pratense</i>	Timothy	Not Native			2 pd	1 cf
<i>Phyla lanceolata</i>	Lanceleaf fogfruit; Frogfruit	Native				1
<i>Poa palustris</i>	Fowl Bluegrass	Native	1		1	1
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf		1 cf
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native				1
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native				1
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native				1
<i>Scrophularia marilandica</i>	Figwort	Native	1			
<i>Securigera varia</i>	Crown Vetch	Not Native		1 cf		
<i>Solidago canadensis</i>	Canada Goldenrod	Native				1
<i>Stellaria media</i>	Chickweed; Common Chickweed	Not Native				1 cf
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native				1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf	1 cf		
<i>Trifolium pratense</i>	Red Clover	Not Native				1 cf
<i>Trifolium repens</i>	White Clover	Not Native				1
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native				1 cf
<i>Urtica dioica</i>	Stinging Nettle	Native				1
<i>Verbena urticifolia</i>	White Vervain	Native			1	
<i>Viola sp.</i>	Unknown Violet	Undetermined	1			

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Non-Native Grassland	Herbaceous Lowland
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		1		

Brookland Park Restoration/Management Recommendations and Opinion of Probable Cost

Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland	0.89	0.89	0.89		0.89	
Savanna/Brushland and Shrub/Scrub Lowland						
Grassland and Herbaceous Lowland		0.45	0.45		0.45	0.45
Total Acres	0.89	1.34	1.34	0	1.34	0.45
Unit Cost (for 3 yrs)	\$ 3,500	\$ 1,500	\$ 1,000		\$ 700	NA
Opinions of Probable Cost ¹	\$ 3,115	\$ 2,010	\$ 1,340	\$ -	\$ 938	\$ 1,500

Total Opinion of Probable Cost¹	\$ 8,903
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland and herbaceous lowland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Brookland Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Non-native Grassland
 - Herbaceous Lowland
 - Recreation Area
 - Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway



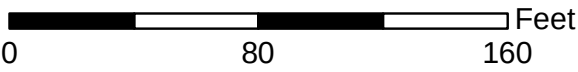
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

CITY PARK MANAGEMENT BRIEF

Natural Area Name: City Park

Natural Area Size (ac): 107

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, north of Park Road and east of Normandy Drive

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Confluence. 2016. Lower City Park Master Plan							Addresses only lower (active) portion of park, not remnant forest in south

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northeast (across Iowa River) to Terrell Mill Park

Dominant Soils Upland: Fayette silt loam (2-9% and 18-25%, slopes), Sattre loam (0-2% slopes)

Lowland: Perks-Spillville complex sandy loam (0-2% slopes)

Hydrology Features: Two ponds; Iowa River flows along north and east edge of park

Historical Vegetation: Oak barrens

Past Land Uses: Cropland

Current Use and Management: Heavily used park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	CD,D	2.16	2.0%
2. Mesic Forest (often maples)	BC,CD	1.88	1.8%
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)	D	0.69	0.6%
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	1.00	0.9%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	2.73	2.5%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		23.50	21.9%
13. Recreation Area (0-50% tree canopy)		60.36	56.2%
14. Building		0.76	0.7%
15. Other Impervious Cover		14.23	13.3%
Totals		107.31	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Red-Tailed Hawk Red-Bellied Woodpecker Belted Kingfisher	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, reed canary grass, etc.)
- Higher quality oak woodland with turf below canopy and patches of spring wildflowers
- 100-yr floodplain encroaches on lower park
- Opportunity for turf to native groundlayer conversion beneath oaks

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

City Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Savanna	Non-Native Grassland
<i>Canopy Stratum</i>						
<i>Acer saccharinum</i>	Silver Maple	Native			3	
<i>Acer saccharum</i>	Sugar Maple	Native	1	3		
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native		1 cf		
<i>Carya ovata</i>	Shagbark Hickory	Native	2			
<i>Celtis occidentalis</i>	Hackberry	Native	3			
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1			
<i>Juglans nigra</i>	Black Walnut	Native	1	1		
<i>Pinus strobus</i>	White Pine; Eastern White Pine	Native	2			
<i>Populus deltoides</i>	Eastern Cottonwood	Native			2	
<i>Prunus serotina</i>	Black Cherry	Native		1		
<i>Quercus alba</i>	White Oak	Native	2	2		
<i>Quercus macrocarpa</i>	Bur Oak	Native	2			
<i>Quercus rubra</i>	Red Oak	Native	2	1		
<i>Quercus sp.</i>	Unknown Oak	Native	1			
<i>Tilia americana</i>	American Basswood	Native	2	3		
<i>Ulmus americana</i>	American Elm	Native	1	1		
<i>Shrub/Vine/Sapling Stratum</i>						
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1	1		
<i>Acer saccharum</i>	Sugar Maple	Native		2		
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	1 cf	1 cf		
<i>Celtis occidentalis</i>	Hackberry	Native		1		
<i>Cercis canadensis</i>	Eastern Redbud; Judas Tree	Native	1			
<i>Cornus alternifolia</i>	Pagoda Dogwood; Alternate-Leaved Dogwood	Native	1	1		
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1			
<i>Juglans nigra</i>	Black Walnut	Native			1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Savanna	Non-Native Grassland
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf	1 cf		
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd	1 cf		
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf			
<i>Morus rubra</i>	Red Mulberry	Native			1	
<i>Prunus serotina</i>	Black Cherry	Native	2			
<i>Quercus rubra</i>	Red Oak	Native		1		
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf			
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1			
<i>Rosa multiflora</i>	Multiflora Rose	Not Native		1 cf		
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined			1	
<i>Tilia americana</i>	American Basswood	Native	1			
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf		1 cf	
<i>Ulmus americana</i>	American Elm	Native	1			
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native	1 pd	1 cf		
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1			
Herbaceous Stratum						
<i>Acer saccharinum</i>	Silver Maple	Native		1		
<i>Actaea pachypoda</i>	Doll's Eyes; White Baneberry	Native	1			
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd	1 cf		
<i>Allium canadense</i>	Wild Onion	Native		1		
<i>Allium tricoccum</i>	Wild Leek; Ramp	Native	1			
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native		1		
<i>Anemone canadensis</i>	Canada anemone	Native			1	
<i>Anemone</i> sp.	Unknown Anemone	Undetermined	1			
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	1	2		
<i>Asarum canadense</i>	Canada Wild Ginger	Native	1	1		
Asteraceae	Unknown Aster	Undetermined			1	
<i>Cardamine concatenata</i>	Cutleaf Toothwort	Native		1		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Savanna	Non-Native Grassland
<i>Carex pennsylvanica</i>	Pennsylvania Sedge	Native		1		
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native		1		
<i>Carex shortiana</i>	Short's Sedge	Native			1	
<i>Carex sp.</i>	Unknown Sedge	Native			1	
<i>Carex spp.</i>	Unknown Sedges	Native		1		
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native			1	1
<i>Carex vulpinoidea</i>	Fox Sedge	Native			1	
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	1	1		
<i>Claytonia virginica</i>	Eastern Spring Beauty	Native		1		
<i>Clematis pitcheri</i>	Pitcher's Leather Flower; Purple Leather Flower; Bluebill	Native		1		
<i>Cryptotaenia canadensis</i>	Honewort	Native	1	1	1	
<i>Dicentra cucullaria</i>	Dutchman's Breeches	Native		1		
<i>Erythronium albidum</i>	White Trout Lily; White Fawn Lily; White Dogtooth Violet	Native		1		
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native		1		
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1	1	1
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1			
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	1	1		
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native			1 cf	
<i>Hackelia virginiana</i>	Stickseed	Native	1			
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf			
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf; Eastern Waterleaf	Native		1		
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	1			
<i>Laportea canadensis</i>	Wood Nettle	Native	1			
<i>Maianthemum racemosum</i>	Large False Solomon's Seal; False Spikenard; Solomon's Plume	Native	1			
<i>Medicago lupulina</i>	Black Medic	Not Native			1 cf	
<i>Menispermum canadense</i>	Canada Moonseed	Native	1	1	1	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native			1 cf	
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native			1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	2	2		
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native			2 pd	3 pd

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Savanna	Non-Native Grassland
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native			1 cf	2 pd
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	1	1		
<i>Polemonium reptans</i>	Jacob's Ladder	Native		1		
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1			
<i>Rumex crispus</i>	Curly Dock	Not Native			1 cf	1 cf
<i>Sanguinaria canadensis</i>	Bloodroot	Native		1		
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1	1		
<i>Scutellaria ovata</i>	Heartleaf Skullcap	Native		1		
<i>Securigera varia</i>	Crown Vetch	Not Native			1 cf	
<i>Silene stellata</i>	Starry Campion; Widow's Frill	Native		1		
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native		1		
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined	1	1		
<i>Solidago canadensis</i>	Canada Goldenrod	Native			1	1
<i>Taraxacum officinale</i>	Common Dandelion	Not Native			1 cf	1 cf
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 pd		1 cf	1 cf
<i>Trifolium pratense</i>	Red Clover	Not Native			1 cf	
<i>Trifolium repens</i>	White Clover	Not Native			1 cf	1 cf
<i>Trillium cernuum</i>	Nodding Trillium	Native		1		
<i>Urtica dioica</i>	Stinging Nettle	Native			1	
<i>Uvularia grandiflora</i>	Large-flowered Bellwort	Native		1		
<i>Veronicastrum virginicum</i>	Culver's Root	Native	1			
<i>Viola</i> sp.	Unknown Violet	Undetermined			1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native			1	1
<i>Woodsia obtusa</i>	Blunt-Lobed Cliff Fern	Native		1		

City Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action						
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	4.04	4.04		4.04	2.16
	Savanna/Brushland and Shrub/Scrub Lowland	0.69	0.69		0.69	0.69
	Grassland and Herbaceous Lowland		1.00	1.00	1.00	1.00
	Total Acres	4.73	5.73	5.73	0	5.73
	\$ 2,000	\$ 1,500	\$ 1,000		\$ 500	NA
Opinions of Probable Cost ¹	\$ 9,460	\$ 8,595	\$ 5,730	\$ -	\$ 2,865	\$ 2,500

Total Opinion of Probable Cost¹	\$ 29,150
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland, savanna, and non-native grassland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

City Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Mesic Forest
 - Savanna
 - Non-native Grassland
 - Open Water
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

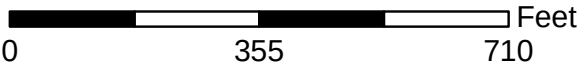
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

COURT HILL PARK MANAGEMENT BRIEF

Natural Area Name: Court Hill Park

Natural Area Size (ac): 11

Natural Area Location (address, nearest street intersection, or other major geographic feature): Southeast district, between Friendship Street (on north) and Brookside Drive (on the South)

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- East to Scott Park, along Ralston Creek

Dominant Soils Upland: NA

Lowland: Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows south through the northern portion of the park and flows west along the southern edge and of park

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Pocket park/trail; portion of Ralston Creek bank stabilized with gabion baskets.

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	3.07	26.9%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.62	5.4%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.64	5.6%
13. Recreation Area (0-50% tree canopy)		6.25	54.8%
14. Building		0.04	0.4%
15. Other Impervious Cover		0.80	7.0%
Totals		11.41	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (black locust, honeysuckles, etc.)
- 100-yr floodplain encroaches on much of site
- Portions of Ralston Creek banks have moderate to severe erosion
- Opportunity for turf to prairie conversion
- Ralston Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize Ralston Creek banks

Court Hill Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest
<i>Canopy Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2
<i>Juglans nigra</i>	Black Walnut	Native	2
<i>Picea sp.</i>	Unknown Spruce	Not Native	1
<i>Platanus occidentalis</i>	American Sycamore	Native	1
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	2 pd
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1
<i>Acer saccharum</i>	Sugar Maple	Native	1
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Morus rubra</i>	Red Mulberry	Native	1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1
<i>Sambucus canadensis</i>	Elderberry	Native	1
<i>Ulmus americana</i>	American Elm	Native	1
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf
<i>Herbaceous Stratum</i>			
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf
Asteraceae	Unknown Aster	Undetermined	1
<i>Carex sp.</i>	Unknown Sedge	Native	1

Species name	Common name	Origin	Altered Forest
<i>Chenopodium album</i>	Lamb's Quarters	Not Native	1
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 pd
<i>Conyza canadensis</i>	Canadian Horseweed	Native	1
<i>Cryptotaenia canadensis</i>	Honewort	Native	1
<i>Echinocystis lobata</i>	Wild Cucumber	Native	1
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1
<i>Hackelia virginiana</i>	Stickseed	Native	1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf
<i>Humulus japonicus</i>	Japanese Hop	Not Native	1 cf
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf
<i>Phleum pratense</i>	Timothy	Not Native	1 cf
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	1 cf
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native	1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1
<i>Securigera varia</i>	Crown Vetch	Not Native	1 pd
<i>Silphium perfoliatum</i>	Cup Plant	Native	2
<i>Solanum dulcamara</i>	Bittersweet Nightshade; Climbing Nightshade	Not Native	1
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf
<i>Urtica dioica</i>	Stinging Nettle	Native	1
<i>Verbena urticifolia</i>	White Vervain	Native	1
<i>Viola sp.</i>	Unknown Violet	Undetermined	2
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1

Court Hill Park Restoration/Management Recommendations and Opinion of Probable Cost

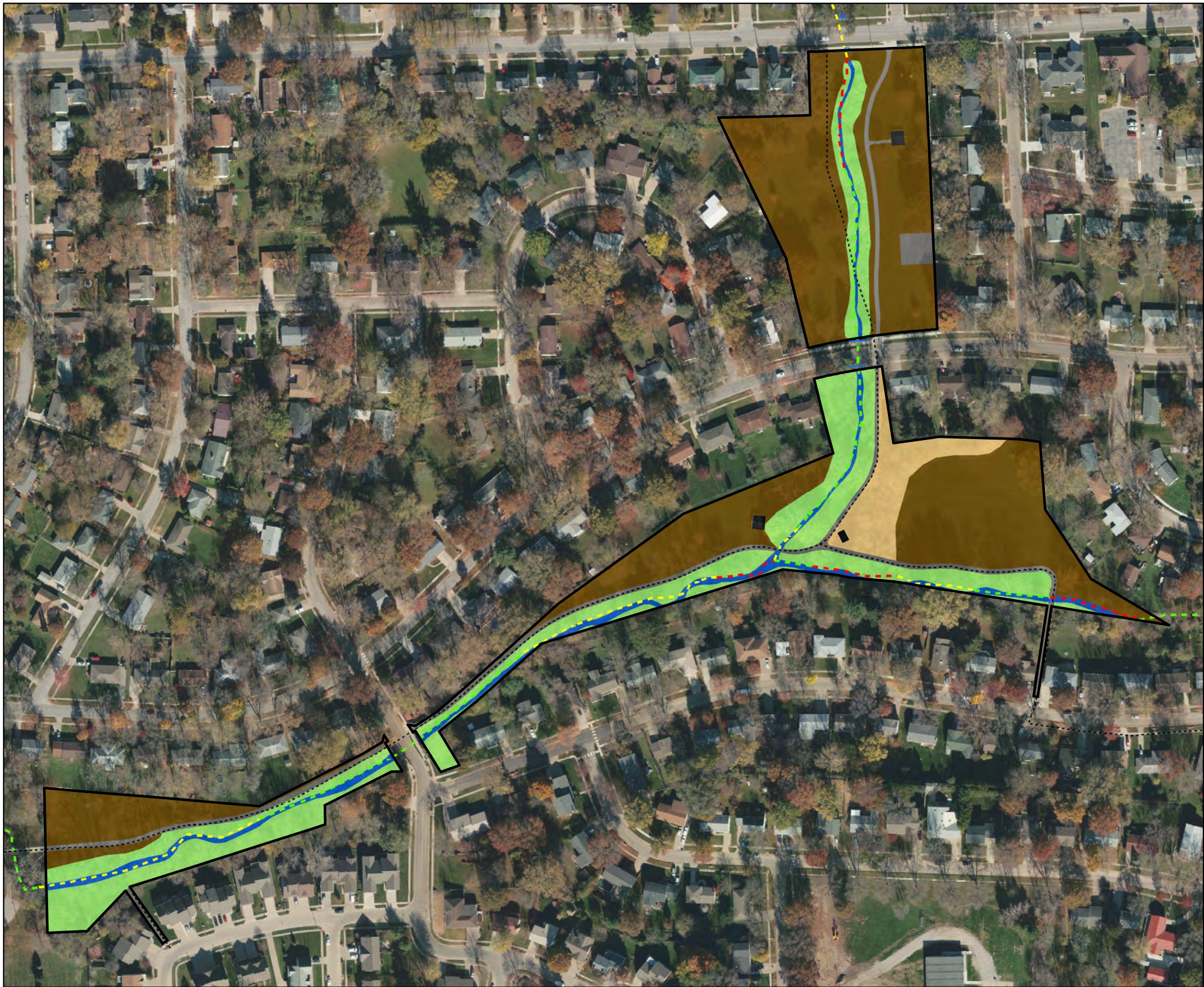
		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland		3.07	3.07	3.07		3.07	
Savanna/Brushland and Shrub/Scrub Lowland							
Grassland and Herbaceous Lowland							
Total Acres		3.07	3.07	3.07	0	3.07	0
Unit Cost (for 3 yrs)	\$	2,500	\$ 1,500	\$ 1,000		\$ 700	
Opinions of Probable Cost ¹	\$	7,675	\$ 4,605	\$ 3,070	\$ -	\$ 2,149	\$ -

Total Opinion of Probable Cost¹	\$ 17,499
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Court Hill Park

- City Limits
- Iowa City Park or Natural Area

Existing Land Cover

- Altered Forest/Woodland
- Open Water
- Woodland with Turf
- Recreation Area
- Building or Structure
- Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway

Stream Bank Stability (2010-2014 data)

- Stable
- Minor Erosion
- Moderate to Severe Erosion

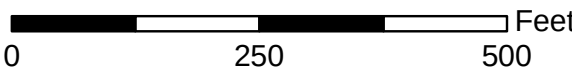
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

CRANDIC PARK MANAGEMENT BRIEF

Natural Area Name: Crandic Park

Natural Area Size (ac): 4

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, northwest of intersection of Rocky Shore Drive and Dill Street

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North (across Iowa River) to Peninsula Park

Dominant Soils Upland: NA

Lowland: Perks-Spillville complex sandy loam (0-2% slopes) and Orthents, loamy

Hydrology Features: Iowa River flows along north edge and of park

Historical Vegetation: Prairie and Oak barrens

Past Land Uses: Cropland

Current Use and Management: Pocket park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	D	1.12	25.9%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.09	2.1%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		2.50	57.9%
14. Building		0.23	5.3%
15. Other Impervious Cover		0.39	9.0%
Totals		4.32	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (creeping Charlie, etc.)
- Small site
- 100-yr floodplain and floodway encroach on site
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Crandic Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Forested Lowland
<i>Canopy Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	4
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2
<i>Populus deltoides</i>	Eastern Cottonwood	Native	3
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Morus rubra</i>	Red Mulberry	Native	1
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 pd
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1
<i>Herbaceous Stratum</i>			
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf
<i>Anemone canadensis</i>	Canada anemone	Native	1
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf
<i>Asarum canadense</i>	Canada Wild Ginger	Native	1
<i>Carex spp.</i>	Unknown Sedges	Native	1
<i>Cichorium intybus</i>	Chicory	Not Native	1
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	1
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf
<i>Epipactis helleborine</i>	Broad-Leaved Helleborine; Broadleaf Helleborine	Not Native	1 cf
<i>Euonymus fortunei</i>	Purple Winter Creeper; Climbing Euonymus; Wintercreeper	Not Native	1 cf
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1
<i>Geum canadense</i>	White Avenas; Canada Avenas	Native	1
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	2 pd
<i>Hackelia virginiana</i>	Stickseed	Native	1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1

Species name	Common name	Origin	Forested Lowland
<i>Plantago major</i>	Common Plantain	Not Native	1 cf
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1
<i>Securigera varia</i>	Crown Vetch	Not Native	1 cf
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined	1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1
<i>Stachys palustris</i>	Woundwort	Native	1
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1
<i>Toxicodendron radicans</i>	Poision Ivy	Native	1 pd
<i>Trillium recurvatum</i>	Prairie Trillium	Native	1
<i>Verbena urticifolia</i>	White Vervain	Native	1
<i>Viola</i> sp.	Unknown Violet	Undetermined	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1

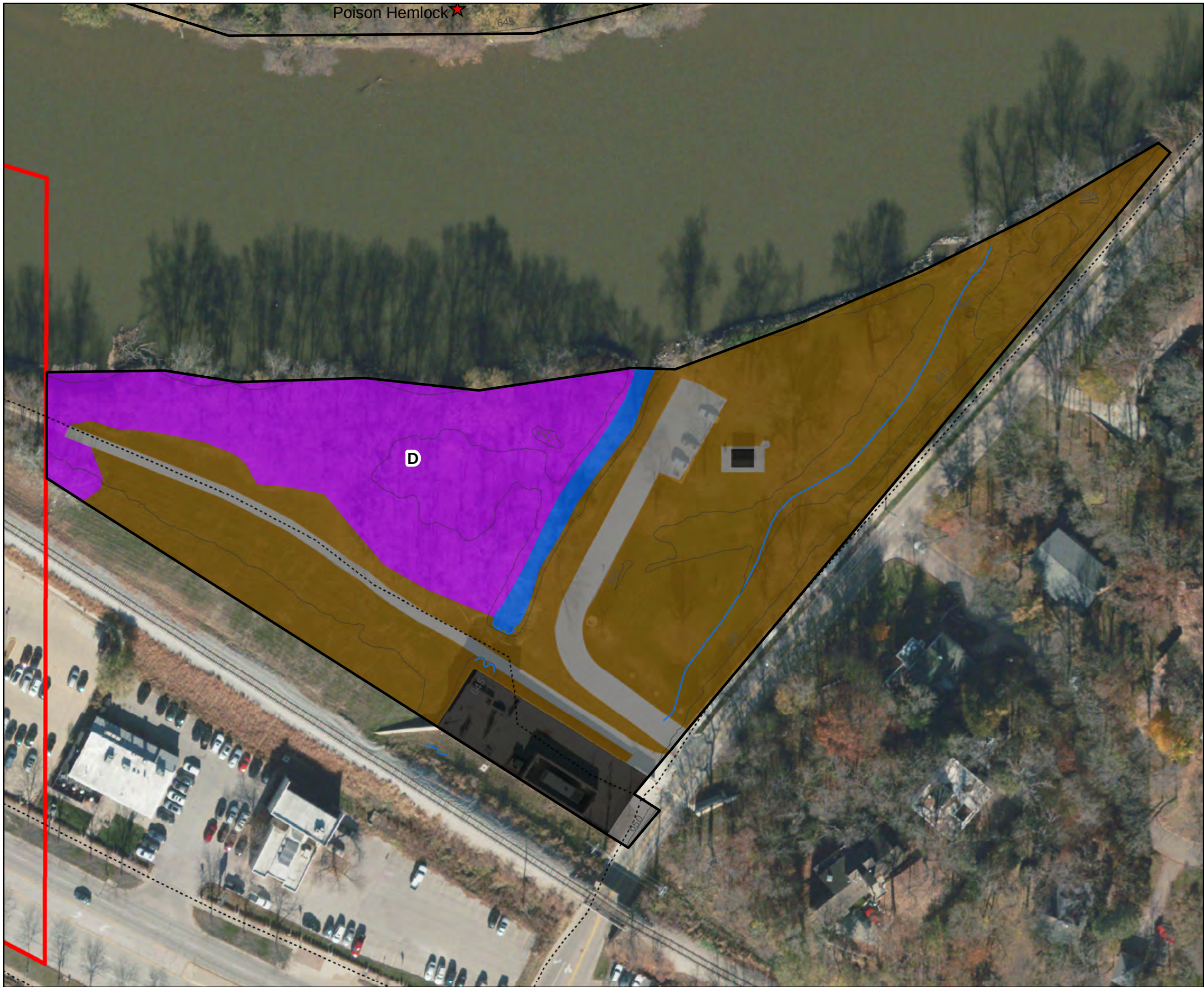
Crandic Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
		1.12	1.12	1.12		1.12	
Forest/Woodland and Forested Lowland							
Savanna/Brushland and Shrub/Scrub Lowland							
Grassland and Herbaceous Lowland							
Total Acres		1.12	1.12	1.12	0	1.12	0
Unit Cost (for 3 yrs)		\$ 1,500	\$ 1,000	\$ 1,000		\$ 1,000	
Opinions of Probable Cost ¹		\$ 1,680	\$ 1,120	\$ 1,120	\$ -	\$ 1,120	\$ -
Total Opinion of Probable Cost¹		\$ 5,040					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forested lowland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Crandic Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
 - Forested Lowland
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

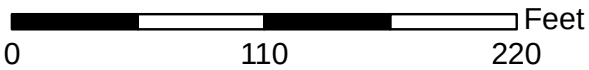
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

CREEKSIDE PARK MANAGEMENT BRIEF

Natural Area Name: Creekside Park

Natural Area Size (ac): 3

Natural Area Location (address, nearest street intersection, or other major geographic feature): Southeast district, between Muscatine Avenue (on northeast) and F Street (on south)

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- NA

Dominant Soils Upland: NA

Lowland: Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows along southeast edge of park

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Pocket park; portion of Ralston Creek bank stabilized with concrete.

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.30	11.7%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.10	3.9%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.33	12.9%
13. Recreation Area (0-50% tree canopy)		1.57	61.3%
14. Building		0.05	2.0%
15. Other Impervious Cover		0.22	8.6%
Totals		2.56	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (white mulberry, etc.)
- Small site
- 100-yr floodplain encroaches on entire site
- Opportunity for turf to prairie conversion
- Portions of Ralston Creek banks have minor erosion
- Ralston Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Improve access to Ralston Creek

Creekside Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest
<i>Canopy Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	3
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2
<i>Acer saccharinum</i>	Silver Maple	Native	1
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	1 cf
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd
<i>Sambucus canadensis</i>	Elderberry	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1
<i>Herbaceous Stratum</i>			
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf
<i>Asclepias</i> sp.	Unknown Milkweed	Native	1
Asteraceae	Unknown Aster	Undetermined	1
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1
<i>Carex</i> spp.	Unknown Sedges	Native	1
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf
<i>Cryptotaenia canadensis</i>	Honewort	Native	1
<i>Hackelia virginiana</i>	Stickseed	Native	1

Species name	Common name	Origin	Altered Forest
<i>Helianthus sp.</i>	Unknown Sunflower	Undetermined	1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf
<i>Humulus japonicus</i>	Japanese Hop	Not Native	1 cf
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1
<i>Verbena urticifolia</i>	White Vervain	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1

Creekside Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action						
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	0.3	0.3	0.3	0.3	
	Savanna/Brushland and Shrub/Scrub Lowland					
	Grassland and Herbaceous Lowland					
	Total Acres	0.3	0.3	0.3	0	0
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,500		NA
Opinions of Probable Cost ¹	\$ 750	\$ 600	\$ 450	\$ -	\$ 1,000	\$ -

Total Opinion of Probable Cost¹	\$ 2,800
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Creekside Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Open Water
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Stable
 - Minor Erosion
 - Moderate to Severe Erosion

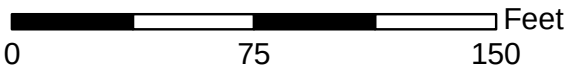
A,B,C,D Natural Community Quality Rank

Data Sources:
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- Johnson County

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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

DUCK CREEK DETENTION MANAGEMENT BRIEF

Natural Area Name: Duck Creek Detention

Natural Area Size (ac): 4

Natural Area Location (address, nearest street intersection, or other major geographic feature): Between Duck Creek Drive and Deerfield Drive

Park/Natural Area Class: Dry stormwater basin/mowed turf

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northwest to Hunters Run Park

Dominant Soils Upland: Ladoga silt loam (2-9% slopes) and Fayette silt loam (14-18% slopes)

Lowland: Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Depression (in NW portion of site) drains north to Willow Creek

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Pocket park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland	CD	0.74	17.6%
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.50	11.9%
13. Recreation Area (0-50% tree canopy)		2.96	70.5%
14. Building			
15. Other Impervious Cover			
Totals		4.20	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, Canada thistle, etc.)
- Wetland overgrown with willow and cottonwoods
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Duck Creek Detention Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Shrub/Scrub Lowland
<i>Canopy Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	3
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Salix nigra</i>	Black Willow	Native	2
<i>Ulmus americana</i>	American Elm	Native	1
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native	1
<i>Sambucus canadensis</i>	Elderberry	Native	1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 pd
<i>Ulmus americana</i>	American Elm	Native	1
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native	1 cf
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	2
<i>Herbaceous Stratum</i>			
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf
<i>Allium</i> sp.	Unknown Garlic	Undetermined	1
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1

Species name	Common name	Origin	Shrub/Scrub Lowland
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf
<i>Asclepias incarnata</i>	Swamp Milkweed	Native	1
<i>Asclepias syriaca</i>	Common Milkweed	Native	1
Asteraceae	Unknown Aster	Undetermined	1
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1
<i>Carex spp.</i>	Unknown Sedges	Native	1
<i>Carex vulpinoidea</i>	Fox Sedge	Native	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	1 pd
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native	1
<i>Hackelia virginiana</i>	Stickseed	Native	1
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	1 cf
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf
<i>Nepeta cataria</i>	Catnip	Not Native	1 cf
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Persicaria hydropiper</i>	Water Pepper; Marshpepper Knotweed	Not Native	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 pd
<i>Pilea pumila</i>	Clearweed	Native	1
<i>Poa palustris</i>	Fowl Bluegrass	Native	1
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native	1
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf
<i>Typha latifolia</i>	Broadleaf Cattail	Native	1
<i>Typha x glauca</i>	Hybrid Cattail	Not Native	1 cf

Species name	Common name	Origin	Shrub/Scrub Lowland
<i>Urtica dioica</i>	Stinging Nettle	Native	1
<i>Viola sp.</i>	Unknown Violet	Undetermined	1

Duck Creek Detention Restoration/Management Recommendations and Opinion of Probable Cost

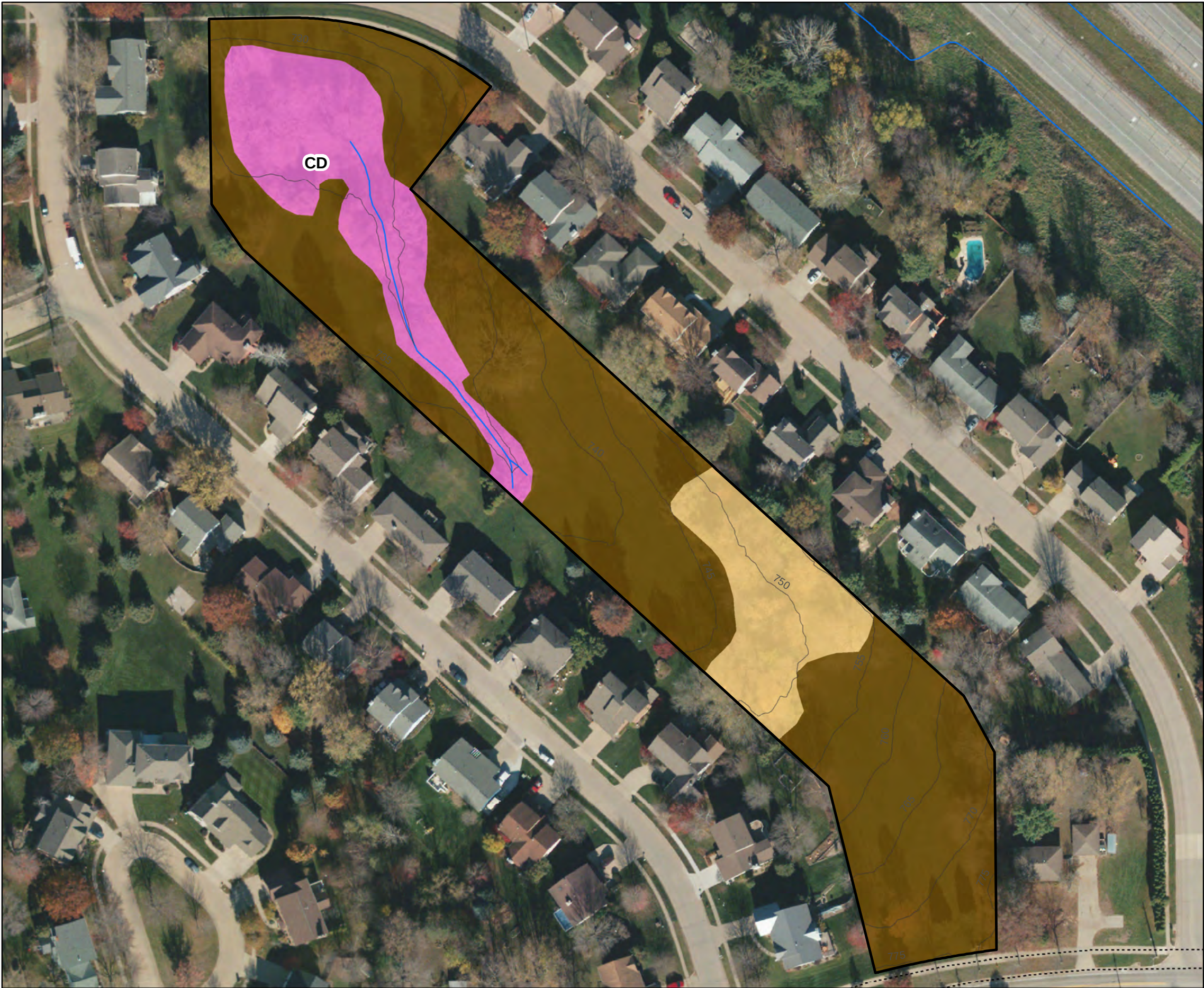
Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland						
Savanna/Brushland and Shrub/Scrub Lowland	0.74	0.74	0.74		0.74	
Grassland and Herbaceous Lowland						
Total Acres	0.74	0.74	0.74	0	0.74	0
Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,500		NA	
Opinions of Probable Cost ¹	\$ 1,850	\$ 1,480	\$ 1,110	\$ -	\$ 1,000	\$ -

Total Opinion of Probable Cost¹	\$ 5,440
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed shrub/scrub lowland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Duck Creek Detention

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
 - Shrub/Scrub Lowland
 - Woodland with Turf
 - Recreation Area
- Contour (5ft interval)
- Trail
- Drainageway

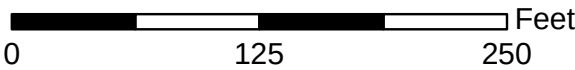
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

ESRC BIOCELLS MANAGEMENT BRIEF

Natural Area Name: ESRC Biocells

Natural Area Size (ac): 1

Natural Area Location (address, nearest street intersection, or other major geographic feature): Northwest of intersection of Scott Blvd. and Freedom Court

Park/Natural Area Class: Dry stormwater basin

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Species lists and planting plans (2014)		X					6 biocells (rain gardens)
Snyder Creek Assessment (2010-2012)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- East to Snyder Creek Greenway

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes); soils amended for biocells

Hydrology Features: Drainageway water flows from N into cells and into drainpipe and creek

Historical Vegetation: Prairie

Past Land Uses: Cropland and grazing

Current Use and Management: Stormwater management facilities

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC	0.44	66.7%
7. Non-native Grassland (little native plant cover)	NR	0.14	21.2%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.02	3.0%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.04	6.1%
14. Building		0.01	1.5%
15. Other Impervious Cover		0.02	3.0%
Totals		0.66	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Endangered: *Agastache foeniculum*

State Threatened: *Allium cernuum*

State Species of Concern: *Amerlanchier alnifolia*, *Baptisia australis*, *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (burdock, thistles, creeping Charlie, wild parsnip, etc.)
- Small site
- 100-yr floodplain encroaches on most of site
- Portions of drainageway banks have minor to moderate erosion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Manage prairie to maintain quality

ESRC Biocells Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Non-Native Grassland
<i>Canopy Stratum</i>				
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native		1
<i>Amelanchier alnifolia</i>	Seviceberry	Native	1	
<i>Aronia melanocarpa</i>	Black Chokeberry	Native		1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native		2
<i>Corylus americana</i>	American Hazelnut; American Hazel	Native	1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native		2
<i>Sambucus canadensis</i>	Elderberry	Native	1	3
<i>Symphoricarpos albus</i>	Snowberry	Native	1	
<i>Viburnum dentatum</i>	Southern Arrowwood	Native	1	
<i>Herbaceous Stratum</i>				
<i>Agastache foeniculum</i>	Anise Hyssop	Native	1	
<i>Ageratina altissima</i>	Common White Snakeroot	Native		1
<i>Allium cernuum</i>	Nodding Wild Onion	Native	1	
<i>Amorpha canescens</i>	Lead Plant	Native	1	
<i>Andropogon gerardii</i>	Big Bluestem	Native	2	
<i>Anemone cylindrica</i>	Thimbleweed	Native	1	
<i>Anemone virginiana</i>	Thimbleweed; Tall Anemone	Native	1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native		3 pd
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	1
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	1	1
<i>Aster novae-angliae</i>	New England Aster	Native	1	
<i>Aster pilosus</i>	Hairy White Oldfield Aster; Frost Aster	Native	1	1
<i>Baptisia alba</i>	Wild White Indigo	Native	1	
<i>Baptisia australis</i>	Wild Blue Indigo	Native	1	

Species name	Common name	Origin	Prairie	Non-Native Grassland
<i>Bouteloua curtipendula</i>	Sideoats Grama	Native	1	
<i>Bromus japonicus</i>	Japanese Brome	Not Native		1 cf
<i>Campanula rotundifolia</i>	Harebell	Native	1	
<i>Cirsium arvense</i>	Canada thistle	Not Native		2 pd
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1 cf	2 pd
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf	2 pd
<i>Coreopsis palmata</i>	Prairie Coreopsis	Native	1	
<i>Dactylis glomerata</i>	Orchardgrass	Not Native		2
<i>Desmanthus illinoensis</i>	Illinois Bundleflower	Native	1	
<i>Desmodium canadense</i>	Showy Tick Trefoil	Native	1	
<i>Dodecatheon meadia</i>	Shooting Star	Native	1	
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1	
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native	1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1
<i>Erigeron canadensis</i>	Horseweed; Canadian Horseweed; Canadian Fleabane	Native	1	
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	1	
<i>Eupatorium altissimum</i>	Tall Boneset	Native		1
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	1	
<i>Eupatorium perfoliatum</i>	Boneset	Native	1	
<i>Festuca arundinacea</i>	Tall Fescue	Not Native		1 cf
<i>Geum triflorum</i>	Prairie Smoke	Native	1	
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native		2 pd
<i>Helianthus mollis</i>	Downy Sunflower	Native	1	
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native		2
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native	2	
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native		1
<i>Heuchera richardsonii</i>	Prairie Alumroot	Native	1	
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native	1	
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native		2
<i>Leonurus cardiaca</i>	Motherwort	Not Native		1 cf

Species name	Common name	Origin	Prairie	Non-Native Grassland
<i>Leucanthemum vulgare</i>	Oxeye Daisy	Not Native		1
<i>Liatris pycnostachya</i>	Prairie Blazing Star	Native	1	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		1 cf
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native		2 cf
<i>Mentha spicata</i>	Spearmint; Common Mint	Not Native		1
<i>Mirabilis nyctaginea</i>	Wild Four O'Clock	Native	1	
<i>Monarda didyma</i>	Scarlet Bee Balm 'Jacob Cline'	Not Native	2	2
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	2	2
<i>Oenothera biennis</i>	Evening Primrose	Native	1	1
<i>Oenothera macrocarpa</i>	Bigfruit Evening Primrose; Missouri Evening Primrose; Ozark Sundrops	Native	1	
<i>Oenothera pilosella</i>	Prairie Sundrops	Native	1	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	2 pd
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	1	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		
<i>Phleum pratense</i>	Timothy	Not Native		1 cf
<i>Phlox pilosa</i>	Prairie Phlox	Native	1	
<i>Physostegia virginiana</i>	Obedient Plant	Native		1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native		1
<i>Rubus laciniatus</i>	Evergreen Blackberry	Not Native	2	
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1	1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	1 cf
<i>Saponaria officinalis</i>	Common Soapwort; Bouncing Bet	Not Native	1	1
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	2	
<i>Securigera varia</i>	Crown Vetch	Not Native		1 cf
<i>Senecio pauperculus</i>	Ragwort	Native	1	
<i>Silene regia</i>	Royal Catchfly	Native	1	
<i>Silphium integrifolium</i>	Rosinweed	Native	1	
<i>Silphium laciniatum</i>	Compass Plant	Native	1	
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native	1	
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native		1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1	2

Species name	Common name	Origin	Prairie	Non-Native Grassland
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native		1
<i>Solidago nemoralis</i>	Oldfield Goldenrod	Native	1	
<i>Solidago rigida</i>	Stiff Goldenrod	Native	1	1
<i>Sorghastrum nutans</i>	Indian Grass	Native	1	
<i>Sporobolus heterolepis</i>	Prairie Dropseed	Native	1	
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native	1	1
<i>Tradescantia bracteata</i>	Prairie Spiderwort	Native	2	
<i>Verbena stricta</i>	Hoary Vervain	Native	1	
<i>Vernonia fasciculata</i>	Common Ironweed; Prairie Ironweed; Smooth Ironweed	Native	2	
<i>Veronicastrum virginicum</i>	Culver's Root	Native	1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		2
<i>Zizia aurea</i>	Golden Alexanders	Native	1	

ESRC Biocells Restoration/Management Recommendations and Opinion of Probable Cost

Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland						
Savanna/Brushland and Shrub/Scrub Lowland						
Grassland and Herbaceous Lowland	0.58	0.58	0.58		0.58	0.58
Total Acres	0	0.58	0.58	0	0.58	0.58
Unit Cost (for 3 yrs)		\$ 2,000	\$ 1,000		NA	NA
Opinions of Probable Cost ¹	\$ -	\$ 1,160	\$ 580	\$ -	\$ 1,000	\$ 1,500

Total Opinion of Probable Cost¹	\$ 4,240
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed prairie and non-native grassland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

ESRC Biocells

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Non-native Grassland
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

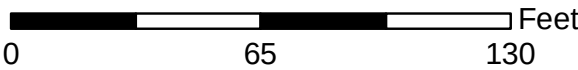
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

FIRE STATION 4 BIOCELL MANAGEMENT BRIEF

Natural Area Name: Fire Station 4 Biocell

Natural Area Size (ac): <1

Natural Area Location (address, nearest street intersection, or other major geographic feature): Northeast of intersection of Scott Blvd. and Dubuque Road

Park/Natural Area Class: Dry stormwater basin

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Fire Station 4 Handbook (2016)		X					Replanted 2013; replanted in 2016
E-mail regarding planted species (2015)		X					

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- NA

Dominant Soils **Upland:** Fayette silty clay loam (9-14% slopes); soils amended for biocells (incl. texture) **Lowland:** NA

Hydrology Features: NA

Historical Vegetation: Oak barrens

Past Land Uses: Cropland and grazing; road

Current Use and Management: Stormwater management facility

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	NN	0.07	63.6%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.04	36.4%
14. Building			
15. Other Impervious Cover			
Totals		0.11	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Threatened: *Filipendula rubra*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (quackgrass, etc.)
- Small site
- Isolated plantings prevents use of prescribed burning

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Manage rain gardens to maintain quality

Fire Station 4 Biocell Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie
<i>Canopy Stratum</i>			
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Viburnum dentatum</i>	Southern Arrowwood	Native	2
<i>Herbaceous Stratum</i>			
<i>Allanthus altissima</i>	Tree of Heaven	Not Native	1 cf
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native	1
<i>Anemone canadensis</i>	Canada anemone	Native	2
<i>Asclepias incarnata</i>	Swamp Milkweed	Native	2
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	1
<i>Baptisia alba</i>	Wild White Indigo	Native	2
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	2
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native	1
<i>Elymus repens</i>	Quackgrass	Not Native	2 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Erigeron canadensis</i>	Horseweed; Canadian Horseweed; Canadian Fleabane	Native	1
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	1
<i>Eupatorium perfoliatum</i>	Boneset	Native	3
<i>Filipendula rubra</i>	Queen of the Prairie	Native	1
<i>Geum triflorum</i>	Prairie Smoke	Native	1
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native	2
<i>Lactuca scariola</i>	Prickly Lettuce	Not Native	2
<i>Medicago lupulina</i>	Black Medic	Not Native	1 cf
<i>Monarda didyma</i>	Scarlet Bee Balm 'Jacob Cline'	Not Native	1
<i>Panicum virgatum</i>	Switchgrass	Native	2
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	1

Species name	Common name	Origin	Prairie
<i>Physostegia virginiana</i>	Obedient Plant	Native	1
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1
<i>Rudbeckia fulgida</i>	Orange Coneflower	Native	1
<i>Senna hebecarpa</i>	Wild Senna; American Senna	Native	2
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2
<i>Sporobolus heterolepis</i>	Prairie Dropseed	Native	2
<i>Trifolium repens</i>	White Clover	Not Native	1 cf

Fire Station 4 Biocell Restoration/Management Recommendations and Opinion of Probable Cost

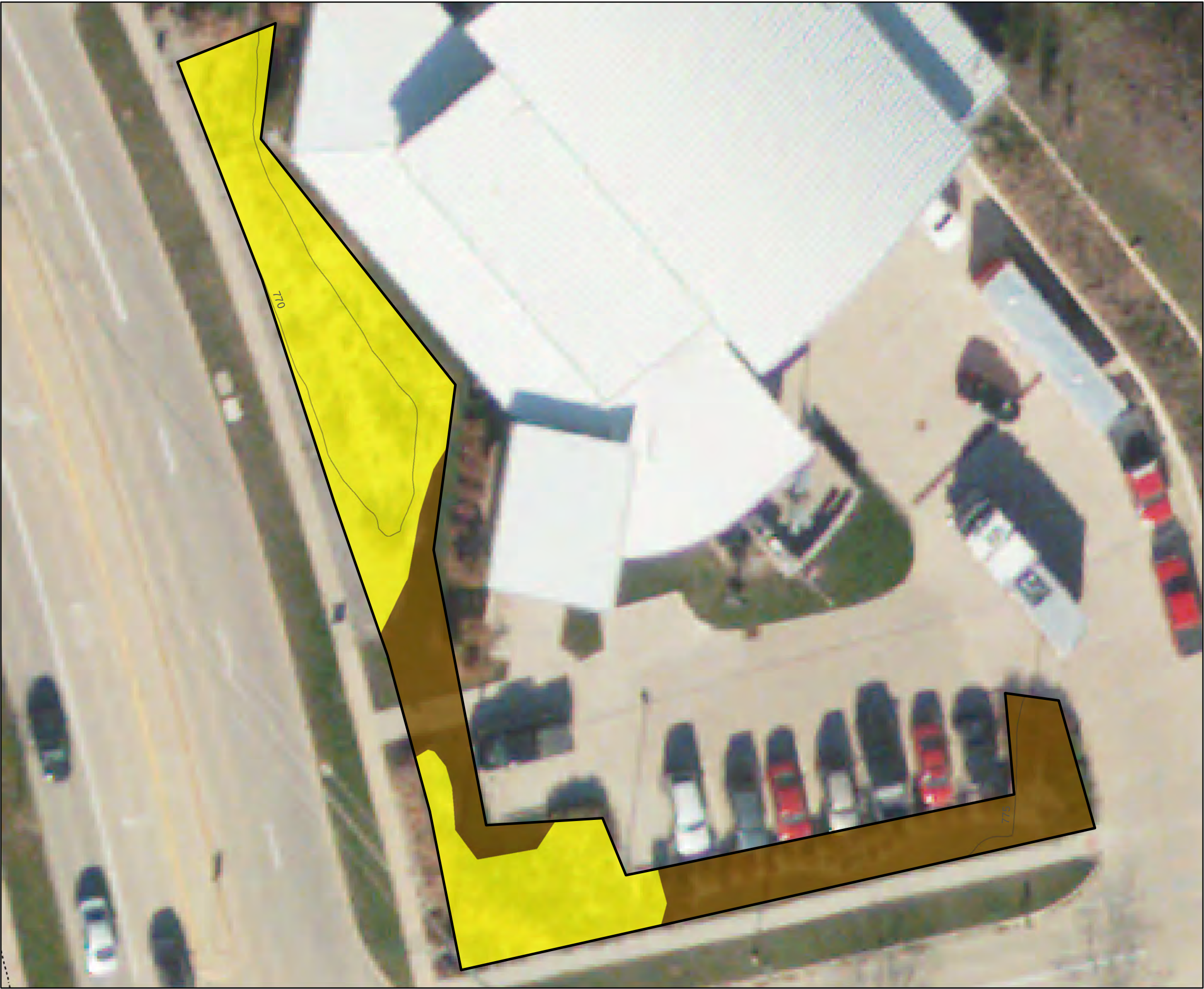
Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland						
Savanna/Brushland and Shrub/Scrub Lowland						
Grassland and Herbaceous Lowland		0.07			0.07	
Total Acres	0	0.07	0	0	0.07	0
Unit Cost (for 3 yrs)		NA			NA	
Opinions of Probable Cost ¹	\$ -	\$ 1,000	\$ -	\$ -	\$ 1,000	\$ -

Total Opinion of Probable Cost¹	\$ 2,000
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed with diverse natives as warranted (costs not included in table above).



Iowa City Natural Areas Inventory
and Management Plan

Fire Station 4 Biocell

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Recreation Area
 - Contour (5ft interval)
 - Trail
 - Drainageway

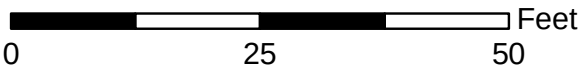
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

GLENDALE PARK MANAGEMENT BRIEF

Natural Area Name: Glendale Park

Natural Area Size (ac): 2

Natural Area Location (address, nearest street intersection, or other major geographic feature): Central district, south of the end of Memler Court

Park/Natural Area Class: Mini Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North to Hickory Hill Park
- South to Trolley Track Greenway

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows northeast to southwest towards Iowa River

Historical Vegetation: Oak barrens

Past Land Uses: Cropland

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.31	19.7%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.15	9.6%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		1.11	70.7%
14. Building			
15. Other Impervious Cover			
Totals		1.57	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (Siberian elm, etc.)
- Small site
- 100-yr floodplain encroaches on site; areas of turf are wet
- Portions of Ralston Creek banks have moderate to severe erosion
- Old dump in NW portion of site
- Opportunity for turf to prairie conversion
- Ralston Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Glendale Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest
<i>Canopy Stratum</i>			
<i>Juglans nigra</i>	Black Walnut	Native	2
<i>Ulmus pumila</i>	Siberian Elm	Not Native	3 ed
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2
<i>Acer saccharinum</i>	Silver Maple	Native	1
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	1 cf
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Cercis canadensis</i>	Eastern Redbud; Judas Tree	Native	1
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native	1 cf
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2
<i>Juglans nigra</i>	Black Walnut	Native	1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Prunus serotina</i>	Black Cherry	Native	1
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native	1
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf
<i>Sambucus canadensis</i>	Elderberry	Native	1
<i>Ulmus americana</i>	American Elm	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1
<i>Herbaceous Stratum</i>			
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native	1
<i>Aster novae-angliae</i>	New England Aster	Native	1
Asteraceae	Unknown Aster	Undetermined	1

Species name	Common name	Origin	Altered Forest
<i>Carex spp.</i>	Unknown Sedges	Native	1
<i>Cryptotaenia canadensis</i>	Honewort	Native	1
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Geum canadense</i>	White Avens; Canada Avens	Native	1
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	1 cf
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	1
<i>Leersia oryzoides</i>	Rice Cutgrass	Native	1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	1
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1
<i>Viola sp.</i>	Unknown Violet	Undetermined	1

Glendale Park Restoration/Management Recommendations and Opinion of Probable Cost

Land Cover Type (ac)	Restoration/Management Action					
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland	0.31	0.31	0.31		0.31	
Savanna/Brushland and Shrub/Scrub Lowland						
Grassland and Herbaceous Lowland						
Total Acres	0.31	0.31	0.31	0	0.31	0
Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,500		NA	
Opinions of Probable Cost ¹	\$ 775	\$ 620	\$ 465	\$ -	\$ 1,000	\$ -

Total Opinion of Probable Cost¹	\$ 2,860
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Glendale Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Open Water
 - Recreation Area
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Minor Erosion
 - Moderate to Severe Erosion

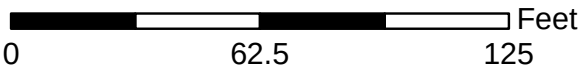
A,B,C,D Natural Community Quality Rank

Data Sources:
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

HICKORY HILL PARK MANAGEMENT BRIEF

Natural Area Name: Hickory Hill Park

Natural Area Size (ac): 185

Natural Area Location (address, nearest street intersection, or other major geographic feature): Central district, north of Rochester/Seventh Avenue and west of North 1st Avenue

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City and Snyder & Assoc. 2016. Hickory Hill Park Master Plan	X						Focused on trails, bridges and signage
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Hirokawa, K.E. 2003. Hickory Hill Past, Present and Future: A Vegetation Analysis and Mgmt Plan. Thesis. University of Iowa.	X	X (detailed)		X			Includes review of historical aerial photos, maps, etc.
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps
Vitosh, Mark A. 2007. General Forest Management Plan. District Forester. Iowa DNR/Forest and Prairies. Iowa City, Iowa.		X			X		
Checklist of the Birds of Greater Hickory Hill Park, Iowa City, IA (RJH 2007)			X				
Ralston Cr. Assessment (2013-14)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- East to Hickory Trail Park (along Ralston Creek)
- South to Glendale Park (along Ralston Creek) and Trolley Track Greenway
- North-northwest to Bristol Drive Woodlands (and other natural areas, mostly forests)
- Northwest to Bur Oak Land Trust easement

Dominant Soils **Upland:** Fayette silt loam (9-25% slopes) (incl. texture) **Lowland:** Nodaway-Arenzville silt loam (1-4% slopes)

Hydrology Features: Ralston Creek (flows west and southwest towards Iowa River); flood control dam

Historical Vegetation: Oak barrens

Past Land Uses: Cropland and grazing

Current Use and Management: Park; portion of forest managed with prescribed fire; volunteer management events

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	BC, C, CD, D	119.81	64.9%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	18.88	10.2%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	D	3.85	2.1%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	C, CD, D	16.37	8.9%
7. Non-native Grassland (little native plant cover)	NR	10.55	5.7%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	1.39	0.8%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		12.55	6.8%
14. Building		0.04	<0.1%
15. Other Impervious Cover		1.11	0.6%
Totals		184.53	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
White-Tailed Deer	Downy Woodpecker Black-Capped Chickadee Northern Flicker Rose-Breasted Grosbeak Red-Bellied Woodpecker	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, multiflora rose, smooth brome, Kentucky bluegrass, reed canary grass, etc.)
- Poor oak regeneration
- 100-yr floodplain encroaches on much of site
- Portions of Ralston Creek banks have moderate to severe erosion, including adjacent to private land
- Large sanitary sewer main runs through park
- Opportunity for turf to prairie conversion
- Ralston Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation (beginning in the higher quality, southern portion of park)
- Increase native vegetation cover and diversity
- Promote oak regeneration (including selective removal of younger native trees)
- Stabilize Ralston Creek banks
- Provide opportunities for public education/interpretation

Hickory Hill Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland
<i>Canopy Stratum</i>							
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native		3			
<i>Carya cordiformis</i>	Bitternut Hickory	Native	1				
<i>Carya ovata</i>	Shagbark Hickory	Native	3				
<i>Celtis occidentalis</i>	Hackberry	Native		1			
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	3	1			
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1				
<i>Juglans nigra</i>	Black Walnut	Native	1	2			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 cf			
<i>Ostrya virginiana</i>	Ironwood; Eastern Hop Hornbeam	Native	1				
<i>Platanus occidentalis</i>	American Sycamore	Native		1			
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1	2			
<i>Prunus serotina</i>	Black Cherry	Native	2	3			
<i>Quercus alba</i>	White Oak	Native	4				
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native	1				
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native	1				
<i>Quercus rubra</i>	Red Oak	Native	1	1			
<i>Tilia americana</i>	American Basswood	Native	2				
<i>Shrub/Vine/Sapling Stratum</i>							
<i>Allanthus altissima</i>	Tree of Heaven	Not Native			1 cf	1 cf	
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	1 cf				
<i>Carya cordiformis</i>	Bitternut Hickory	Native	2				
<i>Celtis occidentalis</i>	Hackberry	Native	1				
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1		4	1	
<i>Elaeagnus angustifolia</i>	Russian Olive	Not Native			1 cf		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland
<i>Eunymus atropurpureus</i>	Wahoo	Native	1				
<i>Juglans nigra</i>	Black Walnut	Native	1				
<i>Juniperus virginiana</i>	Eastern Red Cedar	Native		1			1
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf				
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	3 pd	2 pd	1 cf		
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	2 pd	1 cf			
<i>Ostrya virginiana</i>	Ironwood; Eastern Hop Hornbeam	Native	1				
<i>Prunus caroliniana</i>	Carolina Cherry; Carolina Laurelherry	Not Native	1				
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1	1			
<i>Rosa carolina</i>	Carolina Rose; Pasture Rose	Native				1	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	3 pd			1 cf	
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1			
<i>Tilia americana</i>	American Basswood	Native	2				
<i>Toxicodendron radicans</i>	Poison Ivy	Native	2 pd	1 cf			
<i>Ulmus americana</i>	American Elm	Native	1				
<i>Viburnum dentatum</i>	Southern Arrowwood	Native			1		
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native	1 cf				
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		1			
Herbaceous Stratum							
<i>Agrimonia parviflora</i>	Swamp Agrimony; Small-Flowered Agrimony	Native					1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd	2 pd			
<i>Allium canadense</i>	Wild Onion	Native	1				
<i>Andropogon gerardii</i>	Big Bluestem	Native				1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native		1 cf			
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	1				
<i>Asclepias syriaca</i>	Common Milkweed	Native				1	
<i>Aster pilosus</i>	Hairy White Oldfield Aster; Frost Aster	Native				2	
<i>Barbarea vulgaris</i>	Yellow Rocket; Common Winter Cress	Not Native				2 pd	
<i>Bromus inermis</i>	Smooth Brome	Not Native			3 ed	2 ed	3 ed

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native	1			1	
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native		1			
<i>Carex davisii</i>	Davis' Sedge	Native				1	
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native	1				
<i>Carex sp.</i>	Unknown Sedge	Native	1				
<i>Carex spp.</i>	Unknown Sedges	Native				1	
<i>Cinna arundinacea</i>	Sweet Woodreed; Stout Woodreed	Native		1			
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	2	1			
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native				1	
<i>Cryptotaenia canadensis</i>	Honewort	Native	3	1			
<i>Dactylis glomerata</i>	Orchardgrass	Not Native				1	1
<i>Desmodium cuspidatum</i>	Hairy-Bracted Tick Trefoil; Large-Bracted Tick Trefoil	Native			1		
<i>Dryopteris sp.</i>	Unknown Wood Fern	Undetermined	1				
<i>Duchesnea indica</i>	Mock Strawberry; Indian Strawberry; False Strawberry	Native		1			
<i>Elymus riparius</i>	Riverbank Wild Rye	Native	1				
<i>Elymus villosus</i>	Silky Wild Rye	Native		1			
<i>Erythronium albidum</i>	White Trout Lily; White Fawn Lily; White Dogtooth Violet	Native	1				
<i>Euphorbia cyparissias</i>	Cypress Spurge	Not Native				1 cf	
<i>Festuca subverticillata</i>	Nodding Fescue	Native	1	1			
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native	1	1			
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	2	1		1	
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	1				
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native	1				
<i>Hackelia virginiana</i>	Stickseed	Native	1	1			
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native				1	
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf				
<i>Juncus sp.</i>	Unknown Rush	Undetermined	1				
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native				1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native				1 cf	1 cf
<i>Menispermum canadense</i>	Canada Moonseed	Native	1				
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native			1	3	
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	2	1			
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1				
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native				1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	2			
<i>Postinaca sativa</i>	Wild Parsnip	Not Native				1 cf	
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native				1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		2 pd		1 cf	2 pd
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native					1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native			2 ed	2 ed	3 ed
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	1				
<i>Polemonium reptans</i>	Jacob's Ladder	Native	1				
<i>Pycnanthemum virginianum</i>	Common Mountain Mint; Virginia Mountain Mint	Native				1	
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1				
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 pd				
<i>Rumex crispus</i>	Curly Dock	Not Native				1 cf	
<i>Sanguinaria canadensis</i>	Bloodroot	Native	1				
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	4				
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native	1				
<i>Smilax sp.</i>	Unknown Catbrier	Undetermined	1				
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native				1 cf	
<i>Solidago canadensis</i>	Canada Goldenrod	Native				3	
<i>Solidago rigida</i>	Stiff Goldenrod	Native				1	
<i>Toxicodendron radicans</i>	Poison Ivy	Native		1 cf	1 cf	1 cf	
<i>Tradescantia ohienensis</i>	Ohio Spiderwort	Native				1	
<i>Trifolium pratense</i>	Red Clover	Not Native					1 cf
<i>Trifolium repens</i>	White Clover	Not Native					1 cf
<i>Triosteum perfoliatum</i>	Horse Gentian; Feverwort	Native				1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland
<i>Urtica dioica</i>	Stinging Nettle	Native	1	1			
<i>Verbena urticifolia</i>	White Vervain	Native				1	
<i>Vernonia missurica</i>	Missouri Ironweed	Native				1	
<i>Viburnum sp.</i>	Unknown Viburnum	Undetermined	1				
<i>Viola sp.</i>	Unknown Violet	Undetermined	1	2			
<i>Zizia aurea</i>	Golden Alexanders	Native				1	

Hickory Hill Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland		134.69	138.69	18.88	18.88	138.69	138.69
Savanna/Brushland and Shrub/Scrub Lowland		3.85				3.85	
Grassland and Herbaceous Lowland						26.92	
Total Acres		138.54	138.69	18.88	18.88	169.46	138.69
Unit Cost (for 3 yrs)		\$ 3,000	\$ 1,500	\$ 1,000	\$ 750	\$ 100	\$ 400
Opinions of Probable Cost ¹		\$ 415,620	\$ 208,035	\$ 18,880	\$ 14,160	\$ 16,946	\$ 55,476

Total Opinion of Probable Cost¹	\$ 729,117
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

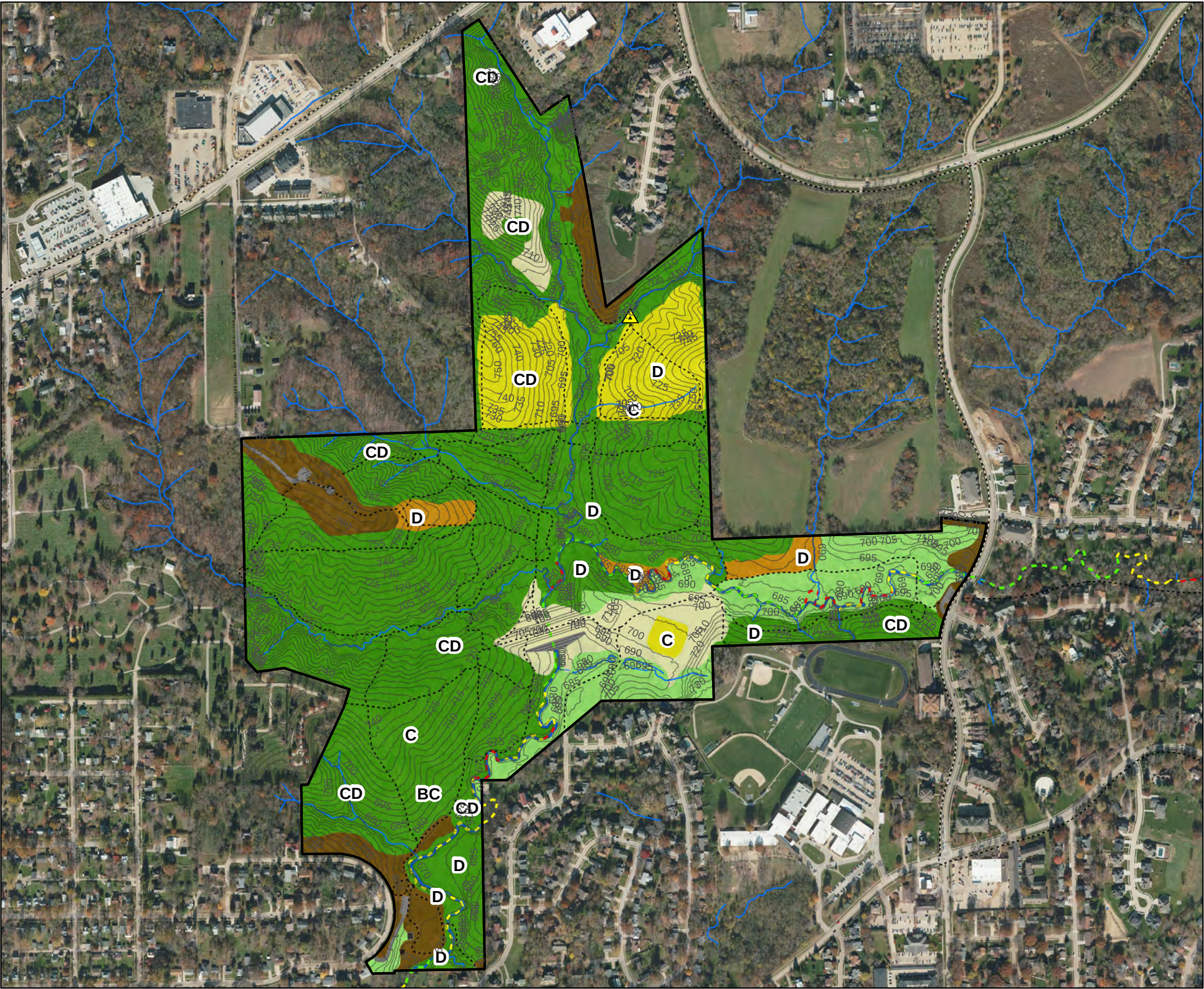
Notes:

Forest/woodland woody invasive removal deducted by 4 acres per REAP grant.

Invasive herbaceous vegetation control, native seeding, and prescribed burning in savanna/brushland and grassland areas not included in table above per REAP grant.

Overseed altered forest/woodland, prairie, and non-native grassland following brush/weed removal.

Install oaks and hickories (e.g., seeds, seedlings, saplings) in altered forest/woodland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Hickory Hill Park

- City Limits
- Iowa City Park or Natural Area
- Notable Erosion Feature
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Prairie
 - Non-native Grassland
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Stable
 - Minor Erosion
 - Moderate to Severe Erosion

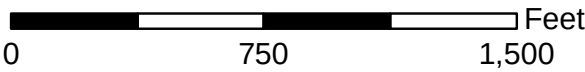
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

HICKORY TRAIL PARK MANAGEMENT BRIEF

Natural Area Name: Hickory Trail Park

Natural Area Size (ac): 3

Natural Area Location (address, nearest street intersection, or other major geographic feature): North district, near east end of Hickory Trail and Hickory Place

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- West to Hickory Hill Park (along Ralston Creek)

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Nodaway-Arenzville silt loam (1-4% slopes)

Hydrology Features: Ralston Creek (flows to west)

Historical Vegetation: Oak barrens

Past Land Uses: Cropland and grazing

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	CD	0.77	23.6%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	D	0.92	28.2%
11. Open Water	NR	0.11	3.4%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		1.45	44.5%
14. Building			
15. Other Impervious Cover		0.01	0.3%
Totals		3.26	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Wild Turkey	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (thistles, ground clovers, reed canary grass, burdock, Kentucky bluegrass, etc.)
- Small site
- 100-yr and 500-yr floodplains and floodway encroach on site
- Portions of Ralston Creek banks have minor erosion
- Opportunity for turf to prairie conversion
- Ralston Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Hickory Trail Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Forested Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	2	
<i>Juglans nigra</i>	Black Walnut	Native	2	
<i>Salix nigra</i>	Black Willow	Native	2	
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Carex vulpinoidea</i>	Fox Sedge	Native	1	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf	
<i>Prunus serotina</i>	Black Cherry	Native	1	
<i>Rhus glabra</i>	Smooth Sumac	Native		1
<i>Salix nigra</i>	Black Willow	Native	1	
<i>Sambucus canadensis</i>	Elderberry	Native	1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	
<i>Herbaceous Stratum</i>				
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf	2 pd
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	1
<i>Bromus inermis</i>	Smooth Brome	Not Native		2 pd
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1	
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native		1
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native	1	
<i>Cirsium arvense</i>	Canada thistle	Not Native		3 pd
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	

Species name	Common name	Origin	Forested Lowland	Herbaceous Lowland
<i>Cirsium vulgare</i>	Bull Thistle	Not Native		2 pd
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf	3 ed
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	1	
<i>Hackelia virginiana</i>	Stickseed	Native	1	
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native	1	
<i>Lepidium virginicum</i>	Virginia Peppergrass; Common Peppergrass	Native		1
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1	1
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	1 cf
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	4 ed	4 ed
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native		2
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	2 pd
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf	
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	1 cf
<i>Scrophularia marilandica</i>	Figwort	Native	1	
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	2	
<i>Trifolium hybridum</i>	Alsike Clover	Not Native		2 pd
<i>Trifolium pratense</i>	Red Clover	Not Native		2 pd
<i>Trifolium repens</i>	White Clover	Not Native		2 pd
<i>Urtica dioica</i>	Stinging Nettle	Native	1	1
<i>Verbena urticifolia</i>	White Vervain	Native	1	

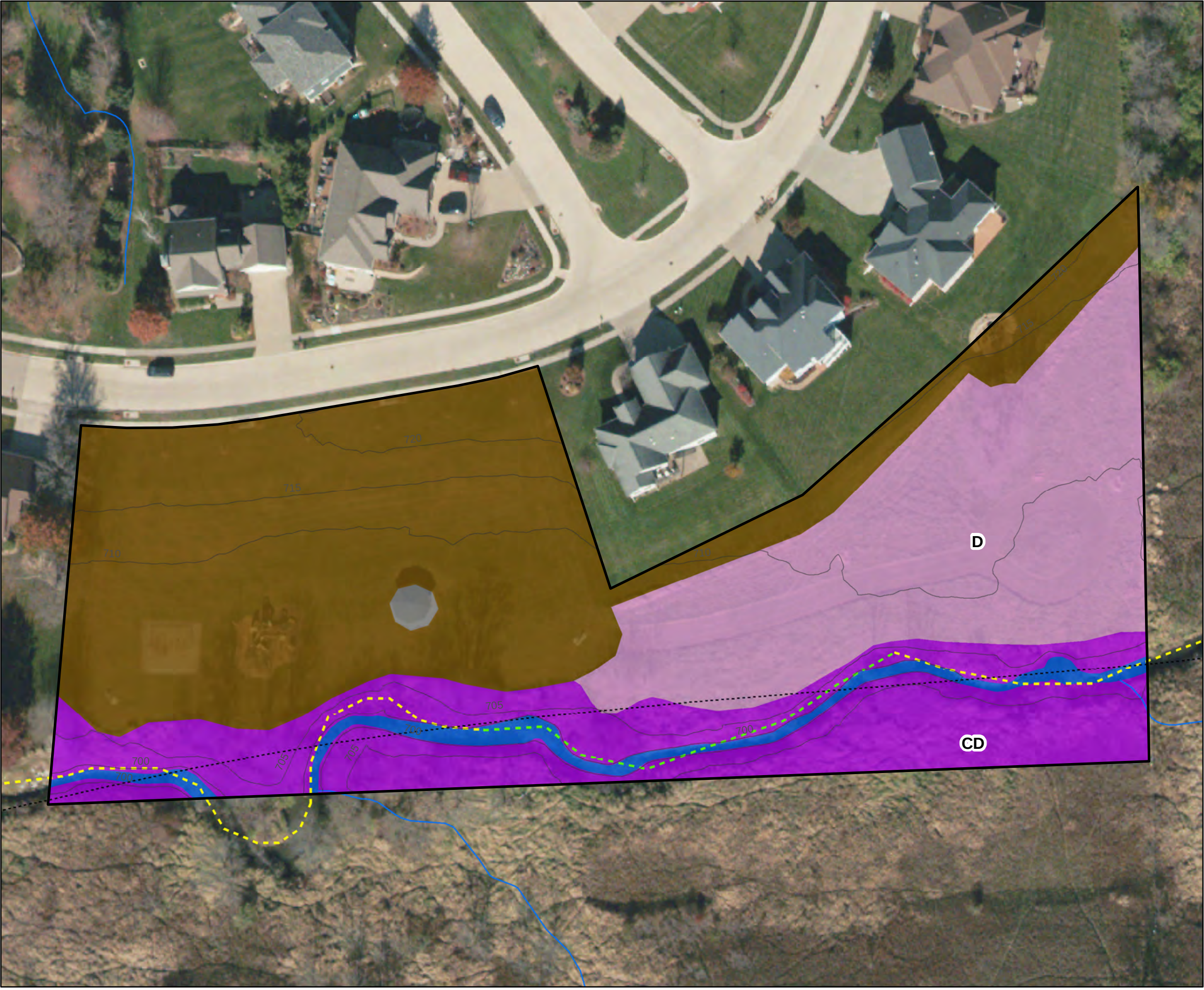
Hickory Trail Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland		0.77	0.77	0.77		0.77	
Savanna/Brushland and Shrub/Scrub Lowland							
Grassland and Herbaceous Lowland			0.92	0.92		0.92	0.92
Total Acres		0.77	1.69	1.69	0	1.69	0.92
Unit Cost (for 3 yrs)	\$	2,500	\$ 2,500	\$ 1,500		\$ 1,000	NA
Opinions of Probable Cost ¹	\$	1,925	\$ 4,225	\$ 2,535	\$ -	\$ 1,690	\$ 2,000
Total Opinion of Probable Cost¹		\$ 12,375					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forested and herbaceous lowlands following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Hickory Trail Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
 - Forested Lowland
 - Herbaceous Lowland
 - Open Water
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)**
 - Stable
 - Minor Erosion

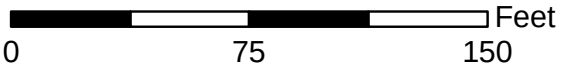
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

HUNTERS RUN PARK MANAGEMENT BRIEF

Natural Area Name: Hunters Run Park

Natural Area Size (ac): 32

Natural Area Location (address, nearest street intersection, or other major geographic feature): West district, north of Duck Creek Drive and Prairie Grass Lane, southwest of Highway 218

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Willow Creek Assessment (2010-2011)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Southeast to Duck Creek Detention

Dominant Soils **Upland:** Clinton silt loam (9-14% slopes), Fayette silt loam (14-18% slopes) (incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Willow Creek (flows to east)

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC	2.82	8.7%
7. Non-native Grassland (little native plant cover)	NR	8.89	27.5%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	CD	7.23	22.4%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	CD, D	3.49	10.8%
11. Open Water	NR	0.92	2.8%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		8.30	25.7%
14. Building		0.02	0.1%
15. Other Impervious Cover		0.63	2.0%
Totals		32.30	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (Amur maple, tall fescue, reed canary grass, crown vetch, poison ivy, etc.)
- Three parcels; southwest parcel experienced severe erosion and was stabilized winter 2016-17
- 100-yr floodplain encroaches on eastern portion of site
- Portions of Willow Creek banks have minor erosion
- Opportunity for turf to prairie conversion
- Willow Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Hunters Run Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>						
<i>Acer saccharinum</i>	Silver Maple	Native			3	
<i>Shrub/Vine/Sapling Stratum</i>						
<i>Acer ginnala</i>	Amur Maple	Not Native		3 cf		
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native			2	2
<i>Acer saccharinum</i>	Silver Maple	Native			2	
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native		1		
<i>Celtis occidentalis</i>	Hackberry	Native			2	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	3		2	2
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		2		
<i>Fraxinus sp.</i>	Unknown Ash	Undetermined			1	
<i>Juglans nigra</i>	Black Walnut	Native			1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native			2 cf	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		2 cf	1 cf	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native			2	
<i>Picea sp.</i>	Unknown Spruce	Not Native		2		
<i>Pinus strobus</i>	White Pine; Eastern White Pine	Native		3		
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1			
<i>Prunus americana</i>	American Plum; Wild Plum	Native				1
<i>Ribes missouriense</i>	Missouri Gooseberry	Native			1	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf	1 cf	1 cf	
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native	1	1		
<i>Salix nigra</i>	Black Willow	Native			1	
<i>Sambucus canadensis</i>	Elderberry	Native				2
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf		3 pd	
<i>Ulmus americana</i>	American Elm	Native	1			

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1		2	2
<i>Herbaceous Stratum</i>						
<i>Ageratina altissima</i>	Common White Snakeroot	Native			1	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native			1 cf	
<i>Ambrosia trifida</i>	Giant Ragweed	Native		1		1
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native			1	
<i>Andropogon gerardii</i>	Big Bluestem	Native	2			
<i>Anemone canadensis</i>	Canada anemone	Native	2			
<i>Apios americana</i>	Potato Bean; Groundnut	Native				1
<i>Baptisia alba</i>	Wild White Indigo	Native	1			
<i>Bromus inermis</i>	Smooth Brome	Not Native				1 pd
<i>Bromus japonicus</i>	Japanese Brome	Not Native				1 cf
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native				2
<i>Carex vulpinoidea</i>	Fox Sedge	Native		1	1	1
<i>Chamaecrista fasciculata</i>	Partridge Pea	Native	2			
<i>Cicuta maculata</i>	Water Hemlock; Spotted Water Hemlock	Native			1	2
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native			1	
<i>Cirsium arvense</i>	Canada thistle	Not Native		2 cf		2 pd
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native				1
<i>Cirsium vulgare</i>	Bull Thistle	Not Native		1 cf		
<i>Conium maculatum</i>	Poison Hemlock	Not Native				2 pd
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native	2			
<i>Cryptotaenia canadensis</i>	Honewort	Native			2	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf		
<i>Duchesnea indica</i>	Mock Strawberry; Indian Strawberry; False Strawberry	Native			2	
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1			
<i>Eleocharis erythropoda</i>	Bald Spikerush; Creeping Spikerush	Native		1		
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native				1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native		4 pd		

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywillly	Native			1	
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native			1	1
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native			1	1
<i>Hackelia virginiana</i>	Stickseed	Native			1	
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native				2
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native			2	
<i>Helopsis helianthoides</i>	Oxeye; False Sunflower	Native	1			
<i>Hypericum pyramidatum</i>	Great St. John's Wort	Native	1			
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native			2	
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native	1			
<i>Lactuca biennis</i>	Tall Blue Lettuce	Native			1	
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native	1			
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		1 cf		1 cf
<i>Malus sp.</i>	Unknown Apple	Undetermined	1			
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf			
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native				1 cf
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	2			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf			
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native			1	
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native	1			
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native			1 cf	2 pd
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	2			
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf	1 cf	3 cf	4 pd
<i>Phleum pratense</i>	Timothy	Not Native				1 cf
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	4 pd		
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	Native				1
<i>Prunus serotina</i>	Black Cherry	Native	1			1
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native	2			
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	2			

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Rosa blanda</i>	Prairie Rose; Smooth Wild Rose; Early Wild Rose	Native	1			
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1			
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native			3	
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	4			
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		1		
<i>Securigera varia</i>	Crown Vetch	Not Native	2 pd	2 cf		
<i>Silphium laciniatum</i>	Compass Plant	Native	1			
<i>Solidago canadensis</i>	Canada Goldenrod	Native	3			
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native			2	3
<i>Solidago rigida</i>	Stiff Goldenrod	Native	2			
<i>Sorghastrum nutans</i>	Indian Grass	Native	1			
<i>Symphotrichum lateriflorum</i>	Calico Aster; One-Sided Aster; White Woodland Aster; Starved Aster	Native			2	
<i>Symphotrichum lanceolatum</i>	Panicled Aster; Lance-Leaved Aster	Native		2		
<i>Taraxacum officinale</i>	Common Dandelion	Not Native		2 cf		
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native			2	1
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native			2	
<i>Toxicodendron radicans</i>	Poison Ivy	Native				2 pd
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native	2			
<i>Trifolium hybridum</i>	Alsike Clover	Not Native				1 cf
<i>Trifolium repens</i>	White Clover	Not Native				1 cf
<i>Viola sororia</i>	Common Blue Violet	Native			2	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		2		

Hunters Run Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	7.23	7.23	7.23	7.23		
	Savanna/Brushland and Shrub/Scrub Lowland						
	Grassland and Herbaceous Lowland		15.2	15.2	15.2	15.2	
	Total Acres	7.23	22.43	22.43	0	22.43	
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,000	\$ 200	NA	
	Opinions of Probable Cost ¹	\$ 18,075	\$ 44,860	\$ 22,430	\$ -	\$ 4,486	\$ 5,000
Total Opinion of Probable Cost ¹		\$	94,851				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forested and herbaceous areas following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Hunters Run Park

City Limits

Iowa City Park or Natural Area

Notable Erosion Feature

Existing Land Cover

Prairie

Non-native Grassland

Forested Lowland

Herbaceous Lowland

Open Water

Recreation Area

Building or Structure

Other Impervious Cover

Contour (5ft interval)

Trail

Drainageway

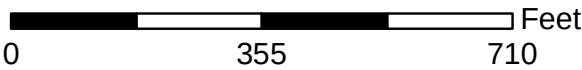
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

IOWA CITY KICKERS SOCCER PARK/OXEYE PRAIRIE MANAGEMENT BRIEF

Natural Area Name: Iowa City Kickers Soccer Park/Oxeye Prairie

Natural Area Size (ac): 164 (entire park); 22 (prairie)

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, soccer park along Soccer Park Road; Oxeye Prairie south of Iowa City's South Wastewater Treatment Plant, east of intersection of Sycamore Street and Nursery Lane

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Wastewater Treatment Plant Wetland		X					Burn plan
Oxeye Prairie Management Plan (Feb. 2009)	X	X	X	X (2009-2013)			Originally planted in 1996; planting plan; burn plan

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North to Sycamore Greenway

Dominant Soils Upland & Lowland: Very complex assemblage of >20 soil types; textures range from loamy fine (incl. texture) sand to silty clay loam; mostly <2% slopes

Hydrology Features: Receives treated effluent from Iowa City's South Wastewater Treatment Plant (just north of the prairie); drainageway flows south, through southeast corner of site, towards Iowa River

Historical Vegetation: Prairie (with Thicket identified in northwest corner)

Past Land Uses: Cropland (including a tile line)

Current Use and Management: Active park; effluent treatment site; City staff have monitored the site intermittently

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	D	1.18	0.7%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC, C, CD, D	15.49	9.5%
7. Non-native Grassland (little native plant cover)	NR	26.12	16.0%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	C, D	8.74	5.3%
11. Open Water	NR	0.32	0.2%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		1.14	0.7%
13. Recreation Area (0-50% tree canopy)		79.30	48.5%
14. Building		3.65	2.2%
15. Other Impervious Cover		27.63	16.9%
Totals		163.57	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
Beaver Mink	None observed	Snapping Turtle American Toad Several spp of frogs	Several spp of Odonata

Issues and Opportunities:

- Invasive vegetation (reed canary grass, Kentucky bluegrass, cattails, etc.)
- Oxeye Prairie ranges from good to poor quality
- Wastewater treatment plant expansion threat to prairie
- 100-yr floodplain encroaches on site
- Planted oak trees experiencing “tatters” suggesting herbicide drift from adjacent cropland
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Iowa City Kickers Soccer Park/Oxeye Prairie Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Non-Native Grassland	Herbaceous Lowland
<i>Canopy Stratum</i>					
<i>Betula nigra</i>	River Birch	Native		1	
<i>Quercus bicolor</i>	Swamp White Oak	Native		1	
<i>Shrub/Vine/Sapling Stratum</i>					
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	1	
<i>Herbaceous Stratum</i>					
<i>Andropogon gerardii</i>	Big Bluestem	Native	2		
<i>Anemone canadensis</i>	Canada anemone	Native	1		
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native	1		1
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native			2
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	1	
<i>Aster novae-angliae</i>	New England Aster	Native	1		
<i>Bromus inermis</i>	Smooth Brome	Not Native	1 cf	1 cf	
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native	1		1
<i>Carex frankii</i>	Frank's Sedge; Bristly Cattail Sedge	Native			1
<i>Carex scoparia</i>	Broom Sedge; Lance-Fruited Oval Sedge	Native			1
<i>Carex spp.</i>	Unknown Sedges	Native	1	1	
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native			1
<i>Carex vulpinoidea</i>	Fox Sedge	Native	1		
<i>Cirsium arvense</i>	Canada thistle	Not Native		1 cf	
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native			1
<i>Conium maculatum</i>	Poison Hemlock	Not Native		1 cf	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf	
<i>Desmodium canadense</i>	Showy Tick Trefoil	Native	1		
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native		1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1	

Species name	Common name	Origin	Prairie	Non-Native Grassland	Herbaceous Lowland
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	1		
<i>Gentiana alba</i>	Cream gentian	Native	1		
<i>Geum</i> sp.	Unknown Avenis	Undetermined			1
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native		1 cf	
<i>Helianthus giganteus</i>	Giant Sunflower; Tall Sunflower	Native			1
<i>Helianthus</i> sp.	Unknown Sunflower	Undetermined	1	1	
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native			1
<i>Koeleria macrantha</i>	June Grass; Prairie June Grass	Native	2		
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native	1		
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf		
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native		1 pd	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1		
<i>Oenothera biennis</i>	Evening Primrose	Native	1		
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	1 cf	1 cf
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	1		
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		1 cf	4 ed
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native		1	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	2 ed	
Polygonaceae	Unknown Knotweed	Undetermined			2
<i>Pycnanthemum</i> sp.	Unknown Mountain Mint	Undetermined			1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	1		
<i>Rosa</i> sp.	Unknown Rose	Undetermined	1		
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf		
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	1		
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native	1		1
<i>Securigera varia</i>	Crown Vetch	Not Native		1 cf	1 cf
<i>Senecio pauperculus</i>	Ragwort	Native	3		2
<i>Silphium integrifolium</i>	Rosinweed	Native	1		
<i>Silphium laciniatum</i>	Compass Plant	Native	1		

Species name	Common name	Origin	Prairie	Non-Native Grassland	Herbaceous Lowland
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native		1 cf	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2	3	1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1		
<i>Solidago rigida</i>	Stiff Goldenrod	Native	1		
<i>Sorghastrum nutans</i>	Indian Grass	Native	2		
<i>Taraxacum officinale</i>	Common Dandelion	Not Native		1 cf	
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native	2		1
<i>Trifolium repens</i>	White Clover	Not Native	1 cf		
<i>Typha x glauca</i>	Hybrid Cattail	Not Native			2 pd
<i>Verbena hastata</i>	Blue Vervain	Native			2
<i>Vernonia fasciculata</i>	Common Ironweed; Prairie Ironweed; Smooth Ironweed	Native			1
<i>Vernonia missurica</i>	Missouri Ironweed	Native			1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1		
<i>Zizia aurea</i>	Golden Alexanders	Native	1		

Iowa City Kickers Soccer Park/Oxeye Prairie Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Forest/Woodland and Forested Lowland								
Savanna/Brushland and Shrub/Scrub Lowland	1.18		1.18	1.18		1.18	1.18	
Grassland and Herbaceous Lowland			50.35	50.35		50.35	50.35	
Total Acres	1.18		51.53	51.53	0	51.53	51.53	
Unit Cost (for 3 yrs)	\$	1,500	\$ 1,500	\$ 1,500		\$	150	NA
Opinions of Probable Cost ¹	\$	1,770	\$ 77,295	\$ 77,295	\$ -	\$ 7,730	\$	15,000
Total Opinion of Probable Cost¹		\$	179,090					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed shrub/scrub and herbaceous areas following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

I. C. Kickers Soccer Park

City Limits

Iowa City Park or Natural Area

Existing Land Cover

Shrub/Scrub

Prairie

Non-native Grassland

Herbaceous Lowland

Woodland with Turf

Recreation Area

Building or Structure

Other Impervious Cover

Contour (5ft interval)

Trail

Drainageway

A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01

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380

760

Feet

N

APPENDIX B. | 227

CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

KIWANIS PARK MANAGEMENT BRIEF

Natural Area Name: Kiwanis Park

Natural Area Size (ac): 15

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, southwest of Teg Drive, near Buchanan Court

Park/Natural Area Class: Community Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Willow Creek Assessment (2010-2011)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- NA

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo silt loam (0-2% slopes), occasionally flooded, overwash

Hydrology Features: Willow Creek flows northwest to southeast

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	4.27	28.9%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	C	1.04	7.0%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.54	3.7%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		7.56	51.1%
14. Building		0.02	0.1%
15. Other Impervious Cover		1.37	9.3%
Totals		14.79	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	Garter snake	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, poison ivy, etc.)
- 100-yr floodplain and floodway encroach on most of site
- Portions of Willow Creek banks have moderate to severe erosion
- Reno mattresses along creek overgrown with willow and cottonwood
- Opportunity for turf to prairie conversion
- Willow Creek access opportunity

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize Willow Creek banks

Kiwanis Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Prairie
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Acer saccharinum</i>	Silver Maple	Native	3	
<i>Celtis occidentalis</i>	Hackberry	Native	1	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Prunus serotina</i>	Black Cherry	Native	1	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 cf	
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1	
<i>Betula nigra</i>	River Birch	Native	1	
<i>Celtis occidentalis</i>	Hackberry	Native	1	
<i>Cornus alternifolia</i>	Pagoda Dogwood; Alternate-Leaved Dogwood	Native	1	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 pd	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf	
<i>Prunus americana</i>	American Plum; Wild Plum	Native	1	
<i>Prunus serotina</i>	Black Cherry	Native	1	
<i>Prunus virginiana</i>	Chokecherry	Native	1	
<i>Prunus x cistena</i>	Purple Leaf Sand Cherry; Dwarf Red Leaf Sand Cherry	Not Native	1	
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf	
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 pd	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf	

Species name	Common name	Origin	Altered Forest	Prairie
<i>Sambucus canadensis</i>	Elderberry	Native	1	
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined	1	
<i>Ulmus americana</i>	American Elm	Native	1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	
<i>Herbaceous Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native		1
<i>Acer saccharinum</i>	Silver Maple	Native		1
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native		1
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native		1
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1	
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native		1
<i>Andropogon gerardii</i>	Big Bluestem	Native		2
<i>Anemone canadensis</i>	Canada anemone	Native	1	
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native	1 cf	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native		1
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	
<i>Asteraceae</i>	Unknown Aster	Undetermined		1
<i>Baptisia alba</i>	Wild White Indigo	Native	1 cf	
<i>Bromus inermis</i>	Smooth Brome	Not Native		1
<i>Carex</i> spp.	Unknown Sedges	Native		1
<i>Celtis occidentalis</i>	Hackberry	Native	1	
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native		1
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1 cf	
<i>Conium maculatum</i>	Poison Hemlock	Not Native		1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1 cf	
<i>Cryptotaenia canadensis</i>	Honewort	Native		1 cf
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf

Species name	Common name	Origin	Altered Forest	Prairie
<i>Elymus repens</i>	Quackgrass	Not Native	1 pd	
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1	
<i>Geum canadense</i>	White Aven; Canada Aven	Native	1	
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	1 cf	
<i>Hackelia virginiana</i>	Stickseed	Native	1	
<i>Helianthus sp.</i>	Unknown Sunflower	Undetermined	1	1
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	1	
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native		1
<i>Medicago lupulina</i>	Black Medic	Not Native		1 cf
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1	
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native		1
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native		1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 pd	
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native		1
Polygonaceae	Unknown Knotweed	Undetermined		1
<i>Prunella vulgaris</i>	Self-Heal; Heal-All	Native		1
<i>Pycnanthemum sp.</i>	Unknown Mountain Mint	Undetermined		1
<i>Robinia pseudoacacia</i>	Black Locust	Not Native		1 cf
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	1	
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	
<i>Salix nigra</i>	Black Willow	Native		1
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1	
<i>Securigera varia</i>	Crown Vetch	Not Native	1 cf	
<i>Silphium perfoliatum</i>	Cup Plant	Native	1	2
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1	

Species name	Common name	Origin	Altered Forest	Prairie
<i>Stachys palustris</i>	Woundwort	Native	1	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1	
<i>Toxicodendron radicans</i>	Poision Ivy	Native	2 ed	2 pd
<i>Trifolium repens</i>	White Clover	Not Native		1 cf
<i>Viola sp.</i>	Unknown Violet	Undetermined	1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		2

Kiwanis Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	4.27	4.27	4.27	4.27		
	Savanna/Brushland and Shrub/Scrub Lowland						
	Grassland and Herbaceous Lowland		1.04	1.04	1.04	1.04	
	Total Acres	4.27	5.31	5.31	0	5.31	1.04
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,000		\$ 300	NA
Opinions of Probable Cost ¹		\$ 10,675	\$ 10,620	\$ 5,310	\$ -	\$ 1,593	\$ 1,500
Total Opinion of Probable Cost ¹		\$	29,698				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

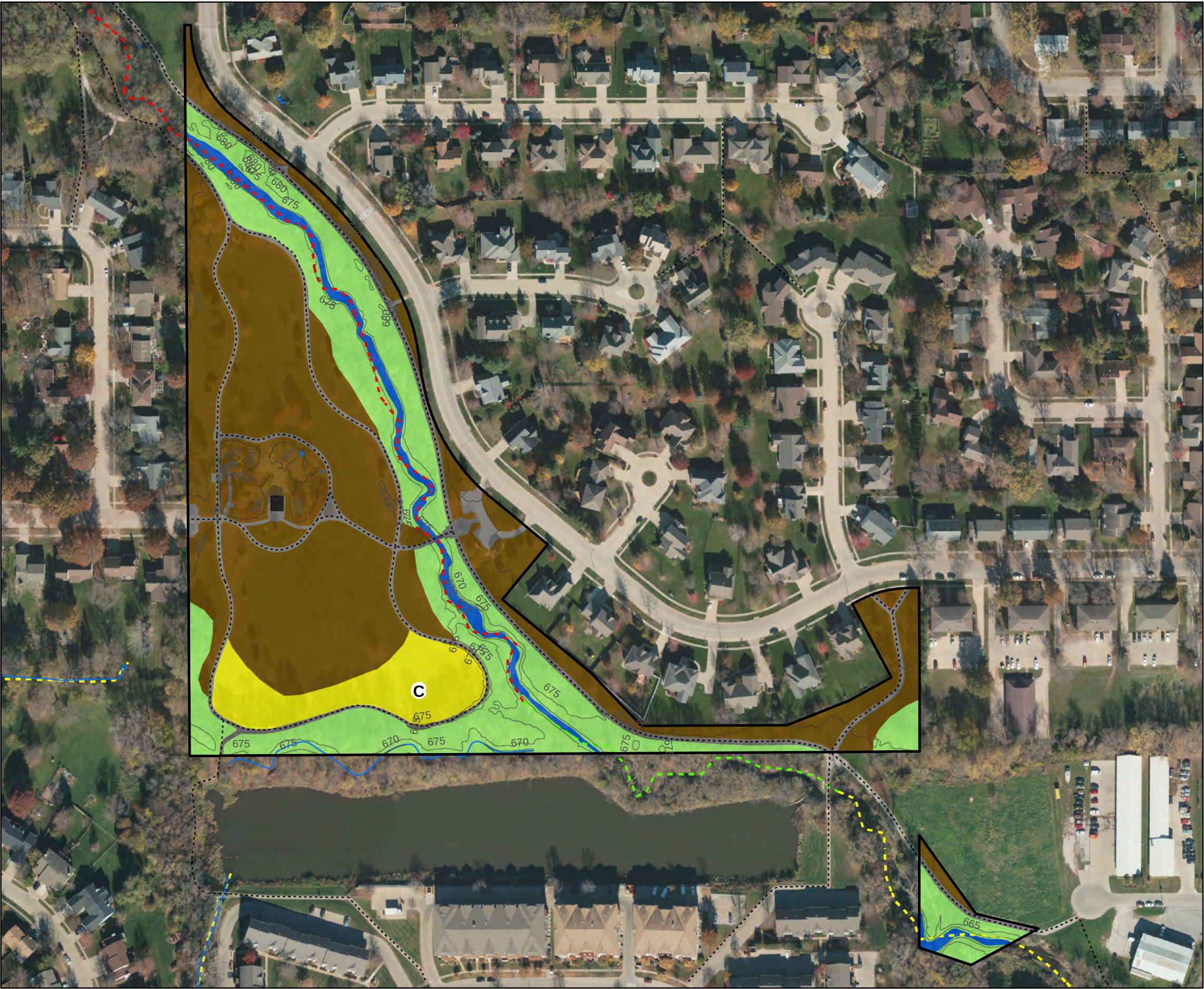
Notes:

Overseed forest/woodland and prairie following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Kiwanis Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Prairie
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway



A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

LANDFILL WETLAND MANAGEMENT BRIEF

Natural Area Name: Landfill Wetland

Natural Area Size (ac): 10

Natural Area Location (address, nearest street intersection, or other major geographic feature): South end of landfill, located on the west side of Iowa City, at the terminus (3900) of Hebl Avenue SW

Park/Natural Area Class: Constructed/mitigation wetland

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Landfill Management Plan. 2013	X	X (incl. 2013 abund.)		X (general; thru 2017)			2 basins and upland and riparian buffers; constructed in 2010
Mitigation Report (Dec. 2016)	X	X					veg cover map

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Opportunities up and downstream of drainageway (just southwest of site)

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Phebe Creek, just southwest of site, flows to southeast

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Wetland mitigation site

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	CD	5.25	55.0%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	BC	3.62	37.9%
11. Open Water	NR	0.77	8.1%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)			
14. Building			
15. Other Impervious Cover			
Totals		9.54	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	Bullfrog Blanchard's Cricket Frog	Viceroy Butterfly Monarch Butterfly Silver-Spotted Skipper Least Skipper Prairie Walking Stick

Issues and Opportunities:

- Invasive vegetation (cattails, reed canary grass, Kentucky bluegrass, red clover, etc.)
- 100-yr floodplain encroaches on west edge of site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Landfill Wetland Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Canopy Stratum</i>				
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		3
<i>Herbaceous Stratum</i>				
<i>Acer saccharinum</i>	Silver Maple	Native		1
<i>Achillea millefolium</i>	Western Yarrow	Native	1	
<i>Acorus americanus</i>	American Sweet Flag	Native		1
<i>Alisma subcordatum</i>	American Water Plantain	Native		1
<i>Andropogon gerardii</i>	Big Bluestem	Native	2	
<i>Anemone canadensis</i>	Canada anemone	Native		1
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native		1
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native	1	
<i>Bidens bipinnata</i>	Spanish Needles	Native		1
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native		3
<i>Bromus inermis</i>	Smooth Brome	Not Native	1 cf	
<i>Bromus japonicus</i>	Japanese Brome	Not Native	1 cf	
<i>Carex bebbii</i>	Bebb's Sedge	Native		2
<i>Carex comosa</i>	Bristly Sedge; Longhair Sedge	Native		1
<i>Carex cristatella</i>	Crested Sedge; Crested Oval Sedge	Native		1
<i>Carex vulpinoidea</i>	Fox Sedge	Native		3
<i>Chamaecrista fasciculata</i>	Partridge Pea	Native	1	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	2 cf	
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	
<i>Coreopsis lanceolata</i>	Lance-Leaved Coreopsis	Native	1	
<i>Dalea purpurea</i>	Purple Prairie clover	Native	1	

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf	
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1	
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native		1
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1	
<i>Eupatorium altissimum</i>	Tall Boneset	Native		1
<i>Eupatorium perfoliatum</i>	Boneset	Native		1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native	1 cf	
<i>Festuca subverticillata</i>	Nodding Fescue	Native	1	
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native		1
<i>Helenium autumnale</i>	Sneezeweed	Native		1
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native	1	2
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native	1	
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native	2	
<i>Iris versicolor</i>	Harlequin Blue Flag Iris	Not Native		1
<i>Juncus dudleyi</i>	Dudley's Rush	Native	1	3
<i>Juncus torreyi</i>	Torrey's Rush	Native		2
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native	1	
<i>Liatris spicata</i>	Dense Blazing Star	Native	1	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	1 cf	1 cf
<i>Lycopus americanus</i>	American Water Horehound; American Bugleweed	Native		1
<i>Lythrum alatum</i>	Winged Loosestrife	Native		1
<i>Lythrum salicaria</i>	Purple Loosestrife	Not Native		1
<i>Medicago lupulina</i>	Black Medic	Not Native	1	
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 pd	
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	1 cf	
<i>Panicum virgatum</i>	Switchgrass	Native	1	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	
<i>Penthorum sedoides</i>	Ditch Stoncrop	Native		1
<i>Persicaria hydropiperoides</i>	False Water Pepper; Mild Waterpepper; Swamp Smartweed	Native		2

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	3 pd	3 pd
<i>Physostegia virginiana</i>	Obedient Plant	Native		1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	3 ed	1 cf
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native		2
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native		1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	2	
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan; Sweet Coneflower	Native	1	
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native		1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	1 cf
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native		1
<i>Salix nigra</i>	Black Willow	Native		1
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	2	
<i>Schoenoplectus acutus</i>	Hard Stem Bulrush; Common Tule	Native		2
<i>Schoenoplectus pungens</i>	Three-Square Bulrush; Common Threesquare	Native		1
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native		2
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		3
<i>Silphium laciniatum</i>	Compass Plant	Native	1	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1	
<i>Solidago rigida</i>	Stiff Goldenrod	Native	3	
<i>Sorghastrum nutans</i>	Indian Grass	Native	2	
<i>Spartina pectinata</i>	Prairie Cordgrass	Native		3
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native	1	
<i>Symphotrichum puniceum</i>	Purple-Stemmed Aster; Swamp Aster	Native	1	
<i>Symphotrichum lanceolatum</i>	Panicked Aster; Lance-Leaved Aster	Native		1
<i>Tradescantia ohienensis</i>	Ohio Spiderwort	Native	1	
<i>Trifolium pratense</i>	Red Clover	Not Native	3 pd	
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native		3 pd
<i>Typha latifolia</i>	Broadleaf Cattail	Native		1

Landfill Wetland Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action													
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning							
Land Cover Type (ac)	Forest/Woodland and Forested Lowland												
	Savanna/Brushland and Shrub/Scrub Lowland												
	Grassland and Herbaceous Lowland	8.87	8.87		8.87	8.87							
	Total Acres	0	8.87	8.87	0	8.87							
	Unit Cost (for 3 yrs)	\$	2,500	\$	1,000	\$	250						
	Opinions of Probable Cost ¹	\$	-	\$	22,175	\$	8,870	\$	-	\$	2,218	\$	3,500
Total Opinion of Probable Cost ¹		\$	36,763										

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

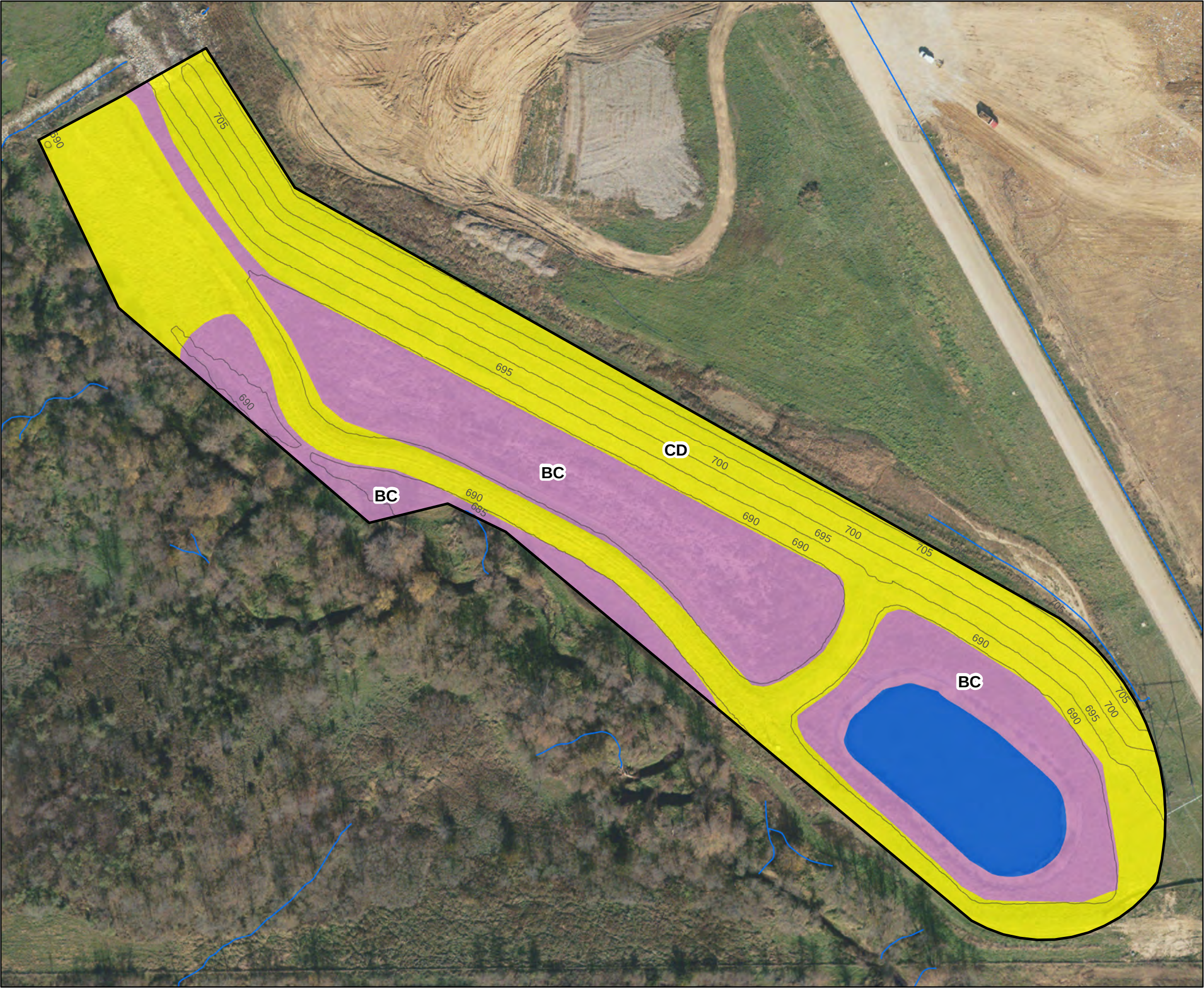
Notes:

Overseed prairie and herbaceous lowland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Landfill Wetland

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Herbaceous Lowland
 - Open Water
 - Contour (5ft interval)
 - Trail
 - Drainageway



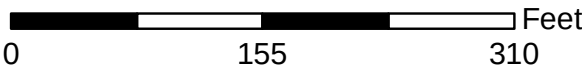
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

LINDEMANN TRAIL GREENWAY MANAGEMENT BRIEF

Natural Area Name: Lindemann Trail Greenway

Natural Area Size (ac): 9

Natural Area Location (address, nearest street intersection, or other major geographic feature): Between Lindemann Drive and Charles Drive

Park/Natural Area Class: Park/greenway

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South to Scott Park

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes) and Ackmore silt loam (0-2% slopes)

Hydrology Features: Ralston Creek flows south along site

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park/greenway; recent vegetation management and stream bank stabilization

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	1.02	10.9%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.41	4.4%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		7.60	81.0%
14. Building			
15. Other Impervious Cover		0.36	3.8%
Totals		9.38	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, non-native bromes, reed canary grass, etc.)
- Recent vegetation management and stream bank stabilization
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Establish native buffer along drainageway (convert turf to prairie)

Lindemann Trail Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Canopy Stratum</i>				
<i>Acer saccharinum</i>	Silver Maple	Native	1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1	
<i>Prunus serotina</i>	Black Cherry	Native	2	
<i>Salix nigra</i>	Black Willow	Native	1	
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd	
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf	
<i>Prunus serotina</i>	Black Cherry	Native	2	
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf	
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	
<i>Herbaceous Stratum</i>				
<i>Agrostis stolonifera</i>	Creeping Bent	Not Native		1 cf
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	
<i>Bromus inermis</i>	Smooth Brome	Not Native	2 pd	2 pd
<i>Bromus japonicus</i>	Japanese Brome	Not Native		2 pd
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1	
<i>Carex sp.</i>	Unknown Sedge	Native	1	

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	
<i>Conyza canadensis</i>	Canadian Horseweed	Native	1	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf	2 pd
<i>Elymus repens</i>	Quackgrass	Not Native		1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1	2
<i>Helopsis helianthoides</i>	Oxeye; False Sunflower	Native		1
<i>Medicago sativa</i>	Alfalfa	Not Native		1 cf
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 cf	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		3 pd
<i>Phleum pratense</i>	Timothy	Not Native		2 pd
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Ratibida columnifera</i>	Upright Prairie Coneflower; Long-Headed Coneflower	Native		1
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native		1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2	2
<i>Trifolium pratense</i>	Red Clover	Not Native		2 pd
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	

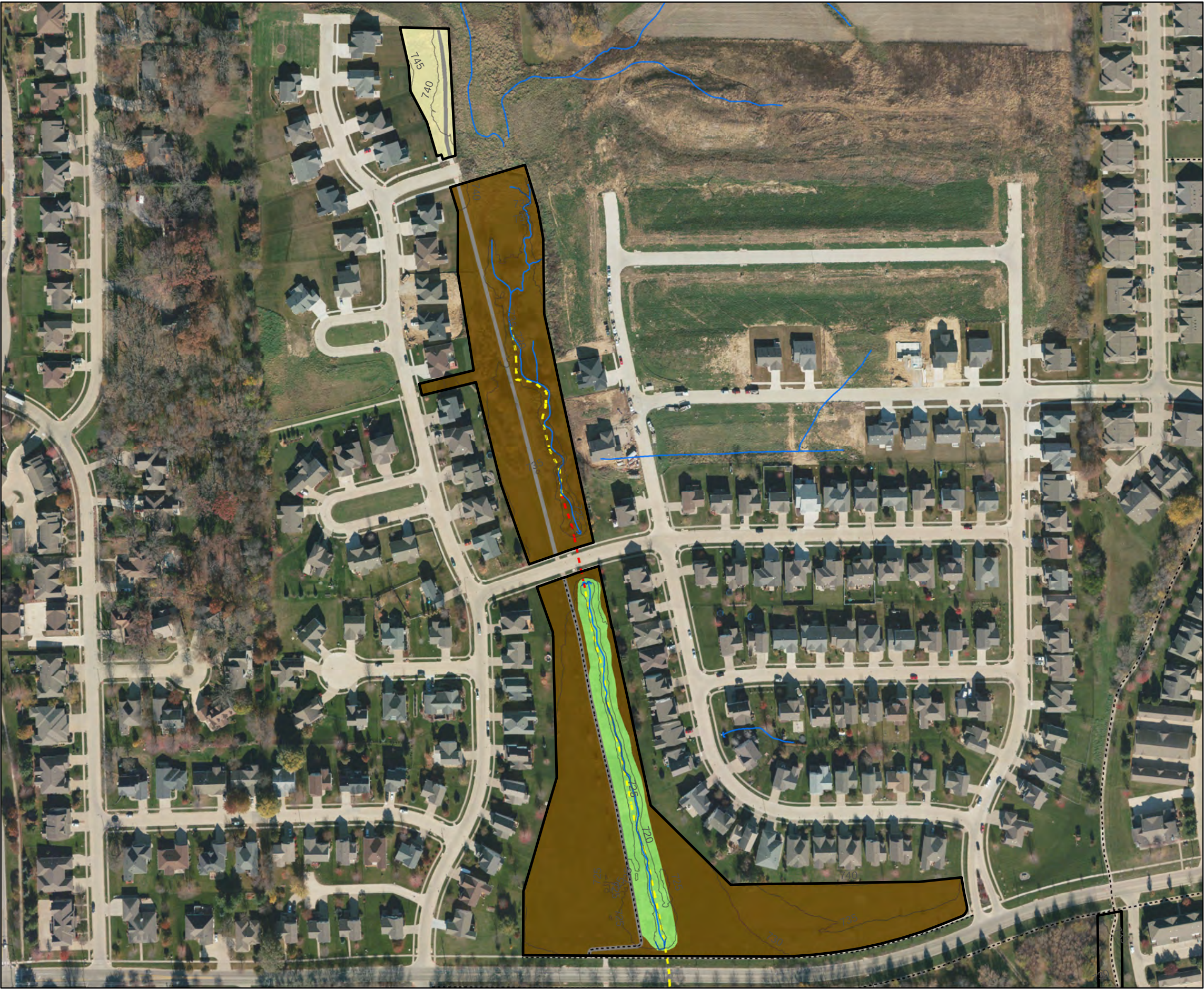
Lindemann Trail Greenway Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
	1.02	1.02			1.02		
		0.41	0.41		0.41	0.41	
	1.02	1.43	0.41	0	1.43	0.41	
	\$ 2,500	\$ 2,500	\$ 1,500		\$ 900	NA	
	\$ 2,550	\$ 3,575	\$ 615	\$ -	\$ 1,287	\$ 1,500	
Total Opinion of Probable Cost ¹							
Total Opinion of Probable Cost ¹		\$	9,527				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland and grassland following brush/weed removal.
Native buffer (i.e., convert turf to prairie) recommended but not included in costs above.



Iowa City Natural Areas Inventory
and Management Plan

Lindemann Trail Greenway

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Minor Erosion
 - Moderate to Severe Erosion

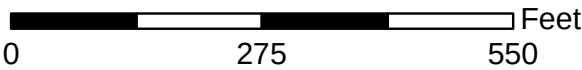
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

LONGFELLOW NATURE TRAIL MANAGEMENT BRIEF

Natural Area Name: Longfellow Nature Trail

Natural Area Size (ac): 2

Natural Area Location (address, nearest street intersection, or other major geographic feature): Central district, southeast of the intersection of Sheridan Avenue and Longfellow Court

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Site history (Jan 2016)	X (brief)						First prairie planting 1996; also tree plantings; burned 1999
Seed order		X					
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- NA

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows north through site

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Heavily used nature trail; last burned in 1999

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.47	22.5%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)	C, D	1.22	58.4%
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.26	12.4%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)			
14. Building			
15. Other Impervious Cover		0.14	6.7%
Totals		2.09	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Threatened: *Filipendula rubra*

State Species of Concern: *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (white mulberry, poison hemlock, etc.)
- Small site
- 100-yr floodplain encroaches on almost entire site
- Minor erosion along Ralston Creek banks

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Longfellow Nature Trail Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Savanna
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	3	
<i>Betula alleghaniensis</i>	Yellow Birch	Native		1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native		1
<i>Juglans nigra</i>	Black Walnut	Native	3	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd	
<i>Quercus bicolor</i>	Swamp White Oak	Native		1
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native		1
<i>Rhus sp.</i>	Unknown Sumac	Undetermined		1
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Cornus alternifolia</i>	Pagoda Dogwood; Alternate-Leaved Dogwood	Native		1
<i>Corylus americana</i>	American Hazelnut; American Hazel	Native		1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	
<i>Humulus japonicus</i>	Japanese Hop	Not Native		1 cf
<i>Juglans nigra</i>	Black Walnut	Native		1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native		1 cf
<i>Malus sp.</i>	Unknown Apple	Undetermined		1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 cf
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native		1
<i>Pinus sp.</i>	Unknown Pine	Undetermined		1
<i>Prunus americana</i>	American Plum; Wild Plum	Native		1
<i>Prunus serotina</i>	Black Cherry	Native		1
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native		1 cf
<i>Rhus sp.</i>	Unknown Sumac	Undetermined		1

Species name	Common name	Origin	Altered Forest	Savanna
<i>Salix babylonica</i>	Weeping Willow	Not Native		1 cf
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1
<i>Sambucus canadensis</i>	Elderberry	Native		1
<i>Ulmus americana</i>	American Elm	Native	1	
<i>Viburnum dentatum</i>	Southern Arrowwood	Native		1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	1
Herbaceous Stratum				
<i>Ageratina altissima</i>	Common White Snakeroot	Native		1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf	1 pd
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native		1
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1	1
<i>Anemone virginiana</i>	Thimbleweed; Tall Anemone	Native		1
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native		1
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf	1 cf
<i>Asclepias syriaca</i>	Common Milkweed	Native		1
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native		1
<i>Asteraceae</i>	Unknown Aster	Undetermined		1
<i>Baptisia sp.</i>	Unknown Wild Indigo	Native		1
<i>Bromus inermis</i>	Smooth Brome	Not Native		1 pd
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native		1
<i>Carex spp.</i>	Unknown Sedges	Native		1
<i>Cichorium intybus</i>	Chicory	Not Native		1
<i>Cirsium arvense</i>	Canada thistle	Not Native		1 cf
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf	2 cf
<i>Conyza canadensis</i>	Canadian Horseweed	Native		1
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native		1
<i>Cryptotaenia canadensis</i>	Honewort	Native		1
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native		1

Species name	Common name	Origin	Altered Forest	Savanna
<i>Echinocystis lobata</i>	Wild Cucumber	Native	1	1
<i>Elymus canadensis</i>	Canada Wild Rye	Native		1
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1
<i>Filipendula rubra</i>	Queen of the Prairie	Native		1
<i>Geum canadense</i>	White Avenas; Canada Avenas	Native		1
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native		1 cf
<i>Hackelia virginiana</i>	Stickseed	Native		1
<i>Helianthus</i> sp.	Unknown Sunflower	Undetermined		1
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native		1
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	1	
<i>Heracleum maximum</i>	Cow Parsnip	Native		1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native		1 pd
<i>Humulus japonicus</i>	Japanese Hop	Not Native		1 pd
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	1	1
<i>Leonurus cardiaca</i>	Motherwort	Not Native		1
<i>Melilotus alba</i>	White Sweet Clover	Not Native		1 cf
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native		1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native		1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		1 pd
<i>Pilea pumila</i>	Clearweed	Native	1	
<i>Polygonum persicaria</i>	Spotted Ladythumb	Not Native	1	
<i>Pycnanthemum</i> sp.	Unknown Mountain Mint	Undetermined		1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native		1
<i>Rubus occidentalis</i>	Black Raspberry	Native		1
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native		1
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native		1
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf

Species name	Common name	Origin	Altered Forest	Savanna
<i>Senna hebecarpa</i>	Wild Senna; American Senna	Native		1
<i>Silphium laciniatum</i>	Compass Plant	Native		1
<i>Silphium perfoliatum</i>	Cup Plant	Native		2
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native		1
<i>Stellaria sp.</i>	Unknown Chickweed	Not Native	1 cf	
<i>Taraxacum officinale</i>	Common Dandelion	Not Native		1 cf
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native		1
<i>Trifolium pratense</i>	Red Clover	Not Native		1
<i>Urtica dioica</i>	Stinging Nettle	Native		1
<i>Verbena urticifolia</i>	White Vervain	Native		1
<i>Veronicastrum virginicum</i>	Culver's Root	Native		1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		1

Longfellow Nature Trail Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	0.47	0.47		0.47		
	Savanna/Brushland and Shrub/Scrub Lowland	1.22	1.22	1.22	1.22	1.22	
	Grassland and Herbaceous Lowland						
	Total Acres	1.69	1.69	1.22	0	1.69	
	Unit Cost (for 3 yrs)	\$ 2,000	\$ 2,000	\$ 1,000	\$ 600	NA	
	Opinions of Probable Cost ¹	\$ 3,380	\$ 3,380	\$ 1,220	\$ -	\$ 1,014	\$ 1,500
Total Opinion of Probable Cost ¹		\$	10,494				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed savanna following brush/weed removal.

Overseed altered forest/woodland as needed (costs not included in table above).



Iowa City Natural Areas Inventory
and Management Plan

Longfellow Nature Trail

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Savanna
 - Open Water
 - Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway
- Stream Bank Stability (2010-2014 data)
 - Minor Erosion

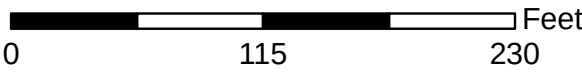
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

MAKADA WETLAND MITIGATION MANAGEMENT BRIEF

Natural Area Name: Makada Wetland Mitigation

Natural Area Size (ac): 4

Natural Area Location (address, nearest street intersection, or other major geographic feature): Northwest corner of Kountry Ln. SE and Lehman Ave.

Park/Natural Area Class: Constructed/mitigation wetland

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Mitigation Report (Dec. 2015)	X	X					veg cover map

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South to Sycamore Greenway

Dominant Soils Upland: NA

(incl. texture) **Lowland:** interbedded silts, sands and sandy loams

Hydrology Features: Basins designed with pothole depressions; Makada I outlets to the greater South Sycamore Drainage system; Makada II outlets to the greater South Sycamore Storm Water Outlet Wetlands system; Makada III outlets into the South Sycamore Stormwater Corridor.

Historical Vegetation: Prairie

Past Land Uses: Cropland with unspecified drainage modifications

Current Use and Management: Wetland mitigation site; City staff have monitored the site intermittently; initial 2010 seeding failed, so re-seeded in 2011 & 2013

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	CD, D	1.66	39.1%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	C	2.17	51.1%
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.37	8.7%
14. Building			
15. Other Impervious Cover		0.05	1.2%
Totals		4.25	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Juncus effusus*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, cattails, etc.)
- Small site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Monitor invading saplings, remove as necessary

Makada Wetland Mitigation Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Canopy Stratum</i>				
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1
<i>Salix nigra</i>	Black Willow	Native		1
<i>Herbaceous Stratum</i>				
<i>Agrostis stolonifera</i>	Creeping Bent	Not Native	1 cf	1 cf
<i>Alisma subcordatum</i>	American Water Plantain	Native		1
<i>Andropogon gerardii</i>	Big Bluestem	Native	1	
<i>Anemone canadensis</i>	Canada anemone	Native	1	
<i>Asclepias incarnata</i>	Swamp Milkweed	Native		1
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native		1
<i>Calamagrostis canadensis</i>	Blue Joint Grass; Bluejoint	Native		2
<i>Carex annectens</i>	Yellow Fox Sedge; Yellowfruit Sedge	Native		1
<i>Carex vulpinoidea</i>	Fox Sedge	Native	1	2
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	1	
<i>Coreopsis palmata</i>	Prairie Coreopsis	Native	1	
<i>Dipsacus laciniatus</i>	Cut-Leaved Teasel	Not Native	1 cf	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1	
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	1	
<i>Eupatorium perfoliatum</i>	Boneset	Native		1
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native	1	
<i>Juncus effusus</i>	Common Rush; Soft Rush	Native		1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1	

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	1 pd	
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	1 pd	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	3 pd	1 pd
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native	1 cf	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	1 pd	
<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	Native	1	
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	Native	1	
<i>Pycnanthemum sp.</i>	Unknown Mountain Mint	Undetermined		1
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	1	
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1	
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native		1
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	1	
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native		1
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		1
<i>Scirpus cyperinus</i>	Wool Grass	Native		
<i>Silphium integrifolium</i>	Rosinweed	Native	1	
<i>Silphium perfoliatum</i>	Cup Plant	Native	1	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2	
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	2	
<i>Solidago rigida</i>	Stiff Goldenrod	Native	1	
<i>Spartina pectinata</i>	Prairie Cordgrass	Native	1	
<i>Trifolium hybridum</i>	Alsike Clover	Not Native	1 pd	
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native		2 pd
<i>Typha latifolia</i>	Broadleaf Cattail	Native		1
<i>Typha x glauca</i>	Hybrid Cattail	Not Native		2 pd
<i>Verbena hastata</i>	Blue Vervain	Native	1	1

Species name	Common name	Origin	Prairie	Herbaceous Lowland
<i>Verbena stricta</i>	Hoary Vervain	Native	1	
<i>Zizia aurea</i>	Golden Alexanders	Native	2	

Makada Wetland Mitigation Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
	Forest/Woodland and Forested Lowland						
	Savanna/Brushland and Shrub/Scrub Lowland						
	Grassland and Herbaceous Lowland	3.83	3.83		3.83	3.83	
	Total Acres	0	3.83	3.83	0	3.83	
	Unit Cost (for 3 yrs)	\$ 2,000	\$ 1,000		\$ 300	NA	
	Opinions of Probable Cost ¹	\$ -	\$ 7,660	\$ 3,830	\$ -	\$ 1,149	\$ 2,000
Total Opinion of Probable Cost¹		\$	14,639				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed prairie and herbaceous lowland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Makada Wetland Mitigation

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Herbaceous Lowland
 - Recreation Area
 - Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway

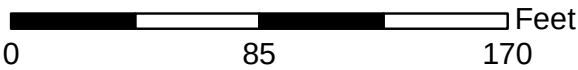
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

NORMANDY DR/ASHTON HOUSE MANAGEMENT BRIEF

Natural Area Name: Normandy Dr/Ashton House

Natural Area Size (ac): 4

Natural Area Location (address, nearest street intersection, or other major geographic feature): Northwest of the intersection of Park Road and Lee Street

Park/Natural Area Class: Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- West (across Iowa River) to Peninsula Park

Dominant Soils **Upland:** Sattre loam (0-2% slopes)
(incl. texture) **Lowland:** Perks-Spillville complex sandy loam (0-2% slopes)

Hydrology Features: Iowa River immediately northwest of site

Historical Vegetation: Oak barrens

Past Land Uses: Cropland

Current Use and Management: Event facility

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)	NN	0.83	22.0%
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		2.15	56.9%
13. Recreation Area (0-50% tree canopy)		0.19	5.0%
14. Building		0.08	2.1%
15. Other Impervious Cover		0.54	14.3%
Totals		3.78	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, etc.)
- Small site
- 100-yr floodplain encroaches on site
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Normandy Dr/Ashton House Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Savanna
<i>Canopy Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	2
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1
<i>Salix babylonica</i>	Weeping Willow	Not Native	1 cf
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Betula nigra</i>	River Birch	Native	1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native	1
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf
<i>Herbaceous Stratum</i>			
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf
Asteraceae	Unknown Aster	Undetermined	1
<i>Bromus tectorum</i>	Downy Brome; Downy Chess; Cheatgrass	Not Native	1 cf
<i>Cichorium intybus</i>	Chicory	Not Native	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	1 cf
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native	1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	1 cf
<i>Mentha arvensis</i>	Wild Mint; Field Mint; Corn Mint	Native	1
<i>Mimulus ringens</i>	Monkey Flower; Allegheny Monkeyflower; Square-Stemmed Monkeyflower	Native	1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	4 ed

Species name	Common name	Origin	Savanna
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1
<i>Stachys palustris</i>	Woundwort	Native	1
<i>Taraxacum officinale</i>	Common Dandelion	Not Native	1 cf
<i>Toxicodendron radicans</i>	Poision Ivy	Native	1 cf
<i>Trifolium repens</i>	White Clover	Not Native	1 cf
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1

Normandy Dr/Ashton House Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland						
	Savanna/Brushland and Shrub/Scrub Lowland	0.83	0.83	0.83	0.83	0.83	
	Grassland and Herbaceous Lowland						
	Total Acres	0.83	0.83	0.83	0	0.83	
	Unit Cost (for 3 yrs)	\$ 1,000	\$ 2,500	\$ 1,500		NA	
	Opinions of Probable Cost ¹	\$ 830	\$ 2,075	\$ 1,245	\$ -	\$ 1,000	\$ 1,500
Total Opinion of Probable Cost ¹		\$	6,650				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed savanna following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Normandy Dr/Ashton House

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Savanna
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

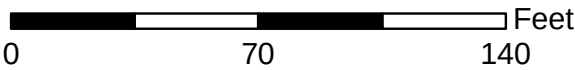
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

PENINSULA PARK MANAGEMENT BRIEF

Natural Area Name: Peninsula Park

Natural Area Size (ac): 113

Natural Area Location (address, nearest street intersection, or other major geographic feature): North district, at the end of Foster Road

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps
Concept plan (Nov. 1998)	X	X					envisioned site providing water supply, residential development, and park

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- East (across Iowa River) to Normandy Dr/Ashton House
- South (across Iowa River) to Crandic Park

Dominant Soils **Upland:** Sattre loam (0-2% slopes), Fayette silt loam (14-18% slopes), and Chelsea loamy fine sand (2-5% slopes)
Lowland: Perks-Spillville complex sandy loam (0-2% slopes) and Coppock silt loam (0-2% slopes)

Hydrology Features: Park located on peninsula of Iowa River

Historical Vegetation: Oak barrens

Past Land Uses: Timber harvest, cropland and grazing

Current Use and Management: Active and passive park; water plant well field

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	BC	27.32	24.3%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	24.92	22.1%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	CD	18.79	16.7%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	2.28	2.0%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	CD	15.98	14.2%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	CD	0.46	0.4%
11. Open Water	NR	2.39	2.1%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		16.84	14.9%
14. Building		0.04	<0.1%
15. Other Impervious Cover		3.62	3.2%
Totals		112.65	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Field Sparrow ¹	Western Chorus Frog	None observed

¹ State Species of Greatest Conservation Need

Issues and Opportunities:

- Invasive vegetation (Oriental bittersweet, poison ivy, Siberian elm, smooth brome, creeping Charlie, reed canary grass, Kentucky bluegrass, etc.)
- Higher quality remnant forest in southern portion of site (impacted by disc golf course)
- 100-yr and 500-yr floodplains and floodway encroach on site
- State SGCN Field Sparrow seen at site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Peninsula Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>								
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	1					
<i>Acer saccharinum</i>	Silver Maple	Native					4	
<i>Betula nigra</i>	River Birch	Native	1	2			2	2
<i>Celtis occidentalis</i>	Hackberry	Native	3					
<i>Fraxinus pennsylvanica</i>	Green Ash	Native					1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	2				2	
<i>Platanus occidentalis</i>	American Sycamore	Native		1			3	
<i>Prunus serotina</i>	Black Cherry	Native	1					
<i>Quercus alba</i>	White Oak	Native	2	1				
<i>Quercus macrocarpa</i>	Bur Oak	Native	2					
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native		1				
<i>Quercus rubra</i>	Red Oak	Native	2					
<i>Tilia americana</i>	American Basswood	Native	1					
<i>Ulmus americana</i>	American Elm	Native	2				2	1
<i>Shrub/Vine/Sapling Stratum</i>								
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	2 pd					
<i>Betula nigra</i>	River Birch	Native			1	1	1	1
<i>Carya cordiformis</i>	Bitternut Hickory	Native		1				
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native		1				
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	3 pd	2 pd			1 cf	
<i>Celtis occidentalis</i>	Hackberry	Native	2					
<i>Celtis occidentalis</i>	Hackberry	Native						1
<i>Cephalanthus occidentalis</i>	Buttonbush	Native					1	1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native			1	1	2	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/ Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Crataegus mollis</i>	Downy Hawthorn	Native	1				1	
<i>Elaeagnus angustifolia</i>	Russian Olive	Not Native			1 pd			
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native			1 cf	2 pd		
<i>Fraxinus pennsylvanica</i>	Green Ash	Native			1		3	2
<i>Gleditsia triacanthos</i>	Honey Locust	Native			2	1		
<i>Juglans nigra</i>	Black Walnut	Native		1		1		
<i>Juniperus virginiana</i>	Eastern Red Cedar	Native			1	1		
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	2 pd				
<i>Menispermum canadense</i>	Canada Moonseed	Native	1				1	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		2 pd	1 pd		2 pd	
<i>Ostrya virginiana</i>	Ironwood; Eastern Hop Hornbeam	Native	1					
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	3				1	1
<i>Platanus occidentalis</i>	American Sycamore	Native		1				
<i>Populus deltoides</i>	Eastern Cottonwood	Native			2			
<i>Populus sp.</i>	Unknown poplar/aspens/cottonwood	Undetermined					2	
<i>Prunus serotina</i>	Black Cherry	Native			1	1		
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native			1 cf			
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native		1				
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native		1				
<i>Quercus rubra</i>	Red Oak	Native		1				
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native		1 cf				
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	2 pd	2 pd				1 cf
<i>Rubus allegheniensis</i>	Allegheny Blackberry; Common Blackberry	Native		2				
<i>Rubus occidentalis</i>	Black Raspberry	Native						1
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1	1			1
<i>Salix nigra</i>	Black Willow	Native		1			1	1
<i>Sambucus canadensis</i>	Elderberry	Native		1				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Smilax tamnoides</i>	Bristly Greenbrier; China Root; Helffetter	Native	1	1			2	
<i>Tilia americana</i>	American Basswood	Native		1				
<i>Toxicodendron radicans</i>	Poison Ivy	Native		3 ed	3 ed		3 ed	1 cf
<i>Ulmus americana</i>	American Elm	Native		2				
<i>Ulmus pumila</i>	Siberian Elm	Not Native		3 ed	2 ed	2 pd		
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		2	1		3	
Herbaceous Stratum								
<i>Acer saccharinum</i>	Silver Maple	Native						1
<i>Agrostis gigantea</i>	Redtop; Black Bent	Not Native					1 cf	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	2 pd				1 cf	
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native						1
<i>Anemone canadensis</i>	Canada anemone	Native					1	
<i>Apios americana</i>	Potato Bean; Groundnut	Native					1	
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native			1		1	
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	1					
<i>Asclepias incarnata</i>	Swamp Milkweed	Native						1
<i>Asclepias syriaca</i>	Common Milkweed	Native			1	1	1	
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	2 cf					
<i>Boehmeria cylindrica</i>	Smallspike False Nettle; Bog Hemp	Native					1	
<i>Bromus inermis</i>	Smooth Brome	Not Native			4 ed	3 ed	2 pd	
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native					1	
<i>Campanula americana</i>	Tall Bellflower	Native					1	
<i>Carex bebbii</i>	Bebb's Sedge	Native						1
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native			1			
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native					1	
<i>Carex grayi</i>	Gray's Sedge	Native					1	
<i>Carex grisea</i>	Wood Gray Sedge; Inflated Narrow-Leaf	Native					1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/ Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
	Sedge							
<i>Carex jamesii</i>	James' Sedge	Native		1				
<i>Carex lupulina</i>	Hop Sedge	Native					1	
<i>Carex pennsylvanica</i>	Pennsylvania Sedge	Native	1					
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native	1					
<i>Carex stipata</i>	Prickly Sedge; Awn-Fruited Sedge	Native					1	
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native						1
<i>Carex vulpinoidea</i>	Fox Sedge	Native						1
<i>Carya ovata</i>	Shagbark Hickory	Native					1	
<i>Celtis occidentalis</i>	Hackberry	Native					2	
<i>Cinna arundinacea</i>	Sweet Woodreed; Stout Woodreed	Native	1				1	
<i>Cirsium arvense</i>	Canada thistle	Not Native						1 cf
<i>Claytonia virginica</i>	Eastern Spring Beauty	Native	1					
<i>Conium maculatum</i>	Poison Hemlock	Not Native						1 cf
<i>Dichanthelium clandestinum</i>	Deer-Tongue Grass; Deertongue	Native					1	
<i>Dryopteris</i> sp.	Unknown Wood Fern	Undetermined	1					
<i>Elymus repens</i>	Quackgrass	Not Native					1 cf	
<i>Elymus virginicus</i>	Virginia Wild Rye	Native					2	
<i>Ernion bitermum</i>	False Rue Anemone	Native	1				1	
<i>Epilobium coloratum</i>	Cinnamon Willow Herb; Purpleleaf Willow Herb	Native						1
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native					1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native			1			
<i>Festuca arundinacea</i>	Tall Fescue	Not Native				3 ed		
<i>Festuca subverticillata</i>	Nodding Fescue	Native	2				1	
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native					1	
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	2					

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/ Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	3					
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	4 pd				4 ed	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1					
<i>Hackelia virginiana</i>	Stickseed	Native					1	
<i>Helenium autumnale</i>	Sneezeweed	Native						1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	2 cf					
<i>Humulus japonicus</i>	Japanese Hop	Not Native					2 pd	
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf; Eastern Waterleaf	Native	1					
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native						1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native						1
<i>Laportea canadensis</i>	Wood Nettle	Native	3				1	
<i>Leersia virginica</i>	Whitegrass; White Cutgrass; Virginia Cutgrass	Native	1					
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf					
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf					
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		1 cf	1 cf			
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native		1 pd	1 pd			1 cf
<i>Mentha arvensis</i>	Wild Mint; Field Mint; Corn Mint	Native						1
<i>Mimulus ringens</i>	Monkey Flower; Allegheny Monkeyflower; Square-Stemmed Monkeyflower	Native						1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native					2 cf	
<i>Muhlenbergia mexicana</i>	Mexican Muhly; Leafy Satin Grass	Native					1	
<i>Panicum virgatum</i>	Switchgrass	Native			1			
<i>Persicaria virginiana</i>	Jumpseed	Native	3					
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		3 pd	2 cf	2 pd	3 pd	3 ed
<i>Phlox divaricata</i>	Blue Phlox; Wild Blue Phlox; Woodland Phlox	Native	1					
<i>Phyla lanceolata</i>	Lanceleaf fogfruit; Frogfruit	Native					1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/ Scrub	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native					3	
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native						1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native		3 ed	4 ed	3 ed	4 ed	1 cf
<i>Poa</i> sp.	Unknown Bluegrass	Undetermined	2					
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	1				1	
<i>Polygonum virginianum</i>	Jumpseed	Native					1	
<i>Ranunculus septentrionalis</i>	Swamp Buttercup	Native	1				1	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native						1 pd
<i>Rubus occidentalis</i>	Black Raspberry	Native					1	
<i>Rumex crispus</i>	Curly Dock	Not Native						1 cf
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	3					
<i>Scrophularia marilandica</i>	Figwort	Native					1	
<i>Securigera varia</i>	Crown Vetch	Not Native			1 cf			
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native				1 cf		
<i>Solidago canadensis</i>	Canada Goldenrod	Native		2	3		3	1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native						1
<i>Stachys palustris</i>	Woundwort	Native					2	1
<i>Stellaria media</i>	Chickweed; Common Chickweed	Not Native						1 cf
<i>Symphotricum lanceolatum</i>	Panicled Aster; Lance-Leaved Aster	Native					1	
<i>Taraxacum officinale</i>	Common Dandelion	Not Native					1 cf	
<i>Toxicodendron radicans</i>	Poison Ivy	Native	3 ed					3 ed
<i>Trifolium repens</i>	White Clover	Not Native			1 cf		3 pd	
<i>Urtica dioica</i>	Stinging Nettle	Native					2	
<i>Verbascum thapsus</i>	Common Mullein	Not Native		1 cf	1 cf	1 pd		
<i>Verbena urticifolia</i>	White Vervain	Native			1			
<i>Vernonia missurica</i>	Missouri Ironweed	Native	1	1				
<i>Viola sororia</i>	Common Blue Violet	Native	2				1	

Peninsula Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	68.22	68.22	68.22	68.22	27.32	
	Savanna/Brushland and Shrub/Scrub Lowland	18.79	18.79	18.79	18.79	18.79	
	Grassland and Herbaceous Lowland		2.74	2.74	2.74	2.74	
	Total Acres	87.01	89.75	89.75	0	89.75	
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,000	\$ 1,000	\$ 100	\$ 500	
Opinions of Probable Cost ¹		\$ 217,525	\$ 179,500	\$ 89,750	\$ -	\$ 8,975	\$ 24,425
Total Opinion of Probable Cost ¹		\$	520,175				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Prescribed burning in forest/woodland to occur only in Dry-Mesic Forest/Woodland.
Overseed forest/woodland, shrub/scrub, and herbaceous areas following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Peninsula Park

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover**
 - Dry-Mesic Forest/Woodland
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Non-native Grassland
 - Forested Lowland
 - Herbaceous Lowland
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

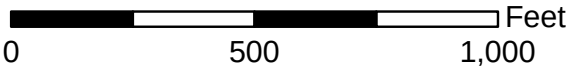
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

REC CENTER GREENWAY MANAGEMENT BRIEF

Natural Area Name: Rec Center Greenway

Natural Area Size (ac): 1

Natural Area Location (address, nearest street intersection, or other major geographic feature): West of Van Buren Street between Washington Street and Burlington Street

Park/Natural Area Class: Urban riparian corridor

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South to Riverfront Crossings Greenway (along Ralston Creek)

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows south through site

Historical Vegetation: Oak barrens

Past Land Uses: Ditch

Current Use and Management: Narrow riparian corridor

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	D	0.58	52.3%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.25	22.5%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.18	16.2%
13. Recreation Area (0-50% tree canopy)			
14. Building			
15. Other Impervious Cover		0.10	9.0%
Totals		1.11	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, Japanese knotweed, Japanese hop, sweet clovers, etc.)
- Small/narrow site
- 100-yr floodplain encroaches on site
- Stable banks to moderate erosion along Ralston Creek

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize eroding sections of stream bank

Rec Center Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Shrub/Scrub
<i>Canopy Stratum</i>			
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	2
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Tilia americana</i>	American Basswood	Native	1
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	1
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native	1 cf
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native	1
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf
<i>Malus sp.</i>	Unknown Apple	Undetermined	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Ulmus americana</i>	American Elm	Native	1
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf
<i>Herbaceous Stratum</i>			
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native	1
<i>Asclepias syriaca</i>	Common Milkweed	Native	1

Species name	Common name	Origin	Shrub/Scrub
Asteraceae	Unknown Aster	Undetermined	1
<i>Bromus inermis</i>	Smooth Brome	Not Native	1 cf
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	1 cf
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1 cf
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf
<i>Echinocystis lobata</i>	Wild Cucumber	Native	1
<i>Elymus repens</i>	Quackgrass	Not Native	1 cf
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	1
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	1
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1
<i>Hackelia virginiana</i>	Stickseed	Native	1
<i>Helianthus</i> sp.	Unknown Sunflower	Undetermined	1
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	1 cf
<i>Humulus japonicus</i>	Japanese Hop	Not Native	1 cf
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	1 cf
<i>Mirabilis nyctaginea</i>	Wild Four O'Clock	Native	1
<i>Nepeta cataria</i>	Catnip	Not Native	1 cf
<i>Oenothera biennis</i>	Evening Primrose	Native	1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native	1
<i>Polygonum cuspidatum</i>	Japanese Knotweed	Not Native	2 cf
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	1

Species name	Common name	Origin	Shrub/Scrub
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Silphium perfoliatum</i>	Cup Plant	Native	1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1
<i>Toxicodendron radicans</i>	Poision Ivy	Native	1 cf
<i>Verbascum thapsus</i>	Common Mullein	Not Native	1
<i>Verbena urticifolia</i>	White Vervain	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	2

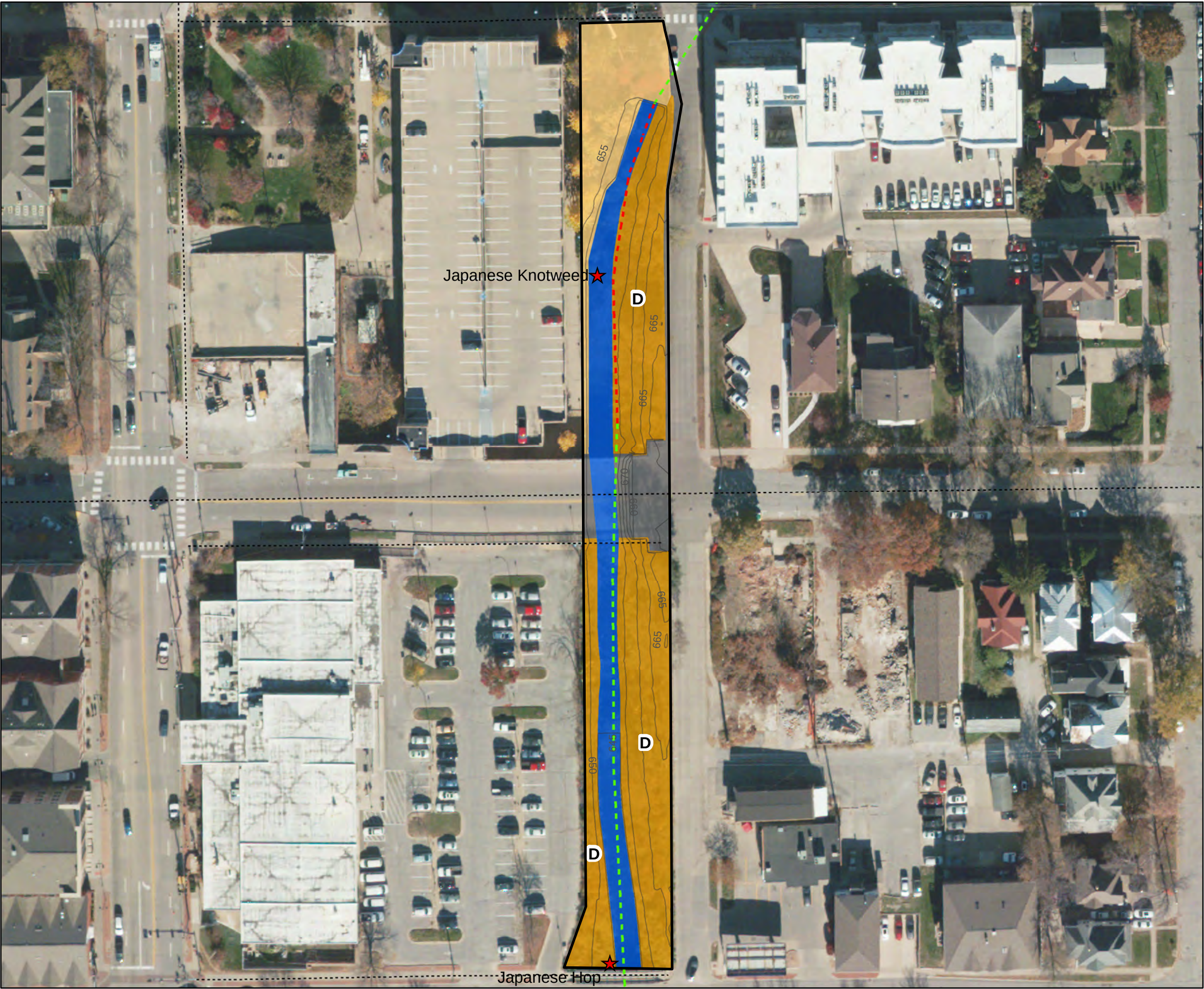
Rec Center Greenway Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland						
	Savanna/Brushland and Shrub/Scrub Lowland	0.58	0.58	0.58	0.58		
	Grassland and Herbaceous Lowland						
	Total Acres	0.58	0.58	0.58	0	0	
	Unit Cost (for 3 yrs)	\$ 2,000	\$ 2,000	\$ 1,000		NA	
	Opinions of Probable Cost ¹	\$ 1,160	\$ 1,160	\$ 580	\$ -	\$ 1,000	\$ -
Total Opinion of Probable Cost ¹		\$	3,900				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed shrub/scrub following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Rec Center Greenway

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover
 - Shrub/Scrub
 - Open Water
 - Woodland with Turf
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Stable
 - Moderate to Severe Erosion

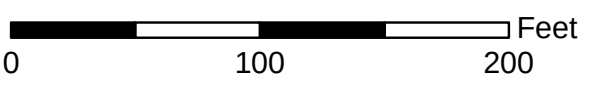
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

RIVERFRONT CROSSINGS GREENWAY MANAGEMENT BRIEF

Natural Area Name: Riverfront Crossings Greenway

Natural Area Size (ac): 3

Natural Area Location (address, nearest street intersection, or other major geographic feature): Between Dubuque Street and Gilbert Street, north of Kirkwood Avenue

Park/Natural Area Class: Urban riparian corridor

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Southwest to Riverfront Crossings Park
- North to Rec Center Greenway (along Ralston Creek)

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows south through site

Historical Vegetation: Oak barrens and Prairie

Past Land Uses: Unknown

Current Use and Management: Narrow riparian corridor

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	1.96	62.2%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.09	2.9%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.86	27.3%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.10	3.2%
14. Building			
15. Other Impervious Cover		0.14	4.4%
Totals		3.15	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
Muskrat	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (white mulberry, burdock, Japanese hop, etc.)
- Small/narrow site, two parcels
- 100-yr floodplain encroaches on site
- Minor to severe erosion along Ralston Creek banks

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize eroding sections of stream bank

Riverfront Crossings Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Acer saccharinum</i>	Silver Maple	Native	1	
<i>Betula nigra</i>	River Birch	Native	1	
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native		1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf	
<i>Pinus strobus</i>	White Pine; Eastern White Pine	Native	1	
<i>Platanus occidentalis</i>	American Sycamore	Native	1	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 cf	
<i>Ulmus americana</i>	American Elm	Native	1	
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Acer saccharinum</i>	Silver Maple	Native	1	1
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native	1 cf	
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native	1	
<i>Celtis occidentalis</i>	Hackberry	Native	1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd	1 cf
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1	
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 cf	
<i>Ulmus americana</i>	American Elm	Native	1	1
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf	

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Herbaceous Stratum</i>				
<i>Abutilon theophrasti</i>	Velvetleaf	Not Native		1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd	
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native		1
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	2 pd	
<i>Asclepias</i> sp.	Unknown Milkweed	Native	1	
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	
<i>Bromus inermis</i>	Smooth Brome	Not Native		1 cf
<i>Bromus japonicus</i>	Japanese Brome	Not Native		1 cf
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1	
<i>Carex</i> spp.	Unknown Sedges	Native	1	
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1 cf	1 cf
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 pd	1 cf
<i>Coryza canadensis</i>	Canadian Horseweed	Native		1
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf	
<i>Echinocystis lobata</i>	Wild Cucumber	Native		1
<i>Elymus repens</i>	Quackgrass	Not Native		1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1	
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native		1 cf
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf	
<i>Humulus japonicus</i>	Japanese Hop	Not Native		2 pd
<i>Impatiens pallida</i>	Yellow Jewelweed; Pale Jewelweed; Pale Touch-Me-Not	Native	1	
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native		1
<i>Medicago sativa</i>	Alfalfa	Not Native		1 cf
<i>Mirabilis nyctaginea</i>	Wild Four O'Clock	Native		1
<i>Miscanthus</i> sp.	Unknown Silvergrass	Not Native	1 cf	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1	
<i>Nepeta cataria</i>	Catnip	Not Native	1 cf	

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Oenothera biennis</i>	Evening Primrose	Native	1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 pd	1 pd
<i>Polygonum cuspidatum</i>	Japanese Knotweed	Not Native	1 pd	
<i>Rubus idaeus</i>	Red Raspberry	Not Native	1	2
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	1	
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf
<i>Setaria faberi</i>	Giant Foxtail; Nodding Foxtail; Japanese Bristlegrass	Not Native		1 cf
<i>Setaria glauca</i>	Yellow Foxtail	Not Native		1 cf
<i>Solanum dulcamara</i>	Bittersweet Nightshade; Climbing Nightshade	Not Native		1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1	
<i>Thlaspi arvense</i>	Field Pennycress	Not Native		1
<i>Urtica dioica</i>	Stinging Nettle	Native	1	
<i>Verbascum thapsus</i>	Common Mullein	Not Native	1 cf	
<i>Verbena urticifolia</i>	White Vervain	Native	1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	

Riverfront Crossings Greenway Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
	1.96	1.96	1.96		1.96		
		0.09	0.09		0.09		
	1.96	2.05	2.05	0	2.05	0	
	\$ 3,000	\$ 2,500	\$ 1,500		\$ 500		
	\$ 5,880	\$ 5,125	\$ 3,075	\$ -	\$ 1,025	\$ -	
Total Opinion of Probable Cost ¹					\$ 15,105		

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland and non-native grassland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Riverfront Crossings Greenway

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover**
 - Altered Forest/Woodland
 - Non-native Grassland
 - Open Water
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)**
 - Minor Erosion
 - Moderate to Severe Erosion

A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

RIVERFRONT CROSSINGS PARK MANAGEMENT BRIEF

Natural Area Name: Riverfront Crossings Park

Natural Area Size (ac): 18

Natural Area Location (address, nearest street intersection, or other major geographic feature): Central district, southwest of corner of Kirkwood Avenue and Clinton Street

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northeast to Riverfront Crossings Greenway (along Ralston Creek)

Dominant Soils Upland: NA

(incl. texture) **Lowland:** Sparta loamy fine sand (0-2% slopes) and Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows south just east of site

Historical Vegetation: Oak barrens

Past Land Uses: Wastewater treatment plant

Current Use and Management: Wetland restoration

Existing Land Cover Types: NOT ASSESSED BY AES DUE TO ACTIVE CONSTRUCTION

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)			
14. Building			
15. Other Impervious Cover			
Totals		0.00	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *Vegetation surveys were not completed for this site by AES since it was under construction.*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- 100-yr and 500-yr floodplains encroach on site
- Minor to moderate/severe erosion along Ralston Creek banks (just east of site)

Restoration and Management Goals:

- Follow management plan after construction is completed.
- Stabilize eroding sections of stream bank

Riverfront Crossings Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland							
Savanna/Brushland and Shrub/Scrub Lowland							
Grassland and Herbaceous Lowland							
Total Acres		0	0	0	0	0	0
Unit Cost (for 3 yrs)							
Opinions of Probable Cost ¹	\$	-	\$	-	\$	-	\$
Total Opinion of Probable Cost¹		\$	-	MANAGEMENT PLAN NOT DEVELOPED BY AES DUE TO ACTIVE CONSTRUCTION			

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Follow management plan after construction is completed.



Iowa City Natural Areas Inventory and Management Plan

Riverfront Crossings Park

- City Limits
- Iowa City Park or Natural Area
- Contour (5ft interval)
- Trail
- Drainageway
- Stream Bank Stability (2010-2014 data)
 - Minor Erosion
 - Moderate to Severe Erosion

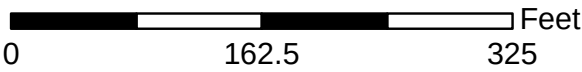
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

ROHRET ROAD PRAIRIE MANAGEMENT BRIEF

Natural Area Name: Rohret Road Prairie

Natural Area Size (ac): 1

Natural Area Location (address, nearest street intersection, or other major geographic feature): North of Rohret Road, east and west of Walden Court

Park/Natural Area Class: Restored prairie

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
City memo by Atkins (Nov. 1995)	X						
Planting list (Oct. 1995)		X					
Plant species observations (Nations Jun. 2011)		X					

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northwest to Walden Detention Area

Dominant Soils **Upland:** Clinton silt loam (9-14% slopes) and Fayette silt loam (14-18% slopes) (incl. texture) **Lowland:** NA

Hydrology Features: NA

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Prairie has been burned, mowed, and overseeded

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC	0.78	100%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)			
14. Building			
15. Other Impervious Cover			
Totals		0.78	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (sweet clovers, Japanese brome, etc.)
- Small site, two parcels

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Install interpretive signage

Rohret Road Prairie Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie
<i>Canopy Stratum</i>			
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Herbaceous Stratum</i>			
<i>Acer ginnala</i>	Amur Maple	Not Native	1 cf
<i>Allium canadense</i>	Wild Onion	Native	2
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1
<i>Andropogon gerardii</i>	Big Bluestem	Native	3
<i>Anemone canadensis</i>	Canada anemone	Native	2
<i>Asclepias syriaca</i>	Common Milkweed	Native	1
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	1
<i>Aster novae-angliae</i>	New England Aster	Native	2
<i>Baptisia alba</i>	Wild White Indigo	Native	1
<i>Barbarea vulgaris</i>	Yellow Rocket; Common Winter Cress	Not Native	1 cf
<i>Bromus japonicus</i>	Japanese Brome	Not Native	2 cf
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native	2
<i>Cirsium arvense</i>	Canada thistle	Not Native	1 pd
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native	2
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1
<i>Desmanthus illinoensis</i>	Illinois Bundleflower	Native	1
<i>Elymus repens</i>	Quackgrass	Not Native	1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1
<i>Euphorbia corollata</i>	Flowering Spurge	Native	1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native	1 cf
<i>Juglans nigra</i>	Black Walnut	Native	1

Species name	Common name	Origin	Prairie
<i>Malus pumila</i>	Orchard Apple	Native	1
<i>Melilotus alba</i>	White Sweet Clover	Not Native	3 pd
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	3 pd
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	3
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf
<i>Poa compressa</i>	Canada Bluegrass	Not Native	1 cf
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native	2
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native	1 cf
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	2
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native	1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	1
<i>Securigera varia</i>	Crown Vetch	Not Native	1 cf
<i>Senna hebecarpa</i>	Wild Senna; American Senna	Native	1
<i>Silphium laciniatum</i>	Compass Plant	Native	1
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native	3
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1
<i>Tradescantia ohimensis</i>	Ohio Spiderwort	Native	1
<i>Verbena stricta</i>	Hoary Vervain	Native	1
<i>Zizia aurea</i>	Golden Alexanders	Native	1

Rohret Road Prairie Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action								
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning		
	Forest/Woodland and Forested Lowland							
	Savanna/Brushland and Shrub/Scrub Lowland							
	Grassland and Herbaceous Lowland	0.78			0.78	0.78		
	Total Acres	0	0.78	0	0	0.78		
	Unit Cost (for 3 yrs)	\$	2,000			NA		
Opinions of Probable Cost ¹		\$	\$	-	\$	1,000	\$	1,500
Total Opinion of Probable Cost¹		\$	4,060					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed prairie if needed following brush/weed removal (costs not included in table above).



Iowa City Natural Areas Inventory
and Management Plan

Rohret Road Prairie

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Contour (5ft interval)
 - Trail
 - Drainageway

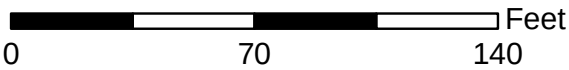
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

RYERSON’S WOODS MANAGEMENT BRIEF

Natural Area Name: Ryerson’s Woods

Natural Area Size (ac): 49

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, just outside the City limits at the intersection of Old Highway 218 S and Oak Crest Hill Rd SE (just southwest of the Johnson County Fairgrounds)

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Management Plan for Ryerson’s Woods State Preserve (2014)	X	X (detailed)		X			Known for spring flora and ferns; generalized veg cover map
Spring Wildflower Walk Invitation (2014)	X	X					

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- East to natural areas and (across Iowa River) Terry Trueblood Recreation Area
- Possible connection to County land to north

Dominant Soils **Upland:** Clinton silt loam (2-9% slopes) and Lindley loam (18-25% slopes) (incl. texture) **Lowland:** NA

Hydrology Features: Located west of the Iowa River floodplain; site dissected by a ravine with six tributaries

Historical Vegetation: Prairie

Past Land Uses: Borrow pit, selective logging, pasture and cropland

Current Use and Management: Passive park and research

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	BC, C, CD, D	33.20	67.4%
2. Mesic Forest (often maples)	BC	5.81	11.8%
3. Altered Forest/Woodland	NR	8.67	17.6%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	CD	0.22	0.4%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	B	0.38	0.8%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.76	1.5%
13. Recreation Area (0-50% tree canopy)			
14. Building		0.01	<0.1%
15. Other Impervious Cover		0.20	0.4%
Totals		49.25	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Scarlet Tanager	Tree Frog	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckle, poison ivy, etc.)
- Ravine erosion present in several locations
- Trails in northern portion of site used by mountain bikers; not appropriate for this site
- Prescribed burning and spot spray herbicide controversial at this site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize eroding sections of ravines

Ryerson's Woods Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species Name	Common Name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Altered Forest	Shrub/Scrub	Prairie
<i>Canopy Stratum</i>							
<i>Carya cordiformis</i>	Bitternut Hickory; Pignut Hickory	Native			1		
<i>Carya ovata</i>	Shagbark Hickory; Shellbark Hickory	Native	2	2	1		
<i>Celtis occidentalis</i>	Hackberry	Native	3	3	1		
<i>Fraxinus americana</i>	White Ash	Native	2	3			
<i>Gleditsia triacanthos</i>	Honey Locust	Native			3	2	
<i>Prunus serotina</i>	Black Cherry	Native		2	1	1	
<i>Quercus alba</i>	White Oak	Native	3				
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native		1			
<i>Quercus velutina</i>	Black Oak	Native			2		
<i>Ulmus americana</i>	American Elm	Native		3			
<i>Shrub/Vine/Sapling Stratum</i>							
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	1 cf				
<i>Carya ovata</i>	Shagbark Hickory; Shellbark Hickory	Native			1		
<i>Celtis occidentalis</i>	Hackberry	Native	2	3	1		
<i>Corylus americana</i>	American Hazelnut; American Hazel	Native	1				
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native				3	
<i>Euonymus alatus</i>	Burning Bush; Winged Euonymus; Winged Wahoo	Not Native	1 cf				
<i>Euonymus atropurpureus</i>	Wahoo	Native		1			
<i>Fraxinus americana</i>	White Ash	Native	2	1			
<i>Juniperus virginiana</i>	Eastern Red Cedar	Native			1	1	
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf				
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd	1 cf	2 pd	1 pd	
<i>Menispermum canadense</i>	Canada Moonseed	Native	1				
<i>Morus rubra</i>	Red Mulberry	Native	1				

Species Name	Common Name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Altered Forest	Shrub/Scrub	Prairie
<i>Prunus serotina</i>	Black Cherry	Native		1			
<i>Prunus virginiana</i>	Chokecherry	Native	1				
<i>Quercus velutina</i>	Black Oak	Native				1	
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf		1 cf		
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1				
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf	1 cf	1 cf	1 pd	
<i>Rubus allegheniensis</i>	Allegheny Blackberry; Common Blackberry	Native				1	
<i>Sambucus canadensis</i>	Common Elderberry	Native		1			
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 pd				
<i>Ulmus americana</i>	American Elm	Native	1				
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native		1 cf			
Herbaceous Stratum							
<i>Adiantum pedatum</i>	Northern Maidenhair Fern	Native	1				
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1				
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	Native	1				
<i>Arisaema dracontium</i>	Green Dragon; Dragon Root	Native		1			
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	1	1			
<i>Asclepias syriaca</i>	Common Milkweed	Native					1
<i>Athyrium filix-femina</i>	Northern Lady Fern; Common Lady Fern	Native	1				
<i>Botrychium virginianum</i>	Rattlesnake Fern; Common Grapefern	Native	1				
<i>Bromus inermis</i>	Smooth Brome	Not Native				2 pd	
<i>Cardamine concatenata</i>	Cutleaf Toothwort	Native	1				
<i>Cinna arundinacea</i>	Sweet Woodreed; Stout Woodreed	Native	1				
<i>Cirsium arvense</i>	Canada thistle	Not Native			1 cf		
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native			1		1
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	2	2			

Species Name	Common Name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Altered Forest	Shrub/Scrub	Prairie
<i>Cirsium vulgare</i>	Bull Thistle	Not Native			1 cf		
<i>Claytonia virginica</i>	Eastern Spring Beauty	Native	1				
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native					1
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native					1
<i>Cryptotaenia canadensis</i>	Honewort	Native	3				
<i>Cryptotaenia canadensis</i>	Honewort	Native		2			
<i>Carex jamesii</i>	James' Sedge	Native			2		
<i>Carex normalis</i>	Greater Straw Sedge; Spreading Oval Sedge	Native				1	
<i>Desmodium cuspidatum</i>	Hairy-Bracted Tick Trefoil; Large-Bracted Tick Trefoil	Native				2	
<i>Desmodium glutinosum</i>	Pointed Leaf Tick Trefoil; Clustered Leaf Tick Trefoil	Native				1	
<i>Dicentra cucullaria</i>	Dutchman's Breeches	Native	1				
<i>Dryopteris carthusiana</i>	Spinulose Fern; Toothed Wood Fern	Native	1				
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native				1 cf	
<i>Ellisia nyctelea</i>	Aunt Lucy; Water-pod	Native			1		
<i>Elymus villosus</i>	Silky Wild Rye	Native		1			
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native			2	1	1
<i>Erythronium albidum</i>	White Trout Lily; White Fawn Lily; White Dogtooth Violet	Native	1				
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native					3
<i>Euphorbia corollata</i>	Flowering Spurge	Native					1
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	1				
<i>Festuca arundinacea</i>	Tall Fescue	Not Native				2 pd	
<i>Festuca subverticillata</i>	Nodding Fescue	Native	1				
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native	2	2			

Species Name	Common Name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Altered Forest	Shrub/Scrub	Prairie
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	2	2		1	
<i>Gentiana alba</i>	Cream gentian	Native				1	
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	1				
<i>Hackelia virginiana</i>	Stickseed	Native	1				
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native				1	
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native					1
<i>Laportea canadensis</i>	Wood Nettle	Native		4			
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native					1
<i>Liparis loeselii</i>	Fen Orchid, Yellow Widelip Orchid; Bog Twayblade	Native			1		
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native				1	
<i>Oenothera biennis</i>	Evening Primrose	Native					1
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1				
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	4		3		
<i>Postinaca sativa</i>	Wild Parsnip	Not Native				1 pd	
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native			2	1	
<i>Pilea pumila</i>	Clearweed	Native			1		
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	2				
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	1				
<i>Polygonum virginianum</i>	Jumpseed	Native	2				
<i>Potentilla arguta</i>	Prairie Cinquefoil	Native					2
<i>Pycnanthemum pilosum</i>	Hairy Mountain Mint	Native				1	
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native					4
<i>Rosa blanda</i>	Prairie Rose; Smooth Wild Rose; Early Wild Rose	Native					1
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native					1

Species Name	Common Name	Origin	Dry-Mesic Forest/Woodland	Mesic Forest	Altered Forest	Shrub/Scrub	Prairie
<i>Rudbeckia laciniata</i>	Cutleaf Coneflower; Goldenglow	Native		1			
<i>Sanguinaria canadensis</i>	Bloodroot	Native	1				
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	4	2			
<i>Scutellaria ovata</i>	Heartleaf Skullcap	Native			1		
<i>Silphium integrifolium</i>	Rosinweed	Native					1
<i>Silphium perfoliatum</i>	Cup Plant	Native					1
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native					1
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native	1				
<i>Solidago canadensis</i>	Canada Goldenrod	Native				4	3
<i>Solidago flexicaulis</i>	Zig-Zag Goldenrod; Broadleaf Goldenrod	Native	1				
<i>Solidago ulmifolia</i>	Elm-Leaf Goldenrod	Native	1				
<i>Sorghastrum nutans</i>	Indian Grass	Native					1
<i>Symphoricarpos orbiculatus</i>	Coralberry; Indian currant	Native			1		
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native					1
<i>Thalictrum dioicum</i>	Early Meadow Rue	Native	1				
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 pd		1 cf	4 ed	
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native					4
<i>Triosteum perfoliatum</i>	Horse Gentian; Feverwort	Native				1	
<i>Urtica dioica</i>	Stinging Nettle	Native			2		
<i>Uvularia grandiflora</i>	Large-flowered Bellwort	Native	1	1			
<i>Viola pubescens</i>	Yellow Violet; Downy Yellow Violet	Native	2				
<i>Viola sororia</i>	Common Blue Violet	Native	2				
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native					1
<i>Zizia aurea</i>	Golden Alexanders	Native					1

Ryerson's Woods Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland		47.68	47.68	8.67	8.67	47.68	33.20
Savanna/Brushland and Shrub/Scrub Lowland		0.22	0.22			0.22	
Grassland and Herbaceous Lowland			0.38			0.38	0.38
Total Acres		47.9	48.28	8.67	8.67	48.28	33.58
Unit Cost (for 3 yrs)	\$	1,500	\$ 2,000	\$ 1,200	\$ 750	250	\$ 500
Opinions of Probable Cost ¹	\$	71,850	\$ 96,560	\$ 10,404	\$ 6,503	\$ 12,070	\$ 16,790
Total Opinion of Probable Cost¹		\$ 214,177					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

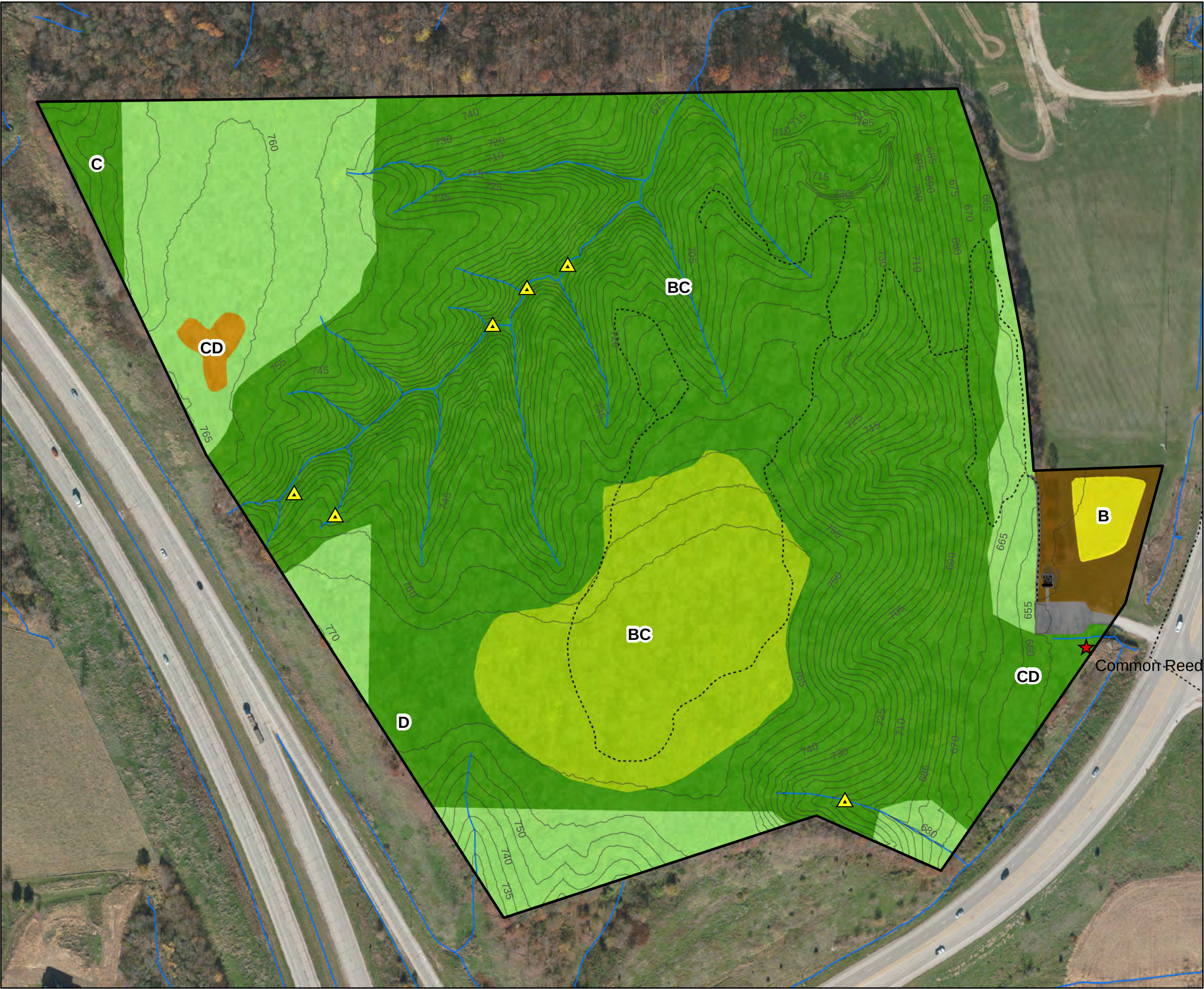
Notes:

Overseed altered forest/woodland areas following brush/weed removal.
 Install oaks and hickories (e.g., seeds, seedlings, saplings) in altered forest/woodland following brush/weed removal.
 Prescribed burning in forest/woodland to occur only in dry-mesic forest/woodland.

Iowa City Natural Areas Inventory and Management Plan

Ryerson's Woods

- City Limits
- Iowa City Park or Natural Area
- Notable Erosion Feature
- Invasive Vegetation
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Mesic Forest
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Prairie
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway



A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

SAND PRAIRIE MANAGEMENT BRIEF

Natural Area Name: Sand Prairie

Natural Area Size (ac): 38

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, north of McCollister Court and east of Gilbert Street

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Iowa City Sand Prairie Natural Area Management Plan (2005)	X	X		X			Burn plan
Iowa City Sand Prairie Controlled Burn map (2015)							Shows 2015 burn unit

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northeast to Wetherby Park
- Southwest to Terry Trueblood Recreation Area

Dominant Soils **Upland:** Sparta loamy fine sand (5-18% slopes), Dickinson fine sandy loam (2-5% slopes), (incl. texture) Tama-Dickinson complex silt loam (9-14% slopes), and "Pits Sand and Gravel"
Lowland: NA

Hydrology Features: Small pond

Historical Vegetation: Prairie

Past Land Uses: Intensive grazing and sand mining

Current Use and Management: Passive park and research; prescribed burn western 2/3 in 2015

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	4.12	10.9%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	CD	7.27	19.2%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	CD	25.33	67.0%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	C	0.48	1.3%
11. Open Water	NR	0.30	0.8%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.28	0.7%
14. Building			
15. Other Impervious Cover			
Totals		37.78	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
White-Tailed Deer	Ring-Necked Pheasant Field Sparrow ¹ Eastern Meadowlark ¹	Lizard Ornate Box Turtle ² Painted Turtle Leopard Frog Green Frog	Several spp of Odonata

¹ State Species of Greatest Conservation Need

² State Threatened (not observed by AES, but previously documented at site)

Issues and Opportunities:

- Invasive vegetation (Siberian elm, honeysuckles, smooth brome, yellow sweet clover, Japanese stiltgrass, poison ivy, etc.)
- Cultural resources have been reported on site
- State-threatened ornate box turtle recorded previously at site (use prescribed burning cautiously)
- State SGCN Field Sparrow and Eastern Meadowlark seen at site
- History of flora and fauna poaching

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Convert shrub/scrub to prairie

Sand Prairie Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Prairie	Herbaceous Lowland
<i>Canopy Stratum</i>						
<i>Gleditsia triacanthos</i>	Honey Locust	Native	4			
<i>Juglans nigra</i>	Black Walnut	Native	1			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd			
<i>Morus rubra</i>	Red Mulberry	Native	1			
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 pd			
<i>Shrub/Vine/Sapling Stratum</i>						
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native			1 cf	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native			1	
<i>Crataegus mollis</i>	Downy Hawthorn	Native	1			
<i>Gleditsia triacanthos</i>	Honey Locust	Native		1	1	
<i>Juglans nigra</i>	Black Walnut	Native	1			
<i>Ligustrum vulgare</i>	Common Privet	Not Native	1 cf			
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	4 ed	1 ed	1 cf	
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Not Native		1 cf		
<i>Maclura pomifera</i>	Osage Orange	Not Native	2		1	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 ed	1 cf	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	2			
<i>Prunus serotina</i>	Black Cherry	Native		2	1	
<i>Rhus glabra</i>	Smooth Sumac	Native		1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf		1 cf	
<i>Ulmus pumila</i>	Siberian Elm	Not Native		1 ed	1 cf	
<i>Herbaceous Stratum</i>						
<i>Achillea millefolium</i>	Western Yarrow	Native		1	1	
<i>Agalinis</i> sp.	Unknown False Foxglove	Native				1

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Prairie	Herbaceous Lowland
<i>Ageratina altissima</i>	Common White Snakeroot	Native	3			
<i>Agrostis stolonifera</i>	Creeping Bent	Not Native				1 cf
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	2 pd			
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native			2	
<i>Ambrosia psilostachya</i>	Western Ragweed; Perennial Ragweed	Native				1
<i>Artemisia ludoviciana</i>	White Sage	Native			1	
<i>Asclepias syriaca</i>	Common Milkweed	Native			1	
<i>Berteroa incana</i>	Hoary Alyssum	Not Native		1	1	
<i>Bromus inermis</i>	Smooth Brome	Not Native	2 pd	4 ed	4 ed	
<i>Bromus tectorum</i>	Downy Brome; Downy Chess; Cheatgrass	Not Native			2 cf	
<i>Carex bebbii</i>	Bebb's Sedge	Native				2
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native		1	2	
<i>Carex grisea</i>	Wood Gray Sedge; Inflated Narrow-Leaf Sedge	Native	2			
<i>Carex jamesii</i>	James' Sedge	Native	2			
<i>Carex scoparia</i>	Broom Sedge; Lance-Fruited Oval Sedge	Native			2	2
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native	1			
<i>Carex vulpinoidea</i>	Fox Sedge	Native				2
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native		2		
<i>Dichanthelium sp.</i>	Unknown Panic Grass	Native			2	1
<i>Eleocharis palustris</i>	Common Spikerush	Native				2
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1			
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1			
<i>Geum canadense</i>	White Aven; Canada Aven	Native	1			
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	2 ed			
<i>Hackelia virginiana</i>	Stickseed	Native	2			
<i>Juncus nodosus</i>	Knotted Rush	Native				1
<i>Juncus sp.</i>	Unknown Rush	Undetermined				1
<i>Juncus torreyi</i>	Torrey's Rush	Native				1
<i>Leersia oryzoides</i>	Rice Cutgrass	Native				1

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Prairie	Herbaceous Lowland
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf			
<i>Lithospermum carolinense</i>	Carolina Puccoon; Hairy Puccoon	Native		1	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd			
<i>Ludwigia</i> sp.	Unknown Water Primrose	Undetermined				1
<i>Lycopus americanus</i>	American Water Horehound; American Bugleweed	Native				2
<i>Maclura pomifera</i>	Osage Orange	Not Native		1 cf		
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native			3 pd	
<i>Microstegium vimineum</i>	Japanese stiltgrass	Not Native	2 pd			
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1	3	2	
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1			
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	2	1		
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native			1 cf	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native			1 cf	1 cf
<i>Phleum pratense</i>	Timothy	Not Native	1 cf			
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	1 pd	1 pd	2 ed	
<i>Polygonum virginianum</i>	Jumpseed	Native	1			
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native				1
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native		1 cf		
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1			
<i>Rosa arkansana</i>	Prairie Rose	Native		1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf			
<i>Rumex acetosella</i>	Sheep Sorrel	Not Native		1 cf	1 cf	
<i>Salix nigra</i>	Black Willow	Native				1
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1			
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native				1
<i>Securigera varia</i>	Crown Vetch	Not Native			1 cf	
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native		1 cf	1 cf	
<i>Solidago canadensis</i>	Canada Goldenrod	Native		1	2	
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1		1	1

Species name	Common name	Origin	Altered Forest	Shrub/Scrub	Prairie	Herbaceous Lowland
<i>Symphoricarpos orbiculatus</i>	Coralberry; Indian currant	Native		1		
<i>Toxicodendron radicans</i>	Poison Ivy	Native	2 pd	2 ed	3 ed	1 ed
<i>Trifolium pratense</i>	Red Clover	Not Native			1 cf	1 cf
<i>Trifolium repens</i>	White Clover	Not Native				1 pd
<i>Ulmus pumila</i>	Siberian Elm	Not Native		2 ed	2 pd	
<i>Verbascum thapsus</i>	Common Mullein	Not Native		1 pd	2 pd	
<i>Verbena stricta</i>	Hoary Vervain	Native			1	
<i>Viola sororia</i>	Common Blue Violet	Native	1			
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native		1		

Sand Prairie Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Forest/Woodland and Forested Lowland		4.12	4.12	4.12		4.12		
Savanna/Brushland and Shrub/Scrub Lowland		7.27	7.27	7.27		7.27	7.27	
Grassland and Herbaceous Lowland			25.81	25.81		25.81	25.81	
Total Acres		11.39	37.2	37.2	0	37.2	33.08	
Unit Cost (for 3 yrs)	\$	2,000	\$ 2,500	\$ 1,500		\$ 200	\$ 400	
Opinions of Probable Cost ¹	\$	22,780	\$ 93,000	\$ 55,800	\$ -	\$ 7,440	\$ 13,232	
Total Opinion of Probable Cost¹		\$ 192,252						

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

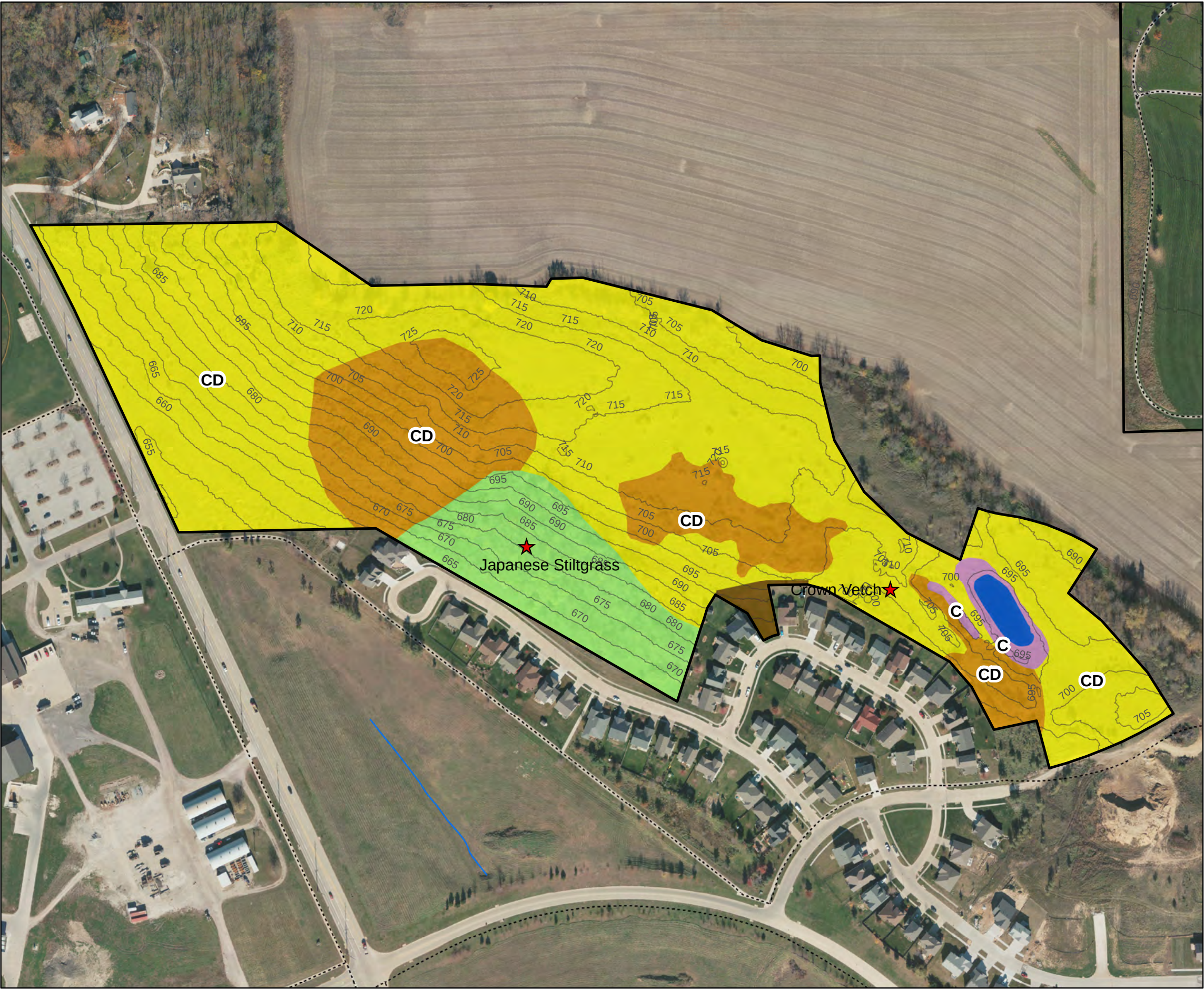
Notes:

Sparse woody vegetation in prairie should be removed or killed using prescribed fire (removal costs not included in table above). Overseed altered forest/woodland, shrub/scrub, and herbaceous areas following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Sand Prairie

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Prairie
 - Herbaceous Lowland
 - Open Water
 - Recreation Area
- Contour (5ft interval)
- Trail
- Drainageway



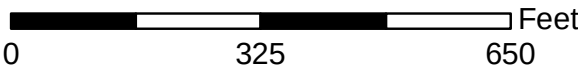
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

SCOTT PARK MANAGEMENT BRIEF

Natural Area Name: Scott Park

Natural Area Size (ac): 51

Natural Area Location (address, nearest street intersection, or other major geographic feature): Southeast district, south of Court Street, east and west of Scott Boulevard

Park/Natural Area Class: Community Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Ralston Creek Assessment (2013-2014)						X	

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North to Lindemann Trail Greenway
- West to Court Hill Park (along Ralston Creek)
- Southeast to Windsor Ridge Park

Dominant Soils **Upland:** Tama silt loam (9-14% slopes)
(incl. texture) **Lowland:** Ackmore silt loam (0-2% slopes) and Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Ralston Creek flows to west through site; tributary (from Lindemann Trail Greenway) enters site from north

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park, maintained turf

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.66	1.3%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	2.78	5.5%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	CD	12.66	25.1%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	1.01	2.0%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		1.97	3.9%
13. Recreation Area (0-50% tree canopy)		28.46	56.3%
14. Building		0.01	<0.1%
15. Other Impervious Cover		2.97	5.9%
Totals		50.52	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, Kentucky bluegrass, garlic mustard, wild parsnip, etc.)
- 100-yr floodplain encroaches on much of site
- Stable banks to moderate/severe erosion along Ralston Creek
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Stabilize eroding sections of stream bank

Scott Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Non-Native Grassland	Forested Lowland
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native		3
<i>Acer saccharinum</i>	Silver Maple	Native		2
<i>Celtis occidentalis</i>	Hackberry	Native		3
<i>Juglans nigra</i>	Black Walnut	Native		3
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		2 cf
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1
<i>Prunus serotina</i>	Black Cherry	Native		2
<i>Quercus macrocarpa</i>	Bur Oak	Native		1
<i>Salix nigra</i>	Black Willow	Native		1
<i>Ulmus americana</i>	American Elm	Native		2
<i>Ulmus pumila</i>	Siberian Elm	Not Native		1 cf
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Juglans nigra</i>	Black Walnut	Native		3
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native		2 cf
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native		1 cf
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Not Native		1 cf
<i>Malus pumila</i>	Orchard Apple	Native		1
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native		2
<i>Prunus americana</i>	American Plum; Wild Plum	Native		1
<i>Prunus virginiana</i>	Chokecherry	Native		2
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native		1 cf
<i>Rhus glabra</i>	Smooth Sumac	Native		1
<i>Rosa multiflora</i>	Multiflora Rose	Not Native		2 cf
<i>Sambucus canadensis</i>	Elderberry	Native		1
<i>Toxicodendron radicans</i>	Poison Ivy	Native		2 pd

Species name	Common name	Origin	Non-Native Grassland	Forested Lowland
<i>Ulmus americana</i>	American Elm	Native		1
<i>Viburnum dentatum</i>	Southern Arrowwood	Native		1
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native		2 cf
<i>Herbaceous Stratum</i>				
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native		3 pd
<i>Ambrosia trifida</i>	Giant Ragweed	Native		2
<i>Bidens frondosa</i>	Common Beggartick; Devil's Beggartick	Native		2
<i>Bromus inermis</i>	Smooth Brome	Not Native	2 pd	1 pd
<i>Bromus japonicus</i>	Japanese Brome	Not Native		1 cf
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native		1
<i>Carex grisea</i>	Wood Gray Sedge; Inflated Narrow-Leaf Sedge	Native		1
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native		1
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native		1
<i>Convolvulus arvensis</i>	European Morning Glory; Field Bindweed	Not Native		1 cf
<i>Cryptotaenia canadensis</i>	Honewort	Native		2
<i>Elymus repens</i>	Quackgrass	Not Native		1 cf
<i>Elymus riparius</i>	Riverbank Wild Rye	Native		1
<i>Elymus virginicus</i>	Virginia Wild Rye	Native		1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native		3
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native		2
<i>Geum canadense</i>	White Avens; Canada Avens	Native		2
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native		2 ed
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native		1
<i>Hackelia virginiana</i>	Stickseed	Native		2
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native		2
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native		1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native		1 cf
<i>Lactuca floridana</i>	Woodland Lettuce	Native		1

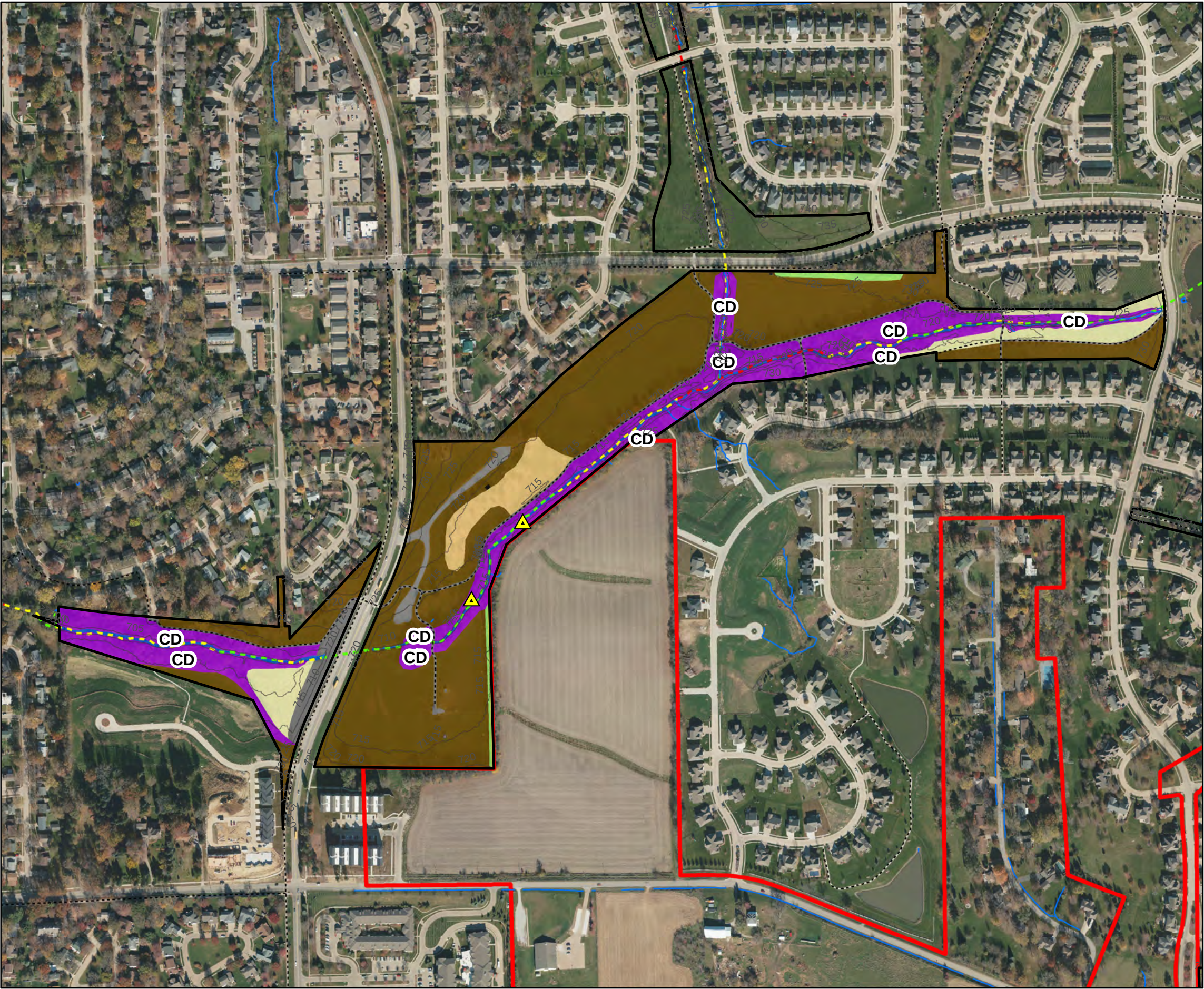
Species name	Common name	Origin	Non-Native Grassland	Forested Lowland
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native		1 pd
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native		1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native		1
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	2 cf	2 cf
<i>Persicaria hydropiperoides</i>	False Water Pepper; Mild Waterpepper; Swamp Smartweed	Native		2
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	4 ed	2 ed
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native		1
<i>Pilea pumila</i>	Clearweed	Native		2
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	2 ed
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native		1
<i>Prunus serotina</i>	Black Cherry	Native		1
<i>Ranunculus abortivus</i>	Littleleaf Buttercup	Native		1
<i>Ribes missouriense</i>	Missouri Gooseberry	Native		1
<i>Rubus occidentalis</i>	Black Raspberry	Native		1
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		1
<i>Smilax tamnoides</i>	Bristly Greenbrier; China Root; Hellfetter	Native		1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native		3
<i>Stellaria media</i>	Chickweed; Common Chickweed	Not Native		1 cf
<i>Symphotrichum lateriflorum</i>	Calico Aster; One-Sided Aster; White Woodland Aster; Starved Aster	Native		3
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native		1
<i>Urtica dioica</i>	Stinging Nettle	Native		1
<i>Viola sororia</i>	Common Blue Violet	Native		2

Scott Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	13.32	13.32		13.32		
	Savanna/Brushland and Shrub/Scrub Lowland						
	Grassland and Herbaceous Lowland		2.78	2.78	2.78	2.78	
	Total Acres	13.32	16.1	2.78	0	16.1	
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,500	\$ 1,500		\$ 200	
Opinions of Probable Cost ¹		\$ 33,300	\$ 40,250	\$ 4,170	\$ -	\$ 3,220	\$ 1,500
Total Opinion of Probable Cost ¹		\$	82,440				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:
Overseed non-native grassland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Scott Park

- City Limits
- Iowa City Park or Natural Area
- Notable Erosion Feature
- Existing Land Cover
 - Altered Forest/Woodland
 - Non-native Grassland
 - Forested Lowland
 - Open Water
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway
- Stream Bank Stability (2010-2014 data)
 - Stable
 - Minor Erosion
 - Moderate to Severe Erosion

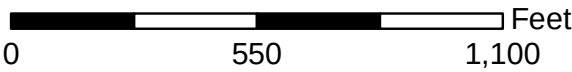
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

SNYDER CREEK GREENWAY MANAGEMENT BRIEF

Natural Area Name: Snyder Creek Greenway

Natural Area Size (ac): 15

Natural Area Location (address, nearest street intersection, or other major geographic feature): East of Scott Boulevard, north and south of Liberty Drive

Park/Natural Area Class: Riparian corridor

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- West to ESRC Biocells
- East to 420th Street Wetland
- North-northeast to Windsor Ridge Park

Dominant Soils **Upland:** Tama silt loam (2-14% slopes)
(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Snyder Creek flows to south through site; tributary (from ESRC Biocells) enters site from west

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Unknown

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	D	5.40	35.8%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	2.77	18.4%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland	D	1.53	10.2%
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	4.98	33.0%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		0.30	2.0%
14. Building			
15. Other Impervious Cover		0.09	0.6%
Totals		15.07	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
White-Tailed Deer Beaver	None observed	Blanchard's Cricket Frog	None observed

Issues and Opportunities:

- Invasive vegetation (Siberian elm, poison hemlock, reed canary grass, yellow sweet clover, wild parsnip, crown vetch, etc.)
- Significant impervious cover to east
- 100-yr floodplain encroaches on most of site
- Stable stream banks
- Beaver dam caused flooding of private land
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Snyder Creek Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Shrub/Scrub	Non-Native Grassland	Shrub/Scrub Lowland
<i>Canopy Stratum</i>					
<i>Acer saccharinum</i>	Silver Maple	Native	2		2
<i>Betula nigra</i>	River Birch	Native	1		
<i>Celtis occidentalis</i>	Hackberry	Native	1		
<i>Pinus strobus</i>	White Pine; Eastern White Pine	Native	1		
<i>Platanus occidentalis</i>	American Sycamore	Native	1		1
<i>Prunus serotina</i>	Black Cherry	Native	1		
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native		1 cf	
<i>Quercus bicolor</i>	Swamp White Oak	Native	1		
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native	2		
<i>Quercus macrocarpa</i>	Bur Oak	Native	1		
<i>Salix nigra</i>	Black Willow	Native			1
<i>Ulmus americana</i>	American Elm	Native	1		3
<i>Ulmus pumila</i>	Siberian Elm	Not Native	3 pd		3 pd
<i>Shrub/Vine/Sapling Stratum</i>					
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	2		
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1		
<i>Juniperus virginiana</i>	Eastern Red Cedar	Native	1		
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Not Native	1 cf		
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 cf		1 cf
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1		
<i>Rhus aromatica</i>	Fragrant Sumac	Native	1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf		
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native			1
<i>Sambucus canadensis</i>	Elderberry	Native			2
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	2		2

Species name	Common name	Origin	Shrub/Scrub	Non-Native Grassland	Shrub/Scrub Lowland
<i>Herbaceous Stratum</i>					
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native		2	
<i>Asclepias syriaca</i>	Common Milkweed	Native	1		1
<i>Bromus inermis</i>	Smooth Brome	Not Native	2 pd	2 pd	
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native			1
<i>Cicuta maculata</i>	Water Hemlock; Spotted Water Hemlock	Native			1
<i>Cirsium arvense</i>	Canada thistle	Not Native	2 cf		
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	1cf		
<i>Conium maculatum</i>	Poison Hemlock	Not Native	3 pd	1 cf	2 pd
<i>Elymus virginicus</i>	Virginia Wild Rye	Native			1
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1		
<i>Festuca arundinacea</i>	Tall Fescue	Not Native	2 pd		
<i>Geum aleppicum</i>	Yellow Avena	Native			1
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native	1		
<i>Helopsis helianthoides</i>	Oxeye; False Sunflower	Native	1		2
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	2 pd		
<i>Lycopus americanus</i>	American Water Horehound; American Bugleweed	Native			2
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	2 pd	3 ed	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 cf	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	3 pd	2 pd	2 cf
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native			1
<i>Persicaria amphibia</i>	Longroot Smartweed; Water Smartweed	Native			1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	2 pd		4 ed
<i>Phragmites australis</i>	Giant Reed Grass	Not Native			1 cf
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native	1		
<i>Potamogeton crispus</i>	Curly Pondweed; Curly-Leaf Pondweed	Not Native			1 pd
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native			1
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 pd		
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf		

Species name	Common name	Origin	Shrub/Scrub	Non-Native Grassland	Shrub/Scrub Lowland
<i>Rumex sp.</i>	Unknown Dock or Sorrel	Undetermined			1
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native			1
<i>Securigera varia</i>	Crown Vetch	Not Native	2 pd	2 pd	
<i>Setaria faberi</i>	Giant Foxtail; Nodding Foxtail; Japanese Bristlegrass	Not Native		1 cf	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	3	2	2
<i>Sorghastrum nutans</i>	Indian Grass	Native	1	2	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1		1
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native			1
<i>Trifolium pratense</i>	Red Clover	Not Native	2 pd		
<i>Typha latifolia</i>	Broadleaf Cattail	Native			1
<i>Verbena urticifolia</i>	White Vervain	Native			1
<i>Viola sororia</i>	Common Blue Violet	Native	1		

Snyder Creek Greenway Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
	Forest/Woodland and Forested Lowland						
	Savanna/Brushland and Shrub/Scrub Lowland	6.93	6.93	6.93		6.93	6.93
	Grassland and Herbaceous Lowland		2.77	2.77		2.77	2.77
	Total Acres	6.93	9.7	9.7	0	9.7	9.7
	Unit Cost (for 3 yrs)	\$ 3,000	\$ 3,000	\$ 1,500		\$ 300	\$ 500
	Opinions of Probable Cost ¹	\$ 20,790	\$ 29,100	\$ 14,550	\$ -	\$ 2,910	\$ 4,850
Total Opinion of Probable Cost¹		\$ 72,200					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

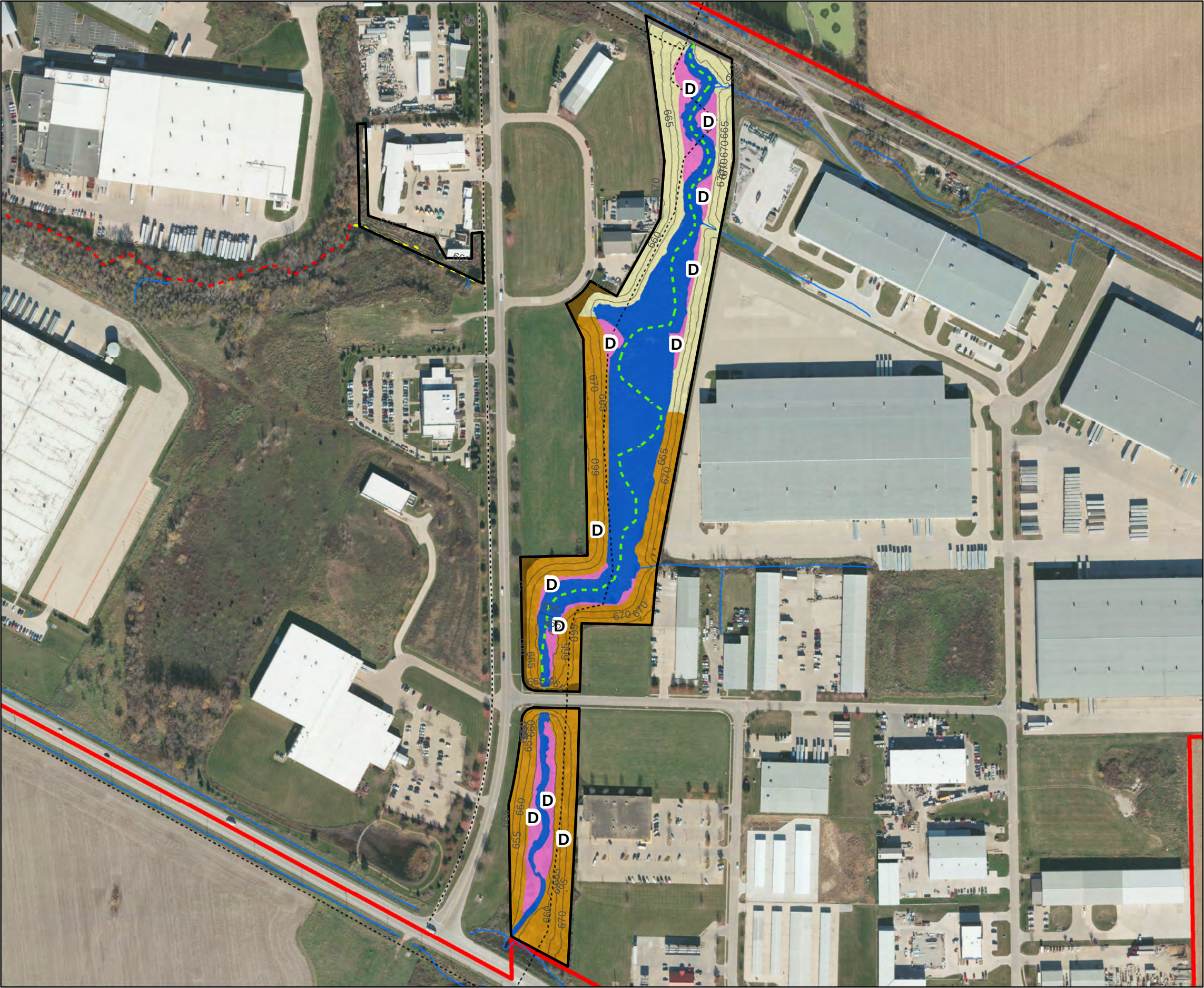
Notes:

Overseed shrub/scrub areas and non-native grassland following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Snyder Creek Greenway

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Shrub/Scrub
 - Non-native Grassland
 - Shrub/Scrub Lowland
 - Open Water
 - Recreation Area
- Contour (5ft interval)
- Trail
- Drainageway



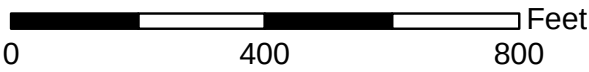
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

STURGIS FERRY PARK MANAGEMENT BRIEF

Natural Area Name: Sturgis Ferry Park

Natural Area Size (ac): 11

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, east of Riverside Drive, southeast of Ruppert Road terminus; east of airport

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North-northeast (across Iowa River and Highway 6) to Riverfront Crossings Park

Dominant Soils **Upland:** NA
(incl. texture) **Lowland:** Orthents, loamy

Hydrology Features: Iowa River adjacent to east of site

Historical Vegetation: Prairie and Oak barrens

Past Land Uses: Cropland

Current Use and Management: Little use except one event/yr; boat ramp

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	2.57	22.7%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	5.43	47.9%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR	0.05	0.4%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		2.20	19.4%
14. Building			
15. Other Impervious Cover		1.08	9.5%
Totals		11.33	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Dickcissel ¹	None observed	None observed

¹ State Species of Greatest Conservation Need

Issues and Opportunities:

- Invasive vegetation (burdock, reed canary grass, birdsfoot trefoil, etc.)
- Former landfill
- 100-yr and 500-yr floodplains encroach on site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Sturgis Ferry Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Canopy Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	3	
<i>Celtis occidentalis</i>	Hackberry	Native	1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf	
<i>Shrub/Vine/Sapling Stratum</i>				
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	2	
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native	1 cf	
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native	1 cf	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2	
<i>Juglans nigra</i>	Black Walnut	Native	1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1	
<i>Sambucus canadensis</i>	Elderberry	Native	1	
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 pd	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1	
<i>Herbaceous Stratum</i>				
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf	
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native		1
<i>Ambrosia trifida</i>	Giant Ragweed	Native		1
<i>Anemone canadensis</i>	Canada anemone	Native	1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	2 pd	1 cf
<i>Asclepias</i> sp.	Unknown Milkweed	Native	1	
<i>Asclepias syriaca</i>	Common Milkweed	Native		1

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
Asteraceae	Unknown Aster	Undetermined	1	
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native		1
<i>Carex</i> spp.	Unknown Sedges	Native	1	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	1 cf	1 pd
<i>Conium maculatum</i>	Poison Hemlock	Not Native	1 cf	
<i>Coryza canadensis</i>	Canadian Horseweed	Native		1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native		1
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native		2 pd
<i>Hackelia virginiana</i>	Stickseed	Native		1
<i>Helianthus giganteus</i>	Giant Sunflower; Tall Sunflower	Native		1
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf	
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native		1
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		2 pd
<i>Medicago lupulina</i>	Black Medic	Not Native		1 cf
<i>Melilotus alba</i>	White Sweet Clover	Not Native	1 cf	1 cf
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native		1 pd
<i>Nepeta cataria</i>	Catnip	Not Native	1 cf	1 cf
<i>Oenothera biennis</i>	Evening Primrose	Native		1
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf	2 pd
<i>Pilea pumila</i>	Clearweed	Native	1	
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native		1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native		1 cf
<i>Salsola collina</i>	Slender Russian Thistle	Not Native		2
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1	

Species name	Common name	Origin	Altered Forest	Non-Native Grassland
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native		1
<i>Securigera varia</i>	Crown Vetch	Not Native		1 cf
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined	1	
<i>Solanum dulcamara</i>	Bittersweet Nightshade; Climbing Nightshade	Not Native	1 cf	1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native		1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1	1
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	1	
<i>Tragopogon dubius</i>	Goat's Beard	Not Native		1 cf
<i>Trifolium pratense</i>	Red Clover	Not Native		1 cf
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native		1 cf
<i>Ulmus pumila</i>	Siberian Elm	Not Native		1 cf
<i>Urtica dioica</i>	Stinging Nettle	Native	1	

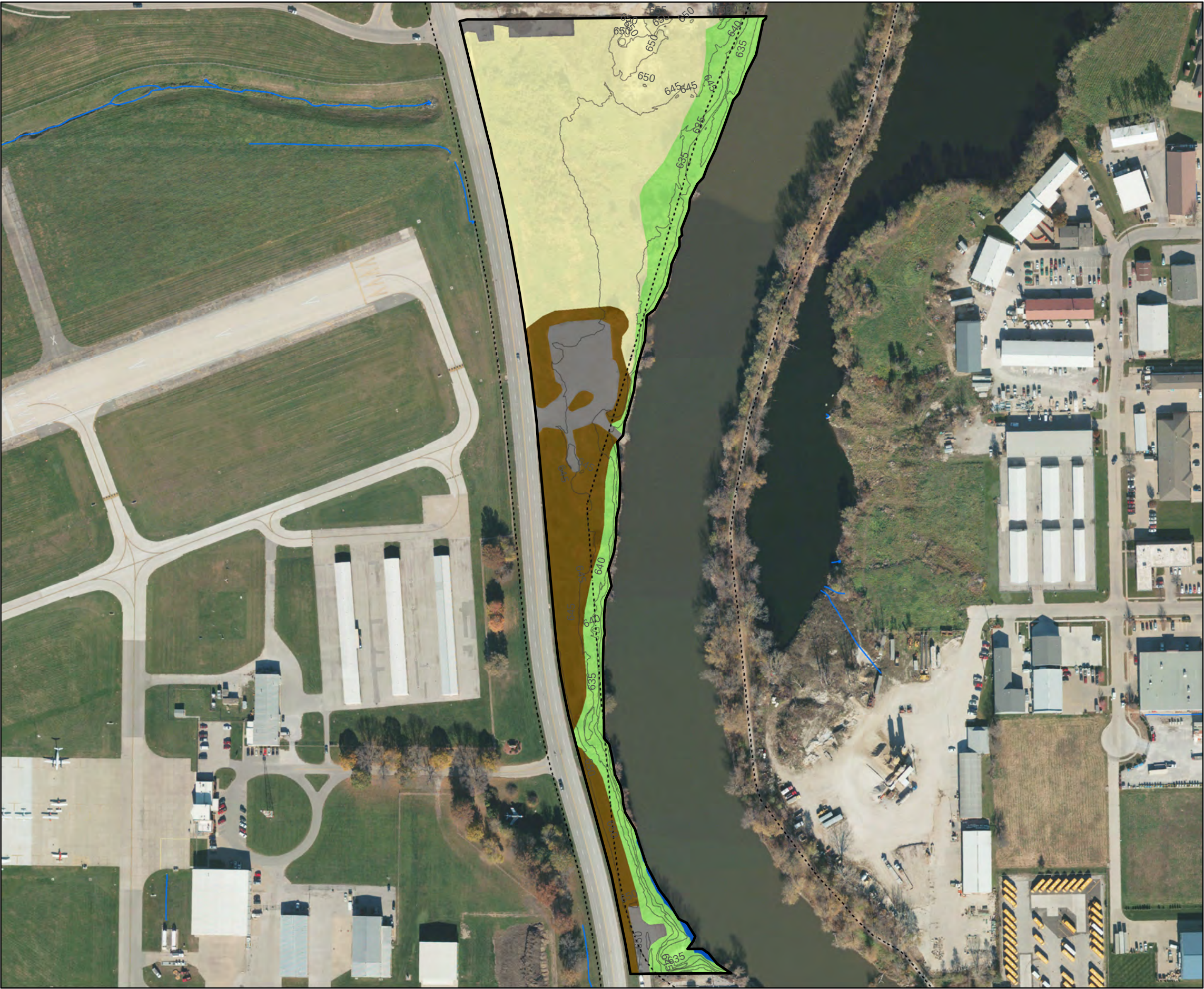
Sturgis Ferry Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
	2.57	2.57	2.57		2.57		
		5.43	5.43		5.43	5.43	
	Total Acres	2.57	8	8	0	8	5.43
	Unit Cost (for 3 yrs)	\$ 2,500	\$ 2,500	\$ 1,500		\$ 300	\$ 400
	Opinions of Probable Cost ¹	\$ 6,425	\$ 20,000	\$ 12,000	\$ -	\$ 2,400	\$ 2,172
Total Opinion of Probable Cost ¹		\$	42,997				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland and non-native grassland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Sturgis Ferry Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Non-native Grassland
 - Open Water
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

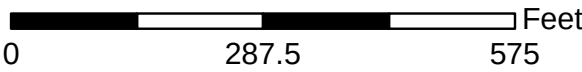
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

SYCAMORE GREENWAY MANAGEMENT BRIEF

Natural Area Name: Sycamore Greenway

Natural Area Size (ac): 102

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, east of South Sycamore Street and north of the wastewater treatment plant

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Map of Sycamore Greenbelt Corridor (2010)							Map shows berms, ponds, and wetlands
South Sycamore Floodway Wetland Greenbelt Habitat & Trail System map							Map shows future park, plantings, trails, berms, and ponds
McCollister Alternatives and Revised maps							Map shows alternative alignments for a proposed road
South Sycamore Bird List			X (birds)				
South Sycamore Three Year Burn Plan (2010)							Includes detailed maps of units
Sycamore Greenspace planting lists (2001)		X					
Sycamore Greenspace proposed signage							Signs describe site, wetland benefits, biodiversity, and fire management

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North/west to Makada Wetland Mitigation
- East to large wetland complex
- South to Iowa City Kickers Soccer Park (and Oxeye Prairie)
- West (across County land) to Terry Trueblood Recreation Area

Dominant Soils Upland: Muscatine silt loam (0-2% slopes), Tama silt loam (2-5% slopes) and Downs silt loam, till (incl. texture) plain, (2-9% slopes)

Lowland: Colo-Ely complex silty clay loam (0-5% slopes), Houghton muck (0-2% slopes), and Colo silt loam (0-2% slopes), occasionally flooded, overwash

Hydrology Features: Drainageway flows south toward Iowa River

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Regional stormwater management; bike trail; prescribed burning

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC, CD, D	15.97	15.7%
7. Non-native Grassland (little native plant cover)	NR	19.95	19.6%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	D	1.10	1.1%
9. Shrub/Scrub Lowland	CD, D	11.93	11.7%
10. Herbaceous Lowland (wet meadow & marsh)	D	19.98	19.6%
11. Open Water	NR	23.17	22.7%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		6.70	6.6%
14. Building			
15. Other Impervious Cover		3.19	3.1%
Totals		101.99	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Red-Bellied Woodpecker Wood Duck >130 bird species reported	Bullfrog	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, Kentucky bluegrass, cattails, smooth brome, wild parsnip, etc.)
- Offsite wetlands to east will likely provide continuous pressure of invasive vegetation
- Heavily used park (passive recreation)
- 100-yr floodplain encroaches on site
- Beavers dam outlets causing flooding of private land

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Install interpretive signage

Sycamore Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland	Open Water
<i>Canopy Stratum</i>								
<i>Populus deltoides</i>	Eastern Cottonwood	Native			3			
<i>Salix nigra</i>	Black Willow	Native			4	1		
<i>Shrub/Vine/Sapling Stratum</i>								
<i>Cephalanthus occidentalis</i>	Buttonbush	Native						1
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	1	1		3		
<i>Cornus sericea</i>	Red Osier Dogwood	Native					1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1					
<i>Physocarpus opulifolius</i>	Ninebark	Native				1		
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1				
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1	2	2	1	1
<i>Salix nigra</i>	Black Willow	Native			2	2	1	1
<i>Thuja occidentalis</i>	Northern White Cedar; Eastern Arborvitea	Native				1		
<i>Viburnum dentatum</i>	Southern Arrowwood	Native					1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1		1			
<i>Herbaceous Stratum</i>								
<i>Andropogon gerardii</i>	Big Bluestem	Native	1	1				
<i>Anemone canadensis</i>	Canada anemone	Native					1	
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native	1				1	
<i>Asclepias syriaca</i>	Common Milkweed	Native	1	1				
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	1					
<i>Aster novae-angliae</i>	New England Aster	Native	1					
<i>Baptisia alba</i>	Wild White Indigo	Native	1					
<i>Bromus inermis</i>	Smooth Brome	Not Native	3 pd	4 ed				
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval	Native	1					

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland	Open Water
	Sedge							
<i>Carex conjuncta</i>	Soft Fox Sedge	Native					1	
<i>Carex lacustris</i>	Lake Sedge; Hairy Sedge	Native				1		
<i>Carex molesta</i>	Troublesome Sedge; Field Oval Sedge	Native					1	
<i>Cirsium arvense</i>	Canada thistle	Not Native					1 cf	
<i>Convolvulus arvensis</i>	European Morning Glory; Field Bindweed	Not Native	1 cf					
<i>Dactylis glomerata</i>	Orchardgrass	Not Native		1				
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf				
<i>Dianthus armeria</i>	Deptford Pink	Not Native	1					
<i>Dipsacus laciniatus</i>	Cut-Leaved Teasel	Not Native					1 cf	
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1					
<i>Elymus repens</i>	Quackgrass	Not Native		1 cf				
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native	2	2				
<i>Leersia oryzoides</i>	Rice Cutgrass	Native			1	1		
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	1 cf	1 cf				
<i>Medicago sativa</i>	Alfalfa	Not Native	1 cf	1 cf				
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	2 pd	2 pd				
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	1					
<i>Nymphaea odorata</i>	American White Water Lily; Fragrant Water Lily	Native						1
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native	1					
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	2 pd	2 pd			1 cf	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native			4 ed	4 ed	4 ed	1 cf
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	2 pd	3 ed				
Polygonaceae	Unknown Knotweed	Undetermined	1			1	1	
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native						1
<i>Pycnanthemum pilosum</i>	Hairy Mountain Mint	Native	1					
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	1					
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	1					

Species name	Common name	Origin	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland	Open Water
<i>Rumex altissimus</i>	Tall Dock; Pale Dock	Native		1				
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native						1
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native					1	
<i>Scirpus fluviatilis</i>	River Bulrush	Native					1	
<i>Securigera varia</i>	Crown Vetch	Not Native		1 pd				
<i>Silphium integrifolium</i>	Rosinweed	Native	1				1	
<i>Silphium perfoliatum</i>	Cup Plant	Native	2				1	
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native					1	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	2	2				
<i>Solidago rigida</i>	Stiff Goldenrod	Native	1					
<i>Sparganium eurycarpum</i>	Broadfruit Bur-Reed; Giant Bur-Reed	Native						1
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native					1	
<i>Trifolium pratense</i>	Red Clover	Not Native	1 cf	1 cf				
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native					1 pd	
<i>Typha x glauca</i>	Hybrid Cattail	Not Native				1 cf	2 pd	
<i>Zizia aurea</i>	Golden Alexanders	Native					1	

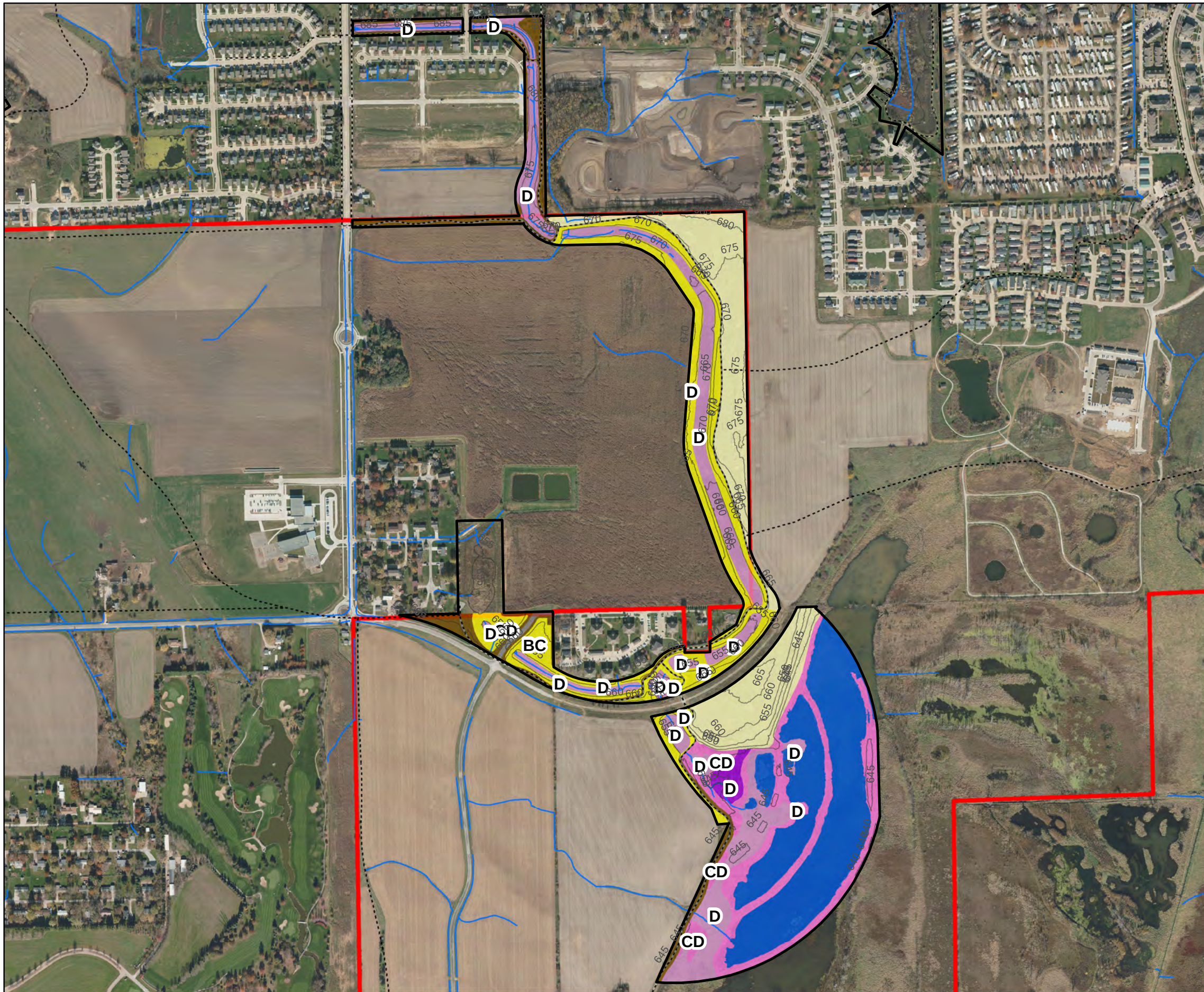
Sycamore Greenway Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
		1.1	1.1		1.1		
		11.93	11.93		11.93	11.93	
		55.9	55.9		55.9	55.9	
	Total Acres	0	68.93	68.93	0	68.93	
		\$ 3,000	\$ 1,500		\$ 200	\$ 400	
		\$ 206,790	\$ 103,395				
	Opinions of Probable Cost ¹	\$ -	\$ 206,790	\$ 103,395	\$ -	\$ 13,786	\$ 27,132
Total Opinion of Probable Cost ¹		\$	351,103				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed upland and lowland areas following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Sycamore Greenway

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
- Prairie
- Non-native Grassland
- Forested Lowland
- Shrub/Scrub Lowland
- Herbaceous Lowland
- Open Water
- Recreation Area
- Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway

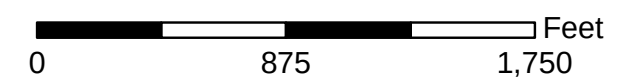
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

TERRELL MILL PARK MANAGEMENT BRIEF

Natural Area Name: Terrell Mill Park

Natural Area Size (ac): 35

Natural Area Location (address, nearest street intersection, or other major geographic feature): North district, southwest of intersection of Taft Speedway and Dubuque Street, along Iowa River

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Southwest (across Iowa River) to City Park

Dominant Soils Upland: Lawler loam (0-2% slopes)

(incl. texture)

Lowland: Perks-Spillville complex sandy loam (0-2% slopes)

Hydrology Features: Iowa River along southwest edge of site

Historical Vegetation: Oak barrens

Past Land Uses: Unknown (Iowa River alignment used to cross central and eastern portion of site)

Current Use and Management: Low park use; University of Iowa boat house and skate park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	3.94	11.4%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)	NN	1.01	2.9%
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.94	2.7%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	C, CD, D	12.26	35.5%
9. Shrub/Scrub Lowland	D	0.74	2.1%
10. Herbaceous Lowland (wet meadow & marsh)	D	2.00	5.8%
11. Open Water	NR	0.43	1.2%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		9.53	27.6%
14. Building		0.42	1.2%
15. Other Impervious Cover		3.23	9.4%
Totals		34.50	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Eastern Phoebe Northern Flicker American Redstart	Western Chorus Frog	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, garlic mustard, creeping Charlie, reed canary grass, etc.)
- Former ice house on site (foundation remains)
- Illegally dumped fill on site
- 100-yr or 500-yr floodplain and/or floodway encroach on entire site
- Opportunities for more trails, archery, etc.

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Install interpretive signage

Terrell Mill Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Savanna	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland
<i>Canopy Stratum</i>							
<i>Acer saccharinum</i>	Silver Maple	Native				3	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	4	1			
<i>Morus rubra</i>	Red Mulberry	Native		1			
<i>Populus deltoides</i>	Eastern Cottonwood	Native	2	1		3	
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native		1			
<i>Quercus rubra</i>	Red Oak	Native				1	
<i>Salix nigra</i>	Black Willow	Native	1				
<i>Ulmus americana</i>	American Elm	Native				1	
<i>Shrub/Vine/Sapling Stratum</i>							
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native			1		
<i>Allanthus altissima</i>	Tree of Heaven	Not Native	1 cf				
<i>Cephalanthus occidentalis</i>	Buttonbush	Native					2
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native			1	1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1	1	1		
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1				
<i>Hibiscus moscheutos</i>	Swamp Rose Mallow; Crimson-Eyed Rose Mallow	Native					1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd				
<i>Lonicera marrowi</i>	Morrow's Honeysuckle	Not Native	1 cf				
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 cf			
<i>Polygonum cuspidatum</i>	Japanese Knotweed	Not Native	1 cf			1 cf	
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native	1 cf				
<i>Quercus bicolor</i>	Swamp White Oak	Native			1		
<i>Robinia pseudoacacia</i>	Black Locust	Not Native			1 cf		

Species name	Common name	Origin	Altered Forest	Savanna	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland
<i>Rosa multiflora</i>	Multiflora Rose	Not Native				1 cf	
<i>Salix nigra</i>	Black Willow	Native			1		
<i>Toxicodendron radicans</i>	Poision Ivy	Native				1 pd	
<i>Ulmus americana</i>	American Elm	Native	1				
Herbaceous Stratum							
<i>Acer saccharinum</i>	Silver Maple	Native				1	1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	2 pd			2 pd	
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native				1	
<i>Anemone canadensis</i>	Canada anemone	Native		1		1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf				
<i>Arisaema dracontium</i>	Green Dragon; Dragon Root	Native				1	
<i>Asarum canadense</i>	Canada Wild Ginger	Native				1	
<i>Asclepias syriaca</i>	Common Milkweed	Native		1			
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1				
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native		1			
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native				1	
<i>Carex grayi</i>	Gray's Sedge	Native				1	
<i>Carex lupulina</i>	Hop Sedge	Native				1	
<i>Carex spp.</i>	Unknown Sedges	Native		1		1	
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native				1	
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native		1			
<i>Carex vulpinoidea</i>	Fox Sedge	Native		1			
<i>Duchesnea indica</i>	Mock Strawberry; Indian Strawberry; False Strawberry	Native		1			
<i>Elymus virginicus</i>	Virginia Wild Rye	Native				1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native			1		
<i>Festuca subverticillata</i>	Nodding Fescue	Native				1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native				1	
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native	1				

Species name	Common name	Origin	Altered Forest	Savanna	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native				1	
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	2 pd			2 pd	
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native				1	
<i>Hackelia virginiana</i>	Stickseed	Native				1	
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native				1 cf	
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native				1	
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native			1		
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native			1 pd		
<i>Lysimachia nummularia</i>	Moneywort	Not Native				1 cf	
<i>Mellilotus officinalis</i>	Yellow Sweet Clover	Not Native			1 cf		
<i>Menispermum canadense</i>	Canada Moonseed	Native				1	
<i>Miscanthus sp.</i>	Unknown Silvergrass	Not Native			1 pd		
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native				1	
<i>Persicaria amphibia</i>	Longroot Smartweed; Water Smartweed	Native				1	
<i>Persicaria hydropiper</i>	Water Pepper; Marshpepper Knotweed	Not Native				1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 pd	3 ed	4 ed		4 ed
<i>Poa palustris</i>	Fowl Bluegrass	Native		2		1	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native			2 pd		
Polygonaceae	Unknown Knotweed	Undetermined			1		
<i>Securigera varia</i>	Crown Vetch	Not Native			1 pd		
<i>Solidago canadensis</i>	Canada Goldenrod	Native		3	2		
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1		1		
<i>Stellaria aquatica</i>	Giant Chickweed	Not Native				1 cf	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native		1		1	
<i>Toxicodendron radicans</i>	Poison Ivy	Native				1 pd	
<i>Urtica dioica</i>	Stinging Nettle	Native	1			1	
<i>Viola sp.</i>	Unknown Violet	Undetermined				1	

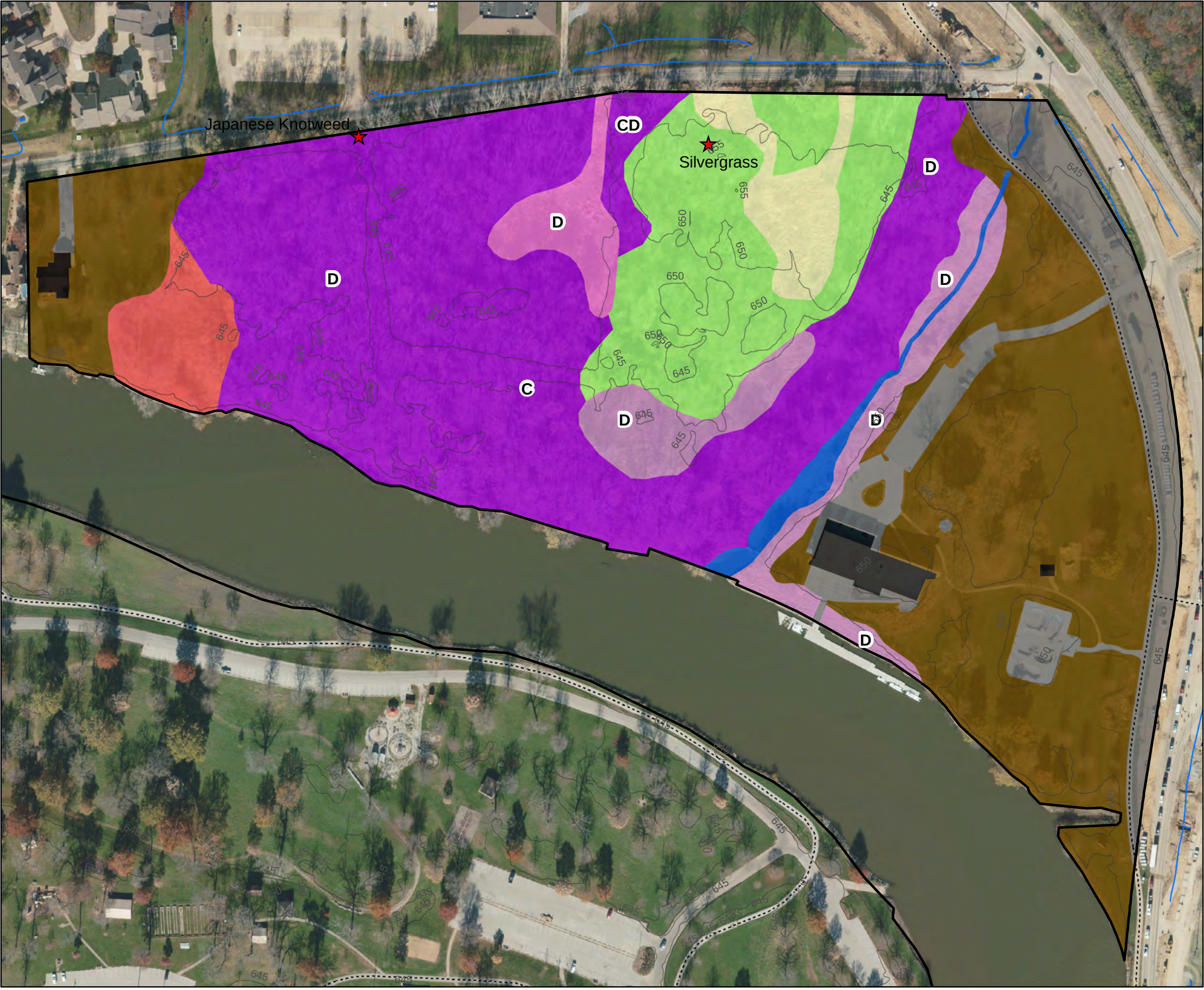
Terrell Mill Park Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	16.2	16.2	16.2	16.2		
	Savanna/Brushland and Shrub/Scrub Lowland	1.01	1.75	1.75	1.75	1.01	
	Grassland and Herbaceous Lowland		2.94	2.94	2.94	2.94	
	Total Acres	17.21	20.89	20.89	0	3.95	
	Unit Cost (for 3 yrs)	\$ 2,000	\$ 2,500	\$ 1,500	\$ 250	\$ 500	
Opinions of Probable Cost ¹		\$ 34,420	\$ 52,225	\$ 31,335	\$ -	\$ 5,223	\$ 1,975
Total Opinion of Probable Cost ¹		\$	125,178				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland, savanna, and herbaceous areas following brush/weed removal.
Woody invasive removal and prescribed burning not needed in shrub/scrub lowland.



Iowa City Natural Areas Inventory and Management Plan

Terrell Mill Park

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover**
 - Altered Forest/Woodland
 - Savanna
 - Non-native Grassland
 - Forested Lowland
 - Shrub/Scrub Lowland
 - Herbaceous Lowland
 - Open Water
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

TERRY TRUEBLOOD RECREATION AREA MANAGEMENT BRIEF

Natural Area Name: Terry Trueblood Recreation Area

Natural Area Size (ac): 206

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, south of intersection of McCollister Boulevard and Gilbert Street

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps
Assorted correspondence (2015)		X					Includes reports of uncommon and invasive plants

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northeast to Sand Prairie and Wetherby Park
- East to Makada Wetland Mitigation and Sycamore Greenway
- West (across Iowa River) to Ryerson Woods

Dominant Soils **Upland:** Sparta loamy fine sand (0-5% slopes) and Waukee loam (0-2% slopes) (incl. texture) **Lowland:** Perks-Spillville complex sandy loam (0-2% slopes) and "Pits Sand and Gravel"

Hydrology Features: large quarry lake on site; several small ponds/wetlands in western portion of site; Iowa River along west edge of site

Historical Vegetation: Oak barrens and prairie

Past Land Uses: Sand and gravel quarry; cropland

Current Use and Management: Heavily used park; fishing

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	D	3.89	1.9%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	5.14	2.5%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	CD, D	7.77	3.8%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	C, CD, D	13.19	6.4%
7. Non-native Grassland (little native plant cover)	NR	22.47	10.9%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	BC, CD	38.69	18.8%
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)	CD	3.57	1.7%
11. Open Water	NR	95.06	46.1%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		9.04	4.4%
14. Building		0.29	0.1%
15. Other Impervious Cover		7.13	3.5%
Totals		206.25	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Carex aggregata*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Belted Kingfisher Eastern Meadowlark ¹ Common Yellowthroat >150 bird species reported	None observed	None observed

¹ State Species of Greatest Conservation Need

Issues and Opportunities:

- Invasive vegetation (Siberian elm, white mulberry, honeysuckle, cattails, reed canary grass, Kentucky bluegrass, smooth brome, yellow sweet clover, crown vetch, etc.)
- Wooded wetland mitigation area in western portion of site
- 100-yr floodplain and floodway encroach on site
- State SGCN Eastern Meadowlark seen at site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Manage wooded wetland mitigation area
- Install interpretive signage

Terry Trueblood Recreation Area Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>									
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native						1	
<i>Acer saccharinum</i>	Silver Maple	Native	2					4	1
<i>Betula nigra</i>	River Birch	Native		2					
<i>Carya cordiformis</i>	Bitternut Hickory	Native						1	
<i>Celtis occidentalis</i>	Hackberry	Native	1					1	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2	2				1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	1					2	1
<i>Juglans nigra</i>	Black Walnut	Native	1	1				1	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf	2 pd				2 pd	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1				1	2	
<i>Prunus serotina</i>	Black Cherry	Native		3					
<i>Quercus macrocarpa</i>	Bur Oak	Native	1	1				1	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native					1 cf		
<i>Salix nigra</i>	Black Willow	Native					1	1	1
<i>Ulmus americana</i>	American Elm	Native	1					1	
<i>Ulmus pumila</i>	Siberian Elm	Not Native		4 ed					
<i>Shrub/Vine/Sapling Stratum</i>									
<i>Acer saccharinum</i>	Silver Maple	Native	1		1		1	3	
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native				1 cf			
<i>Betula nigra</i>	River Birch	Native				1			
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native					1		
<i>Celtis occidentalis</i>	Hackberry	Native		1			1		
<i>Cephalanthus occidentalis</i>	Buttonbush	Native				1		1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native				1			1
<i>Cornus obliqua</i>	Swamp Dogwood; Silky Dogwood; Blue-Fruited Dogwood	Native				1			
<i>Fraxinus pennsylvanica</i>	Green Ash	Native			1				1
<i>Juglans nigra</i>	Black Walnut	Native		1				1	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	4 ed			1 cf	2 pd	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf			1 cf	1 cf		
<i>Physocarpus opulifolius</i>	Ninebark	Native				1			
<i>Platanus occidentalis</i>	American Sycamore	Native				1		1	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1		1			3	
<i>Prunus serotina</i>	Black Cherry	Native					1		
<i>Quercus alba</i>	White Oak	Native				1			
<i>Quercus bicolor</i>	Swamp White Oak	Native				1			
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native				1			
<i>Quercus velutina</i>	Black Oak	Native				1			
<i>Robinia pseudoacacia</i>	Black Locust	Not Native					1 cf		
<i>Rubus occidentalis</i>	Black Raspberry	Native						1	
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native			4		1	1	1
<i>Salix nigra</i>	Black Willow	Native			1				
<i>Sambucus canadensis</i>	Elderberry	Native			1				
<i>Toxicodendron radicans</i>	Poison Ivy	Native		1 cf				1 cf	
<i>Ulmus americana</i>	American Elm	Native	1					1	
<i>Ulmus pumila</i>	Siberian Elm	Not Native	1 cf				1 cf	2 pd	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1					1	
Herbaceous Stratum									
<i>Agalinis</i> sp.	Unknown False Foxglove	Native							1

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Ageratina altissima</i>	Common White Snakeroot	Native						1	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd	1 cf				1 cf	
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native				1			
<i>Ambrosia trifida</i>	Giant Ragweed	Native				1		1	
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native	1					2	
<i>Andropogon gerardii</i>	Big Bluestem	Native				1			
<i>Anemone canadensis</i>	Canada anemone	Native						1	1
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native			1	1			
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf					2 pd	
<i>Asclepias syriaca</i>	Common Milkweed	Native						1	
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native				1			
<i>Bidens cernua</i>	Nodding Beggartick; Nodding Bur Marigold	Native							1
<i>Boehmeria cylindrica</i>	Smallspike False Nettle; Bog Hemp	Native						1	
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native							1
<i>Bromus inermis</i>	Smooth Brome	Not Native			4 ed	2 pd	4 ed	3 ed	
<i>Bromus japonicus</i>	Japanese Brome	Not Native				1 cf			
<i>Bromus tectorum</i>	Downy Brome; Downy Chess; Cheatgrass	Not Native				1 cf			
<i>Callirhoe bushii</i>	Bush's Poppy Mallow	Native				1			
<i>Cannabis sativa</i>	Marijuana	Not Native						1	
<i>Carex aggregata</i>	Smooth Clustered Sedge; Glomerate Sedge	Native						1	
<i>Carex annectens</i>	Yellow Fox Sedge; Yellowfruit Sedge	Native					1		
<i>Carex bebbii</i>	Bebb's Sedge	Native						1	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native				1	1		
<i>Carex comosa</i>	Bristly Sedge; Longhair Sedge	Native							1
<i>Carex cristatella</i>	Crested Sedge; Crested Oval Sedge	Native						1	
<i>Carex grisea</i>	Wood Gray Sedge; Inflated Narrow-Leaf Sedge	Native				1		1	
<i>Carex hystericina</i>	Porcupine Sedge; Bottlebrush Sedge	Native							1
<i>Carex jamesii</i>	James' Sedge	Native						2	
<i>Carex normalis</i>	Greater Straw Sedge; Spreading Oval Sedge	Native						1 2	
<i>Carex shortiana</i>	Short's Sedge	Native						1	
<i>Carex sp.</i>	Unknown Sedge	Native					1		
<i>Carex spp.</i>	Unknown Sedges	Native	1					1	
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native						1	
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native						1	
<i>Carex vulpinoidea</i>	Fox Sedge	Native					1	1	2
<i>Cinna arundinacea</i>	Sweet Woodreed; Stout Woodreed	Native						1	
<i>Cirsium arvense</i>	Canada thistle	Not Native				1 cf		1 cf	1 cf
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native					1	1	
<i>Commelina communis</i>	Day-flower	Not Native						1 cf	
<i>Cryptotaenia canadensis</i>	Honewort	Native						1	
<i>Dactylis glomerata</i>	Orchardgrass	Not Native				1	1		
<i>Dalea purpurea</i>	Purple Prairie clover	Native				1			
<i>Dichanthelium oligosanthes</i>	Scribner's Panic Grass	Native				1			
<i>Echinochloa crus-galli</i>	Common Barnyard Grass; Barnyard Millet; Cockspur	Not Native							1 cf

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Eleocharis palustris</i>	Common Spikerush	Native					1		4
<i>Ellisia nyctelea</i>	Aunt Lucy; Water-pod	Native						1	
<i>Elymus canadensis</i>	Canada Wild Rye	Native				1			
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	1	1				1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native			1	1	1		1
<i>Erythronium albidum</i>	White Trout Lily; White Fawn Lily; White Dogtooth Violet	Native	1						
<i>Eupatorium serotinum</i>	Lateflowering Thoroughwort	Native					1		
<i>Festuca arundinacea</i>	Tall Fescue	Not Native						2 pd	
<i>Festuca subverticillata</i>	Nodding Fescue	Native		1					
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native						2	
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native						2 pd	
<i>Hackelia virginiana</i>	Stickseed	Native	1					2	
<i>Helenium autumnale</i>	Sneezeweed	Native				1			
<i>Helianthus annuus</i>	Wild Sunflower	Not Native				1 cf			
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native						1	
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native				1			
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native				1			
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native				1		1	
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native				1			
<i>Humulus japonicus</i>	Japanese Hop	Not Native						1 pd	
<i>Juncus</i> sp.	Unknown Rush	Undetermined					1		
<i>Koeleria macrantha</i>	June Grass; Prairie June Grass	Native				1			
<i>Laportea canadensis</i>	Wood Nettle	Native		1				2	
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf					1 cf	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 pd	2 pd					
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native				1 pd		1 cf	

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Lycopus americanus</i>	American Water Horehound; American Bugleweed	Native							1
<i>Lysimachia nummularia</i>	Moneywort	Not Native	1 cf						
<i>Medicago lupulina</i>	Black Medic	Not Native				2 pd			
<i>Medicago sativa</i>	Alfalfa	Not Native					1 cf		
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native			1 cf	2 pd	2 pd	2 pd	
<i>Menispermum canadense</i>	Canada Moonseed	Native						1	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native				2			
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native						2 pd	
<i>Muhlenbergia mexicana</i>	Mexican Muhly; Leafy Satin Grass	Native						1	
<i>Oenothera biennis</i>	Evening Primrose	Native				1			
<i>Panicum virgatum</i>	Switchgrass	Native						1	
<i>Persicaria amphibia</i>	Longroot Smartweed; Water Smartweed	Native					1		
<i>Persicaria hydropiperoides</i>	False Water Pepper; Mild Waterpepper; Swamp Smartweed	Native							2
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native				2 pd		3 pd	4 ed
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native						1	
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native						1	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native			2 pd	2 pd	3 ed	2 ed	3 ed
<i>Populus deltoides</i>	Eastern Cottonwood	Native							1
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	Native							1
<i>Ranunculus abortivus</i>	Littleleaf Buttercup	Native		1					
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native				1			
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native				1			

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native				2			
<i>Rumex crispus</i>	Curly Dock	Not Native			1 cf	1 cf		1 cf	
<i>Salix nigra</i>	Black Willow	Native							1
<i>Schizachyrium scoparium</i>	Little Bluestem	Native				2			
<i>Schoenoplectus pungens</i>	Three-Square Bulrush; Common Threesquare	Native							1
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native							2
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native							1
<i>Scirpus fluviatilis</i>	River Bulrush	Native					1		
<i>Scrophularia marilandica</i>	Figwort	Native						1	
<i>Scutellaria ovata</i>	Heartleaf Skullcap	Native	1						
<i>Securigera varia</i>	Crown Vetch	Not Native	1 cf		2 pd	1 pd	2 pd	1 cf	
<i>Solidago canadensis</i>	Canada Goldenrod	Native				4	2		
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	1			3		2	3
<i>Solidago graminifolia</i>	Grass-Leaved Goldenrod	Native						1	
<i>Spartina pectinata</i>	Prairie Cordgrass	Native							1
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native							1
<i>Stellaria media</i>	Chickweed; Common Chickweed	Not Native						1 pd	
<i>Symphyotrichum lateriflorum</i>	Calico Aster; One-Sided Aster; White Woodland Aster; Starved Aster	Native						1	
<i>Symphyotrichum lanceolatum</i>	Panicled Aster; Lance-Leaved Aster	Native						1	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native						1	
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf		1 cf	1 cf	1 cf	2 pd	
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native				1			

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Herbaceous Lowland
<i>Triodanis perfoliata</i>	Venus' Looking Glass; Claspig Bellwort	Native				1	1		
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native							4 ed
<i>Ulmus pumila</i>	Siberian Elm	Not Native				1 cf		1 cf	
<i>Urtica dioica</i>	Stinging Nettle	Native	1					2	
<i>Verbascum thapsus</i>	Common Mullein	Not Native				1 cf	1 cf	2 pd	
<i>Verbena hastata</i>	Blue Vervain	Native							1
<i>Verbena stricta</i>	Hoary Vervain	Native				1			
<i>Verbena urticifolia</i>	White Vervain	Native						1	
<i>Viola sororia</i>	Common Blue Violet	Native						1	
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native			1		1		
<i>Zizia aptera</i>	Heartleaf Alexanders	Native				1			

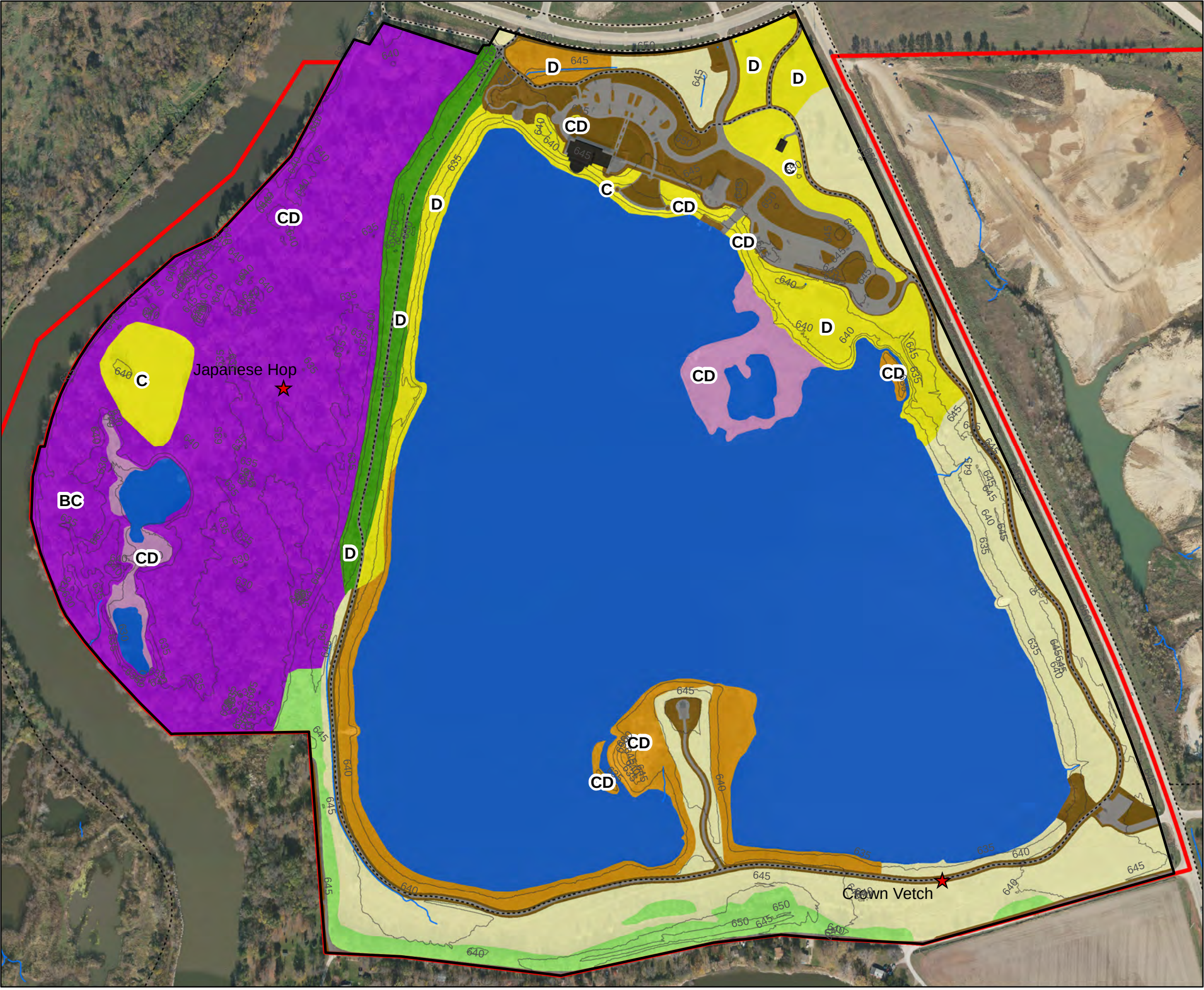
Terry Trueblood Recreation Area Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
Land Cover Type (ac)	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
	47.72	47.72	47.72		47.72		
	7.77	7.77	7.77		7.77	7.77	
	22.47	39.23	39.23		39.23	39.23	
	77.96	94.72	94.72	0	94.72	47	
	\$ 2,500	\$ 2,500	\$ 1,500		\$ 150	\$ 400	
Opinions of Probable Cost ¹	\$ 194,900	\$ 236,800	\$ 142,080	\$ -	\$ 14,208	\$ 18,800	
Total Opinion of Probable Cost ¹		\$	606,788				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed forest/woodland, shrub/scrub, and herbaceous areas following brush/weed removal.
Woody invasive removal needed in non-native grassland.



Iowa City Natural Areas Inventory and Management Plan

Terry Trueblood Recreation Area

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Prairie
 - Non-native Grassland
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A,B,C,D Natural Community Quality Rank

Data Sources:
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

TROLLEY TRACK GREENWAY MANAGEMENT BRIEF

Natural Area Name: Trolley Track Greenway

Natural Area Size (ac): 1

Natural Area Location (address, nearest street intersection, or other major geographic feature): Southeast of intersection of Washington Place (extension of Glendale Court) and William White Boulevard

Park/Natural Area Class: Linear pocket park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- North to Glendale Park (along Ralston Creek)

Dominant Soils **Upland:** Downs silt loam, till plain, (2-5% slopes) and Fayette silt loam (5-14% slopes) (incl. texture) **Lowland:** NA

Hydrology Features: NA

Historical Vegetation: Oak barrens and prairie

Past Land Uses: Cropland and former trolley track

Current Use and Management: Park; residents maintain

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	0.16	12.6%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.02	1.6%
13. Recreation Area (0-50% tree canopy)		1.06	83.5%
14. Building			
15. Other Impervious Cover		0.03	2.4%
Totals		1.27	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (honeysuckles, etc.)
- Small, linear site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity

Trolley Track Greenway Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest
<i>Canopy Stratum</i>			
<i>Acer saccharinum</i>	Silver Maple	Native	1
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Juglans nigra</i>	Black Walnut	Native	3
<i>Prunus serotina</i>	Black Cherry	Native	2
<i>Quercus macrocarpa</i>	Bur Oak	Native	1
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Celtis occidentalis</i>	Hackberry	Native	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	2 pd
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	1
<i>Sambucus canadensis</i>	Elderberry	Native	1
<i>Smilax sp.</i>	Unknown Catbrier	Undetermined	1
<i>Ulmus americana</i>	American Elm	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1
<i>Herbaceous Stratum</i>			
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 pd
<i>Carex spp.</i>	Unknown Sedges	Native	1
<i>Cryptotaenia canadensis</i>	Honewort	Native	1
<i>Geum canadense</i>	White Avens; Canada Avens	Native	1
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	1 cf
<i>Hackelia virginiana</i>	Stickseed	Native	1
<i>Hosta sp.</i>	Unknown Hosta	Not Native	1
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1

Species name	Common name	Origin	Altered Forest
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	1
<i>Quercus macrocarpa</i>	Bur Oak	Native	1
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native	1
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf
<i>Viola sp.</i>	Unknown Violet	Undetermined	1



Iowa City Natural Areas Inventory
and Management Plan

Trolley Track Greenway

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Altered Forest/Woodland
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

VILLA PARK MANAGEMENT BRIEF

Natural Area Name: Villa Park

Natural Area Size (ac): 7

Natural Area Location (address, nearest street intersection, or other major geographic feature): West Central district, between McBride Road, Calvin Avenue, Keswick Drive, and Spencer Drive

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- NA

Dominant Soils **Upland:** Fayette silt loam (9-14% slopes)
(incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: NA

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		7.06	100%
14. Building			
15. Other Impervious Cover			
Totals		7.06	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: Vegetation surveys were not completed for this site by AES since it was entirely cultural land covers.

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- No native communities
- Small site
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

Establish some area(s) of native vegetation (e.g., convert turf to prairie)

Villa Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland							
	Savanna/Brushland and Shrub/Scrub Lowland							
	Grassland and Herbaceous Lowland							
	Total Acres	0	0	0	0	0	0	
Unit Cost (for 3 yrs)								
Opinions of Probable Cost ¹		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Opinion of Probable Cost¹		\$ -	NO NATURAL COMMUNITIES, SO NO RESTORATION/MANAGEMENT ACTIONS RECOMMENDED					

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

No natural communities present.

Iowa City Natural Areas Inventory and Management Plan

Villa Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Recreation Area
 - Building or Structure
 - Contour (5ft interval)
 - Trail
 - Drainageway



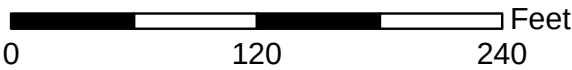
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

WALDEN DETENTION AREA MANAGEMENT BRIEF

Natural Area Name: Walden Detention Area

Natural Area Size (ac): 2

Natural Area Location (address, nearest street intersection, or other major geographic feature): Between Walden Road and Jensen Street, south of Willow Creek

Park/Natural Area Class: Dry stormwater basin

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South to Rohret Road Prairie

Dominant Soils **Upland:** Clinton silt loam (9-14% slopes) and Fayette silty clay loam (14-18% slopes) (incl. texture) **Lowland:** NA

Hydrology Features: NA

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Dry stormwater basin

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR	0.63	36.8%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		1.05	61.4%
14. Building			
15. Other Impervious Cover		0.03	1.8%
Totals		1.71	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: *see attached matrix on following page(s)*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (tall fescue, Kentucky bluegrass, birdsfoot trefoil, red clover, etc.)
- Small site

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Potential for community garden

Walden Detention Area Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Non-Native Grassland
<i>Canopy Stratum</i>			
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Herbaceous Stratum</i>			
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native	1
<i>Asclepias syriaca</i>	Common Milkweed	Native	1
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	1
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	1 cf
<i>Festuca arundinacea</i>	Tall Fescue	Not Native	3 ed
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	1
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	1 cf
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	2 pd
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native	1
<i>Plantago major</i>	Common Plantain	Not Native	1 cf
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	3 ed
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	1 cf
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native	1 cf
<i>Trifolium pratense</i>	Red Clover	Not Native	2 ed
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1

Walden Detention Area Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Forest/Woodland and Forested Lowland								
Savanna/Brushland and Shrub/Scrub Lowland								
Grassland and Herbaceous Lowland			0.63	0.63		0.63	0.63	
Total Acres		0	0.63	0.63	0	0.63	0.63	
Unit Cost (for 3 yrs)			\$ 2,000	\$ 1,500		NA	NA	
Opinions of Probable Cost ¹	\$ -	\$ 1,260	\$ 945	\$ -	\$ 750	\$ 1,500		
Total Opinion of Probable Cost¹		\$ 4,455						

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed non-native grassland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Walden Detention Area

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
 - Non-native Grassland
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

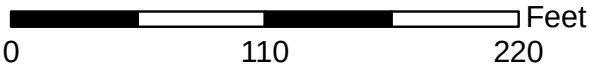
A,B,C,D Natural Community Quality Rank

Data Sources:
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

WATERWORKS PRAIRIE PARK MANAGEMENT BRIEF

Natural Area Name: Waterworks Prairie Park

Natural Area Size (ac): 226

Natural Area Location (address, nearest street intersection, or other major geographic feature): North district, northwest of the I-80/Dubuque Ave. interchange

Park/Natural Area Class: Regional Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Iowa DNR. 2017. Forest Stewardship Plan, Healthy Forest Initiative.		X			X		Includes stand maps
Waterworks tree planting plan (1995)		X					
U.S. Army Corps wetland letter (1997)							Discusses Corps jurisdiction issues
Ion Exchange seed mixes (1998)		X					
Iowa City Water Works Park Master Plan Summary (1999)		X (seed mixes)					
Water Works oversized maps and plan (1999 & 2002)				X			Veg cover maps (incl. master plan map)
Ion Exchange seed mixes (2003)		X					
Water Works species list (2010)		X					
Water Plant staff goals (2014)							Map showing goals/projects
Waterworks plugs planted		X					
Waterworks landscaping plans				X			

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- South (along east bank of Iowa River) to Peninsula Park
- Southeast to Terrell Mill Park

Dominant Soils Upland: Fayette silt loam and silty clay loam (5-25% slopes), Sattre loam (0-2% slopes) and (incl. texture) Bertrand silt loam (1-3% slopes)

Lowland: Perks-Spillville complex sandy loam (0-2% slopes), “Pits Limestone Quarry” and Coppock silt loam (0-2% slopes)

Hydrology Features: Quarry lake, basins, and Iowa River along north and west edges of site

Historical Vegetation: Oak barrens

Past Land Uses: Sand quarry and cropland

Current Use and Management: Park, fishing lake, water treatment

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)	B, C, D	18.24	8.1%
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	4.51	2.0%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)	CD, D	12.08	5.3%
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC, C, CD, D	75.12	33.2%
7. Non-native Grassland (little native plant cover)	NR	15.98	7.1%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	C, CD, D	23.16	10.2%
9. Shrub/Scrub Lowland	C, CD, D	8.69	3.8%
10. Herbaceous Lowland (wet meadow & marsh)	D	0.60	0.3%
11. Open Water	NR	30.71	13.6%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		1.59	0.7%
13. Recreation Area (0-50% tree canopy)		26.37	11.7%
14. Building		1.36	0.6%
15. Other Impervious Cover		7.83	3.5%
Totals		226.21	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Baptisia australis*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
Beaver	Pileated Woodpecker Red-Bellied Woodpecker	Western Chorus Frog	None observed

Issues and Opportunities:

- Invasive vegetation (Oriental bittersweet, garlic mustard, smooth brome, tall fescue, sweet clovers, reed canary grass, Kentucky bluegrass, cattails, etc.)
- Has not received prescribed burning due to nearby highways
- 100-yr floodplain and floodway encroach on about half of site
- Shoreline erosion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Maintain/improve natural vegetation communities for water filtering services
- Install interpretive signage
- Stabilize eroding sections of shoreline

Waterworks Prairie Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>										
<i>Acer saccharinum</i>	Silver Maple	Native	2					4		
<i>Carya cordiformis</i>	Bitternut Hickory	Native	2							
<i>Carya ovata</i>	Shagbark Hickory	Native	2							
<i>Celtis occidentalis</i>	Hackberry	Native	1					1		
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native		1 cf						
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2	1				2		
<i>Gleditsia triacanthos</i>	Honey Locust	Native	2	4						
<i>Juglans nigra</i>	Black Walnut	Native		3						
<i>Populus deltoides</i>	Eastern Cottonwood	Native		2				2 (in 141D)	1	
<i>Prunus serotina</i>	Black Cherry	Native	2							
<i>Quercus macrocarpa</i>	Bur Oak	Native	2							
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native	2							
<i>Quercus rubra</i>	Red Oak	Native	3							
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	1 cf							
<i>Salix nigra</i>	Black Willow	Native							1	
<i>Tilia americana</i>	American Basswood	Native	2							
<i>Ulmus americana</i>	American Elm	Native						2		
<i>Ulmus rubra</i>	Slippery Elm	Native	1							
<i>Shrub/Vine/Sapling Stratum</i>										
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native					1			
<i>Betula nigra</i>	River Birch	Native						2		
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	1 cf (3 pd in NE)	2 pd						

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Cephalanthus occidentalis</i>	Buttonbush	Native						1		
<i>Cornus alternifolia</i>	Pagoda Dogwood; Alternate-Leaved Dogwood	Native	1							
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native			1	1				
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native				1 cf				
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1	2	1		2		
<i>Gleditsia triacanthos</i>	Honey Locust	Native		1		1	1			
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf	1 pd				1 cf		
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf							
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native		1 cf	1cf	1 cf				
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1							
<i>Populus deltoides</i>	Eastern Cottonwood	Native				1			1	
<i>Prunus serotina</i>	Black Cherry	Native		1						
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native						1 cf		
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	1	1				1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf			1 cf				
<i>Rubus occidentalis</i>	Black Raspberry	Native				1				
<i>Salix babylonica</i>	Weeping Willow	Not Native		1 cf						
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native		1	3	1			4	1
<i>Salix petiolaris</i>	Meadow Willow	Native							1	
<i>Smilax sp.</i>	Unknown Catbrier	Undetermined	1							
<i>Ulmus americana</i>	American Elm	Native				1		2		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Ulmus pumila</i>	Siberian Elm	Not Native			1 cf	1 cf	1 cf			
Herbaceous Stratum										
<i>Acer saccharinum</i>	Silver Maple	Native			1					
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native		1 cf						
<i>Alisma subcordatum</i>	American Water Plantain	Native							1	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf	2 pd				1 cf		
<i>Ambrosia artemisiifolia</i>	Common Ragweed;	Native				1				
<i>Amphicarpaea bracteata</i>	Annual Ragweed	Native								
<i>Andropogon gerardii</i>	Hog Peanut	Native	1					1		
<i>Anemone canadensis</i>	Big Bluestem	Native				2				
	Canada anemone	Native			1		1			
<i>Anemone virginiana</i>	Thimbleweed; Tall Anemone	Native	1					1		
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native						1		
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf	1 cf				1 cf		
<i>Arisaema dracontium</i>	Green Dragon; Dragon Root	Native						1		
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	1							
<i>Artemisia ludoviciana</i>	White Sage	Native					1			
<i>Asclepias syriaca</i>	Common Milkweed	Native					1			
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native				1				
<i>Aster novae-angliae</i>	New England Aster	Native				1				
<i>Astragalus canadensis</i>	Canadian Milk Vetch	Native			1					
<i>Baptisia alba</i>	Wild White Indigo	Native				1				
<i>Baptisia australis</i>	Wild Blue Indigo	Native				1				
<i>Barbarea vulgaris</i>	Yellow Rocket;	Not Native				1 cf				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
	Common Winter Cress									
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native							2	1
<i>Bromus inermis</i>	Smooth Brome	Not Native					3 ed			
<i>Bromus tectorum</i>	Downy Brome; Downy Chess; Cheatgrass	Not Native				1 cf				
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native		1		1				
<i>Carduus nutans</i>	Musk Thistle	Not Native				1 cf				
<i>Carex annectens</i>	Yellow Fox Sedge; Yellowfruit Sedge	Native				1				
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native			1					
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native						1		
<i>Carex conjuncta</i>	Soft Fox Sedge	Native			1					
<i>Carex crinita</i>	Fringed Sedge	Native			1					
<i>Carex davisii</i>	Davis' Sedge	Native			1					
<i>Carex grayi</i>	Gray's Sedge	Native						1		
<i>Carex hystericina</i>	Porcupine Sedge; Bottlebrush Sedge	Native							1	
<i>Carex lacustris</i>	Lake Sedge; Hairy Sedge	Native						1		
<i>Carex lupulina</i>	Hop Sedge	Native						1		
<i>Carex pensylvanica</i>	Pennsylvania Sedge	Native	1							
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native	1							
<i>Carex spp.</i>	Unknown Sedges	Native		1					1	2
<i>Carex sprengelii</i>	Sprengel's Sedge;	Native						1		

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
	Long-Beaked Sedge									
<i>Carex vulpinoidea</i>	Fox Sedge	Native			1				1	
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	2							
<i>Cirsium arvense</i>	Canada thistle	Not Native			1 cf		1 cf			
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native				1	1		1	
<i>Cirsium vulgare</i>	Bull Thistle	Not Native					1 cf			
<i>Conium maculatum</i>	Poison Hemlock	Not Native		1 cf	1 cf	1 pd				
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native				1				
<i>Cryptotaenia canadensis</i>	Honewort	Native	2							
<i>Cuscuta</i> sp.	Unknown Dodder	Undetermined							1	
<i>Dactylis glomerata</i>	Orchardgrass	Not Native					1			
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native				1 cf				
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native				1				
<i>Eleocharis palustris</i>	Common Spikerush	Native							1	1
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	1					1		
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native			1	1				
<i>Eupatorium serotinum</i>	Lateflowering Thoroughwort	Native								1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native					3 ed			
<i>Festuca subverticillata</i>	Nodding Fescue	Native						1		
	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1							
<i>Galium triflorum</i>	Stickseed	Native								
<i>Hackelia virginiana</i>	Unknown Sunflower	Undetermined				1		1		
<i>Heliopsis helianthoides</i>	Oxeye; False	Native				1				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
	Sunflower									
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native						1 cf		
	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not		1							
<i>Impatiens capensis</i>	Not	Native								
<i>Juncus sp.</i>	Unknown Rush	Undetermined							2	2
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native			2					
<i>Laportea canadensis</i>	Wood Nettle	Native	3					1		
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native			1	1				
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	1 cf							
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native				1 pd	1 pd			
<i>Lysimachia sp.</i>	Unknown Loosestrife	Undetermined							1	
<i>Lythrum salicaria</i>	Purple Loosestrife	Not Native							1	
<i>Melilotus alba</i>	White Sweet Clover	Not Native					2 pd			
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native			1 cf	2 pd				
<i>Menispermum canadense</i>	Canada Moonseed	Native	1							
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native				1	1			
<i>Oenothera biennis</i>	Evening Primrose	Native			1					
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	1							
<i>Panicum virgatum</i>	Switchgrass	Native				2	1			
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native				1				
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	2	1						
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native				1 cf				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native			1	1				
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native		1 cf		1 pd		2 pd	2 pd	3 pd
<i>Physostegia virginiana</i>	Obedient Plant	Native			1					
<i>Phytolacca americana</i>	Pokeweed; Poke;	Native						1		
<i>Pilea pumila</i>	Inkberry; Pigeonberry	Native						1		
	Clearweed	Native								
<i>Plantago rugelii</i>	Rugel's Plantain;	Native						1		
	Blackseed Plantain	Native								
<i>Poa palustris</i>	Fowl Bluegrass	Native						1		
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native			2 pd	2 pd	2 pd			
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	1							
<i>Polygonum persicaria</i>	Spotted Ladythumb	Not Native								1
<i>Polygonum virginianum</i>	Jumpseed	Native	1							
<i>Populus deltoides</i>	Eastern Cottonwood	Native			1					
<i>Pycnanthemum virginianum</i>	Common Mountain Mint; Virginia Mountain Mint	Native			1				1	
	Yellow Coneflower;					1				
<i>Ratibida pinnata</i>	Gray-Headed Coneflower	Native								
<i>Rubus occidentalis</i>	Black Raspberry	Native		1						
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native				1				
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	2					2		
<i>Rumex crispus</i>	Curly Dock	Not Native							1 cf	
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native			1					1
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	3							
<i>Schizachyrium scoparium</i>	Little Bluestem	Native				1				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native							1	
<i>Scrophularia marilandica</i>	Figwort	Native		1						
<i>Securigera varia</i>	Crown Vetch	Not Native			1 cf	1 cf				
<i>Silphium integrifolium</i>	Rosinweed	Native				1				
<i>Silphium laciniatum</i>	Compass Plant	Native				1				
<i>Silphium perfoliatum</i>	Cup Plant	Native				1				
<i>Smilax</i> sp.	Unknown Catbrier	Undetermined						2		
<i>Solidago canadensis</i>	Canada Goldenrod	Native			2	3	3		2	1
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native		1				1		
<i>Solidago rigida</i>	Stiff Goldenrod	Native				2			1	
<i>Sorghastrum nutans</i>	Indian Grass	Native			1	1				
<i>Spartina pectinata</i>	Prairie Cordgrass	Native							1	
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native			1				1	
<i>Stellaria aquatica</i>	Giant Chickweed	Not Native						1 cf		
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf	1 pd		1 cf		2 pd		
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native				1				
<i>Trifolium hybridum</i>	Alsike Clover	Not Native			1 cf					
<i>Trifolium pratense</i>	Red Clover	Not Native					1 cf			
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native							1 cf	
<i>Typha x glauca</i>	Hybrid Cattail	Not Native								3 cf
<i>Urtica dioica</i>	Stinging Nettle	Native		1				1		
<i>Verbascum blattaria</i>	Moth Mullein	Not Native				1 cf				
<i>Verbascum thapsus</i>	Common Mullein	Not Native				1 cf				
<i>Verbena hastata</i>	Blue Vervain	Native			1					
<i>Vernonia missurica</i>	Missouri Ironweed	Native	2							
<i>Veronicastrum virginicum</i>	Culver's Root	Native				1				

Species name	Common name	Origin	Dry-Mesic Forest/Woodland	Altered Forest	Shrub/Scrub	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Viola sp.</i>	Unknown Violet	Undetermined	1					1		
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native			1	1		1		
<i>Zizia aurea</i>	Golden Alexanders	Native				1				

Waterworks Prairie Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action					
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning
Forest/Woodland and Forested Lowland		45.91	45.91	4.51		45.91	18.24
Savanna/Brushland and Shrub/Scrub Lowland		20.77	20.77	20.77		20.77	20.77
Grassland and Herbaceous Lowland			91.7	15.98		91.7	91.7
Total Acres		66.68	158.38	41.26	0	158.38	130.71
Unit Cost (for 3 yrs)	\$	2,000	\$ 2,000	\$ 1,000		\$ 100	400
Opinions of Probable Cost ¹	\$	133,360	\$ 316,760	\$ 41,260	\$ -	\$ 15,838	\$ 52,284

Total Opinion of Probable Cost¹	\$ 559,502
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¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed altered forest/woodland, shrub/scrub, and non-native grassland areas following brush/weed removal.

Prescribed burning not needed in altered forest/woodland and forested lowland.

Overseed dry-mesic forest/woodland, forested lowland, and prairie areas if needed following brush/weed removal (costs not included in table above).

Iowa City Natural Areas Inventory and Management Plan

Waterworks Prairie Park

- City Limits
- Iowa City Park or Natural Area
- Invasive Vegetation
- Existing Land Cover
 - Dry-Mesic Forest/Woodland
 - Altered Forest/Woodland
 - Shrub/Scrub
 - Prairie
 - Non-native Grassland
 - Forested Lowland
 - Shrub/Scrub Lowland
 - Herbaceous Lowland
 - Open Water
 - Woodland with Turf
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

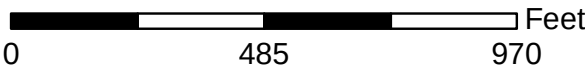
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

WETHERBY PARK MANAGEMENT BRIEF

Natural Area Name: Wetherby Park

Natural Area Size (ac): 24

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, south of intersection of Taylor Drive and Burns Avenue

Park/Natural Area Class: Community Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Southwest to Sand Prairie

Dominant Soils **Upland:** Tama silt loam (2-9% slopes), Ely silty clay loam (2-5% slopes), and Atterberry silt loam, (incl. texture) benches, (0-2% slopes)
Lowland: NA

Hydrology Features: NA

Historical Vegetation: Prairie

Past Land Uses: Cropland

Current Use and Management: Park, disc golf course, maintained turf

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	BC	1.56	6.4%
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)			
11. Open Water	NR		
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		21.50	88.3%
14. Building			
15. Other Impervious Cover		1.28	5.3%
Totals		24.34	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Silphium terebinthinaceum*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Dickcissel ¹	None observed	None observed

¹ State Species of Greatest Conservation Need

Issues and Opportunities:

- Invasive vegetation (Kentucky bluegrass, dandelion, Canada thistle, etc.)
- Edible forest and community gardens in northern portion of site
- State SGCN Dickcissel seen at site
- Opportunity for turf to prairie conversion

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Restore southern portion to prairie and connect to Sand Prairie

Wetherby Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Prairie
<i>Canopy Stratum</i>			
<i>Shrub/Vine/Sapling Stratum</i>			
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	2
<i>Juglans nigra</i>	Black Walnut	Native	1
<i>Maclura pomifera</i>	Osage Orange	Not Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Prunus serotina</i>	Black Cherry	Native	1
<i>Herbaceous Stratum</i>			
<i>Ambrosia trifida</i>	Giant Ragweed	Native	1
<i>Andropogon gerardii</i>	Big Bluestem	Native	3
<i>Anemone canadensis</i>	Canada anemone	Native	2
<i>Asclepias syriaca</i>	Common Milkweed	Native	2
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	1
<i>Baptisia alba</i>	Wild White Indigo	Native	1
<i>Bromus inermis</i>	Smooth Brome	Not Native	1 ed
<i>Chamaecrista fasciculata</i>	Partridge Pea	Native	1
<i>Cirsium arvense</i>	Canada thistle	Not Native	2 pd
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	1
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native	1
<i>Elymus canadensis</i>	Canada Wild Rye	Native	1
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	1
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	1
<i>Gentiana alba</i>	Cream gentian	Native	2
<i>Helianthus rigidus</i>	Prairie Sunflower	Native	3
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native	1

Species name	Common name	Origin	Prairie
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native	1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	1
<i>Lespedeza capitata</i>	Roundheaded bushclover	Native	2
<i>Liatris pycnostachya</i>	Prairie Blazing Star	Native	1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	1 cf
<i>Panicum virgatum</i>	Switchgrass	Native	1
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native	1
<i>Postinaca sativa</i>	Wild Parsnip	Not Native	1 cf
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	1
<i>Physostegia virginiana</i>	Obedient Plant	Native	1
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	4 ed
<i>Potentilla recta</i>	Sulphur Cinquefoil	Not Native	1 cf
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native	2
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	2
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native	1
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native	1 cf
<i>Solidago canadensis</i>	Canada Goldenrod	Native	1
<i>Solidago rigida</i>	Stiff Goldenrod	Native	1
<i>Sorghastrum nutans</i>	Indian Grass	Native	3
<i>Taraxacum officinale</i>	Common Dandelion	Not Native	3 pd
<i>Tradescantia ohienis</i>	Ohio Spiderwort	Native	1
<i>Vernonia missurica</i>	Missouri Ironweed	Native	1
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	2
<i>Zizia aurea</i>	Golden Alexanders	Native	1

Wetherby Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Forest/Woodland and Forested Lowland								
Savanna/Brushland and Shrub/Scrub Lowland								
Grassland and Herbaceous Lowland			1.56	1.56		1.56	1.56	
Total Acres		0	1.56	1.56	0	1.56	1.56	
Unit Cost (for 3 yrs)			\$	2,500	\$	1,000	\$	600
Opinions of Probable Cost ¹	\$	-	\$	3,900	\$	1,560	\$	936
Total Opinion of Probable Cost¹	\$	7,896						

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed prairie following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Wetherby Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Prairie
 - Recreation Area
 - Building or Structure
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

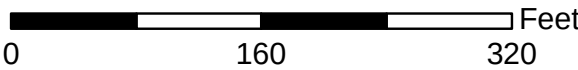
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

WHISPERING MEADOWS WETLANDS MANAGEMENT BRIEF

Natural Area Name: Whispering Meadows Wetlands

Natural Area Size (ac): 18

Natural Area Location (address, nearest street intersection, or other major geographic feature): South district, southwest of Highway 6 and west of Bon-Aire Mobile Home Park

Park/Natural Area Class: Specialty Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
Iowa City. 2016. Natural Areas - Inventory, Management Needs and Assessment	X			X (general)			Combined report addressing 12 natural areas in City
Wetland Site & Landscape Plan							Planting plan
Whispering Meadows Wetland Park Planting History (1994/1995)		X					
Whispering Meadows Wetland Park Maintenance Guide (1995)		X		X			Includes wildlife habitat enhancement
Correspondence re. butterfly garden and shrub plantings (1997)		X					

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Southwest to Sycamore Greenway

Dominant Soils **Upland:** Tama silt loam (2-5% slopes)
(incl. texture) **Lowland:** Sperry silt loam, depressional, (0-1% slopes)

Hydrology Features: Majority of site a wetland complex

Historical Vegetation: Prairie

Past Land Uses: Cropland (until 1993)

Current Use and Management: Park

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR		
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)	NN	0.83	4.7%
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)	CD, D	3.44	19.3%
7. Non-native Grassland (little native plant cover)	NR	1.30	7.3%
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland	C	0.39	2.2%
9. Shrub/Scrub Lowland	D	0.53	3.0%
10. Herbaceous Lowland (wet meadow & marsh)	CD, D	3.57	20.0%
11. Open Water	NR	4.85	27.2%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)			
13. Recreation Area (0-50% tree canopy)		2.86	16.1%
14. Building			
15. Other Impervious Cover		0.02	0.1%
Totals		17.81	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

State Species of Concern: *Juncus effusus*

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
Beaver	None observed	None observed	None observed

Issues and Opportunities:

- Invasive vegetation (reed canary grass, white sweet clover, Kentucky bluegrass, etc.)
- Trash from neighborhood accumulates on site
- Shoreline erosion
- Beaver damage

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Install interpretive signage

Whispering Meadows Wetlands Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Savanna	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Canopy Stratum</i>								
<i>Acer saccharinum</i>	Silver Maple	Native	2			3	1	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2		1			
<i>Populus deltoides</i>	Eastern Cottonwood	Native		1		2	2	
<i>Quercus bicolor</i>	Swamp White Oak	Native			1			
<i>Quercus rubra</i>	Red Oak	Native	1					
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native					1	
<i>Salix nigra</i>	Black Willow	Native				2		
<i>Shrub/Vine/Sapling Stratum</i>								
<i>Acer ginnala</i>	Amur Maple	Not Native				1 cf	1 cf	
<i>Acer saccharinum</i>	Silver Maple	Native				1	1	
<i>Alnus sp.</i>	Unknown Alder	Undetermined					1	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native				2		1
<i>Cornus sericea</i>	Red Osier Dogwood	Native						1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native		1		1	1	
<i>Gleditsia triacanthos</i>	Honey Locust	Native						1
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native				1 cf	1 cf	
<i>Populus deltoides</i>	Eastern Cottonwood	Native			1			
<i>Prunus serotina</i>	Black Cherry	Native		1				
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native				1		
<i>Sambucus canadensis</i>	Elderberry	Native		1				
<i>Ulmus americana</i>	American Elm	Native				1		1
<i>Ulmus pumila</i>	Siberian Elm	Not Native						1 cf

Species name	Common name	Origin	Savanna	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Herbaceous Stratum</i>								
<i>Acorus americanus</i>	American Sweet Flag	Native						1
<i>Alisma subcordatum</i>	American Water Plantain	Native						1
<i>Ambrosia trifida</i>	Giant Ragweed	Native						1
<i>Anemone canadensis</i>	Canada anemone	Native		1		1		
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native						1
<i>Asclepias syriaca</i>	Common Milkweed	Native		1				
<i>Aster novae-angliae</i>	New England Aster	Native		1				
Asteraceae	Unknown Aster	Undetermined				1		1
<i>Bidens frondosa</i>	Common Beggartick; Devil's Beggartick	Native						1
<i>Bromus inermis</i>	Smooth Brome	Not Native			2 pd			
<i>Bromus japonicus</i>	Japanese Brome	Not Native		1 cf				
<i>Carex annectens</i>	Yellow Fox Sedge; Yellowfruit Sedge	Native			1			2
<i>Carex intumescens</i>	Greater Bladder Sedge; Shining Bur Sedge	Native		1				
<i>Carex lacustris</i>	Lake Sedge; Hairy Sedge	Native						2
<i>Carex lupulina</i>	Hop Sedge	Native						1
<i>Carex scoparia</i>	Broom Sedge; Lance-Fruited Oval Sedge	Native				1		1
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native		1				
<i>Carex vulpinoidea</i>	Fox Sedge	Native		1		1		2
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native		1				
<i>Conium maculatum</i>	Poison Hemlock	Not Native		1 cf				1 cf
<i>Dactylis glomerata</i>	Orchardgrass	Not Native		1				
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf				
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native		1		1		
<i>Eupatorium perfoliatum</i>	Boneset	Native						1
<i>Festuca arundinacea</i>	Tall Fescue	Not Native			2 pd			
<i>Geum sp.</i>	Unknown Avenas	Undetermined		1				1

Species name	Common name	Origin	Savanna	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>Helianthus giganteus</i>	Giant Sunflower; Tall Sunflower	Native		1				
<i>Helianthus strumosus</i>	Woodland Sunflower; Pale-Leaved Sunflower; Pale-Leaf Woodland Sunflower	Native				1		
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native		1				
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native		1				
<i>Juncus effusus</i>	Common Rush; Soft Rush	Native						1
<i>Juncus sp.</i>	Unknown Rush	Undetermined						1
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		1 cf				
<i>Melilotus alba</i>	White Sweet Clover	Not Native		4 pd	3 pd			
<i>Persicaria hydropiper</i>	Water Pepper; Marshpepper Knotweed	Not Native						1
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	4 ed		3 pd	2 pd	4 ed	3 pd
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native		1 cf	2 pd			
Polygonaceae	Unknown Knotweed	Undetermined					1	1
<i>Prunella vulgaris</i>	Self-Heal; Heal-All	Native		1				
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native		1				
<i>Rosa multiflora</i>	Multiflora Rose	Not Native		1 cf				
<i>Rumex crispus</i>	Curly Dock	Not Native		1 cf				
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native					1	
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native						1
<i>Scirpus fluviatilis</i>	River Bulrush	Native				1	1	1
<i>Senecio pauperculus</i>	Ragwort	Native		1				
<i>Silphium perfoliatum</i>	Cup Plant	Native	1	3	1	3		2
<i>Sisyrinchium montanum</i>	American Blue-Eyed Grass; Mountain Blue-Eyed Grass; Strict Blue-Eyed Grass	Native						1
<i>Solidago canadensis</i>	Canada Goldenrod	Native		2		2		2
<i>Sorghastrum nutans</i>	Indian Grass	Native		1				
<i>Sparganium</i>	Broadfruit Bur-Reed; Giant Bur-Reed	Native					1	

Species name	Common name	Origin	Savanna	Prairie	Non-Native Grassland	Forested Lowland	Shrub/Scrub Lowland	Herbaceous Lowland
<i>eurycarpum</i>								
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native		1				
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native				1		1
<i>Toxicodendron radicans</i>	Poision Ivy	Native						1 cf
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	Native		1				
<i>Trifolium aureum</i>	Golden Clover; Large Hop Trefoil	Not Native						1 cf
<i>Trifolium hybridum</i>	Alsike Clover	Not Native		1 cf		1 cf		
<i>Trifolium pratense</i>	Red Clover	Not Native				1 cf		
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native						1 cf
<i>Typha latifolia</i>	Broadleaf Cattail	Native						1
<i>Vernonia fasciculata</i>	Common Ironweed; Prairie Ironweed; Smooth Ironweed	Native						1
<i>Vitus riparia</i>	Riverbank Grape; Frost Grape	Native						1

Whispering Meadows Wetlands Restoration/Management Recommendations and Opinion of Probable Cost

Restoration/Management Action							
	Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Land Cover Type (ac)	Forest/Woodland and Forested Lowland	0.39	0.39	0.39	0.39	0.39	
	Savanna/Brushland and Shrub/Scrub Lowland	0.53	1.36	1.36	1.36	1.36	
	Grassland and Herbaceous Lowland		8.31	8.31	8.31	8.31	
	Total Acres	0.92	10.06	10.06	0	10.06	
	Unit Cost (for 3 yrs)	\$ 2,000	\$ 2,500	\$ 1,500	\$ 300	\$ 600	
Opinions of Probable Cost ¹		\$ 1,840	\$ 25,150	\$ 15,090	\$ -	\$ 3,018	\$ 6,036
Total Opinion of Probable Cost ¹		\$	51,134				

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Invasive woody removal not needed in savanna.

Overseed upland and lowland areas following brush/weed removal.

Iowa City Natural Areas Inventory and Management Plan

Whispering Meadows Wetlands

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover
 - Savanna
 - Prairie
 - Non-native Grassland
 - Forested Lowland
 - Shrub/Scrub Lowland
 - Herbaceous Lowland
 - Open Water
 - Recreation Area
 - Other Impervious Cover
- Contour (5ft interval)
- Trail
- Drainageway

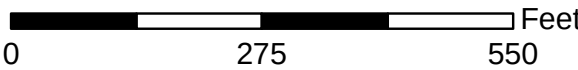
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CITY OF IOWA CITY – NATURAL AREAS INVENTORY AND MANAGEMENT PLAN

WINDSOR RIDGE PARK MANAGEMENT BRIEF

Natural Area Name: Windsor Ridge Park

Natural Area Size (ac): 21

Natural Area Location (address, nearest street intersection, or other major geographic feature): Southeast district, between Arlington Drive, Barrington Road, Huntington Drive and American Legion Road

Park/Natural Area Class: Neighborhood Park

Previous Natural Resources-Related Plans/Data:

Citation/Data	History	Plant Spp List	Animal Spp List	NR Mgmt Plan	Forest Mgmt Plan	Stream Assessment	Other
NA							

Notes: Spp=species; NR=natural resources; Mgmt=management

Habitat Connection Opportunities:

- Northwest to Scott Park and Lindemann Trail Greenway

Dominant Soils **Upland:** Downs silt loam, till plain, (9-14% slopes) and Tama silt loam (2-5% slopes) (incl. texture) **Lowland:** Colo-Ely complex silty clay loam (0-5% slopes)

Hydrology Features: Pond/wetland at south end of site

Historical Vegetation: Prairie and small portion of Grove in northeast portion of site

Past Land Uses: Cropland

Current Use and Management: Park, maintained turf

Existing Land Cover Types:

Existing Land Cover	Natural Community Quality Ranks	Acres	Percent of Site
NATURAL LAND COVERS			
<i>UPLAND PLANT COMMUNITIES</i>			
Forest/Woodland (50-100% tree canopy)			
Mature Forest/Woodland (large trees)			
1. Dry-Mesic Forest/Woodland (often oaks)			
2. Mesic Forest (often maples)			
3. Altered Forest/Woodland	NR	2.24	10.8%
Savanna/Brushland (5-50% tree canopy)			
4. Savanna (tree dominated)			
5. Shrub/Scrub (shrub dominated)			
Grassland (<5% tree canopy)			
6. Prairie (native plants dominate)			
7. Non-native Grassland (little native plant cover)	NR		
<i>LOWLAND PLANT COMMUNITIES (including wetlands)</i>			
8. Forested Lowland			
9. Shrub/Scrub Lowland			
10. Herbaceous Lowland (wet meadow & marsh)		0.43	2.1%
11. Open Water	NR	2.07	9.9%
CULTURAL LAND COVERS			
12. Woodland with Turf (50-100% tree canopy)		0.57	2.7%
13. Recreation Area (0-50% tree canopy)		14.27	68.6%
14. Building			
15. Other Impervious Cover		1.23	5.9%
Totals		20.81	100%

NR = not ranked

Natural Community Quality Rank Descriptions

- **A** = Highest quality natural community, no disturbances and natural processes intact.
- **B** = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of invasive plants.
- **C** = Moderate condition natural community with obvious past disturbance but still clearly recognizable as a native community. Not dominated by weedy species in any layer.
- **D** = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered.
- **NN** = Altered/non-native plant community. These semi-natural communities do not receive a natural quality rank.

Flora: see attached matrix on following page(s)

Noteworthy Wildlife (including rare species and SGCN):

Mammals	Birds	Reptiles & Amphibians	Insects
None observed	Common Yellowthroat	Many frogs	Dragonflies

Issues and Opportunities:

- Invasive vegetation (white mulberry, honeysuckles, birdsfoot trefoil, reed canary grass, etc.)
- Algae prevalent in pond
- Opportunity for turf to prairie conversion and rain gardens/biocells

Restoration and Management Goals:

- Remove invasive vegetation
- Increase native vegetation cover and diversity
- Install interpretive signage

Windsor Ridge Park Flora

Cover Classes: 1 uncommon (<10%); 2 common (10-30%); 3 sub-dominant (30-50%); 4 dominant (>50%)

Red font = invasive species of concern

Spatial Dispersion (invasives only): ed=evenly distributed throughout; pd=patchily distributed throughout; cf=concentrated in few-several areas

Species name	Common name	Origin	Altered Forest	Herbaceous Lowland	Open Water
<i>Canopy Stratum</i>					
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	3		
<i>Acer saccharinum</i>	Silver Maple	Native	2		
<i>Acer saccharum</i>	Sugar Maple	Native	1		
<i>Celtis occidentalis</i>	Hackberry	Native	2		
<i>Juglans nigra</i>	Black Walnut	Native	2		
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd		
<i>Populus deltoides</i>	Eastern Cottonwood	Native	1		
<i>Prunus serotina</i>	Black Cherry	Native	1		
<i>Quercus rubra</i>	Red Oak	Native	1		
<i>Salix nigra</i>	Black Willow	Native	1		
<i>Shrub/Vine/Sapling Stratum</i>					
<i>Acer saccharinum</i>	Silver Maple	Native		1	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	2		
<i>Juglans nigra</i>	Black Walnut	Native	1		
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	2 pd		
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	1 cf		
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	2 pd		
<i>Morus rubra</i>	Red Mulberry	Native	2		
<i>Prunus serotina</i>	Black Cherry	Native	2		
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native	1		
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	1 cf		
<i>Sambucus canadensis</i>	Elderberry	Native	2		
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf		
<i>Ulmus americana</i>	American Elm	Native	1		
<i>Herbaceous Stratum</i>					

Species name	Common name	Origin	Altered Forest	Herbaceous Lowland	Open Water
<i>Ageratina altissima</i>	Common White Snakeroot	Native	1		
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	1 cf		
<i>Ambrosia trifida</i>	Giant Ragweed	Native		1	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	1 cf		
<i>Asclepias syriaca</i>	Common Milkweed	Native		2	
Asteraceae	Unknown Aster	Undetermined		1	
<i>Bidens cernua</i>	Nodding Beggartick; Nodding Bur Marigold	Native			1
<i>Carex normalis</i>	Greater Straw Sedge; Spreading Oval Sedge	Native		1	
<i>Carex spp.</i>	Unknown Sedges	Native	1		
<i>Carex vulpinoidea</i>	Fox Sedge	Native		1	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native		1 cf	
<i>Echinacea sp.</i>	Unknown Purple Coneflower	Undetermined		1	
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native		1	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	1		
<i>Festuca arundinacea</i>	Tall Fescue	Not Native		2 pd	
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native	1		
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	1		
<i>Geum sp.</i>	Unknown Avena	Undetermined	1		
<i>Hackelia virginiana</i>	Stickseed	Native	1		
<i>Helianthus strumosus</i>	Woodland Sunflower; Pale-Leaved Sunflower; Pale-Leaf Woodland Sunflower	Native		1	
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	1 cf		
<i>Humulus japonicus</i>	Japanese Hop	Not Native		1 cf	
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native		1	
<i>Leersia virginica</i>	Whitegrass; White Cutgrass; Virginia Cutgrass	Native	1		
<i>Leonurus cardiaca</i>	Motherwort	Not Native	1 cf		
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native		3 ed	
<i>Melilotus alba</i>	White Sweet Clover	Not Native		1 cf	
<i>Oenothera biennis</i>	Evening Primrose	Native		1	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	1		

Species name	Common name	Origin	Altered Forest	Herbaceous Lowland	Open Water
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native		1 cf	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	1 cf	2 pd	
<i>Phleum pratense</i>	Timothy	Not Native		1 pd	
<i>Pilea pumila</i>	Clearweed	Native	1		
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	1		
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native			1
<i>Rumex crispus</i>	Curly Dock	Not Native	1 cf	1 cf	
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native			1
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	1		
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native		1	
<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native		2	
<i>Toxicodendron radicans</i>	Poison Ivy	Native	1 cf		
<i>Urtica dioica</i>	Stinging Nettle	Native		1	
<i>Verbena urticifolia</i>	White Vervain	Native	1		
<i>Viola sp.</i>	Unknown Violet	Undetermined	1		
<i>Vitis riparia</i>	Riverbank Grape; Frost Grape	Native	1		

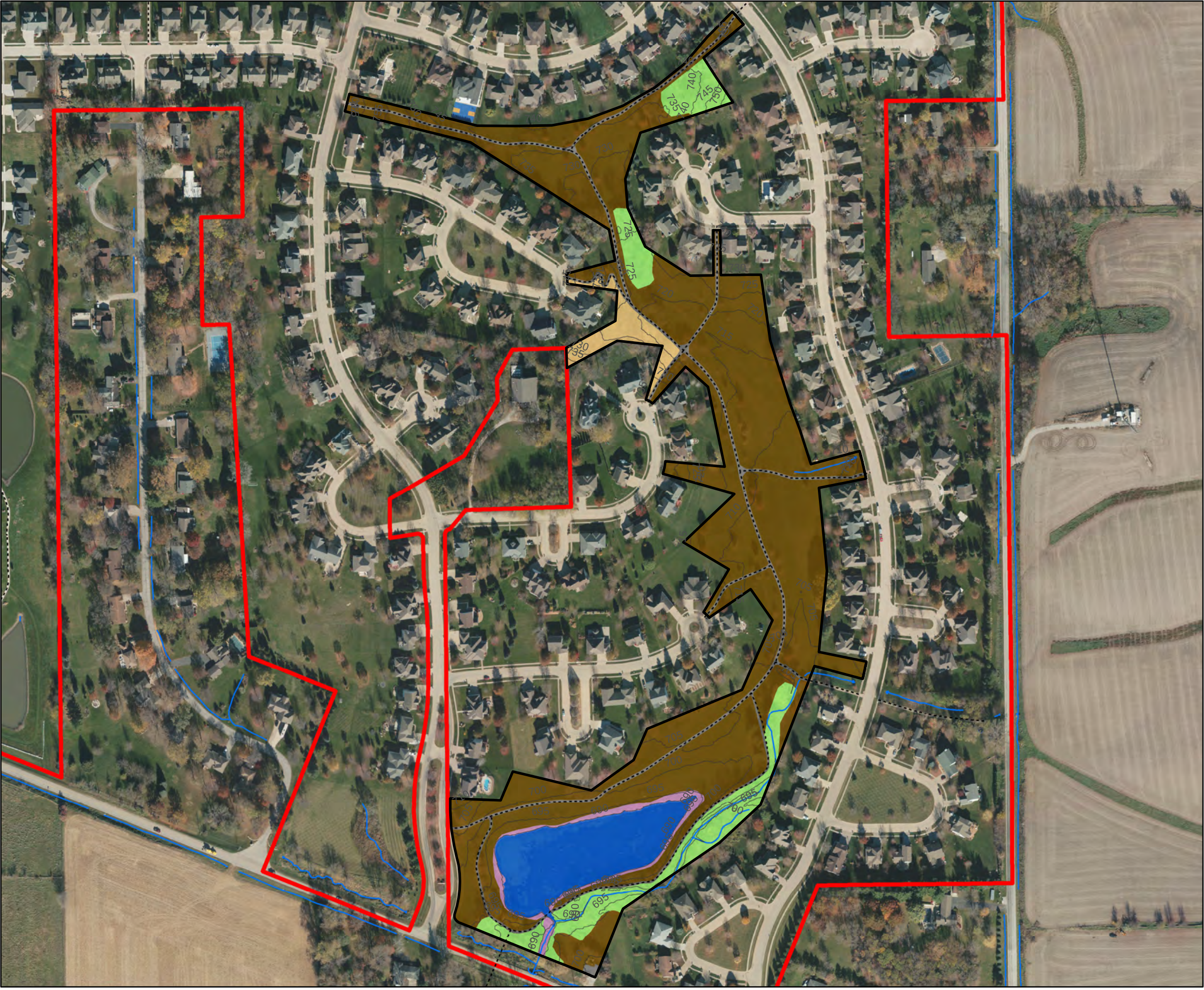
Windsor Ridge Park Restoration/Management Recommendations and Opinion of Probable Cost

		Restoration/Management Action						
Land Cover Type (ac)		Remove Invasive Woody Vegetation	Control Invasive Herbaceous Vegetation	Install Herbaceous Vegetation	Install Woody Vegetation	Ecological Monitoring	Prescribed Burning	
Forest/Woodland and Forested Lowland		2.24	2.24	2.24		2.24		
Savanna/Brushland and Shrub/Scrub Lowland								
Grassland and Herbaceous Lowland			0.43	0.43		0.43	0.43	
Total Acres		2.24	2.67	2.67	0	2.67	0.43	
Unit Cost (for 3 yrs)	\$	2,500	\$ 2,000	\$ 1,250		\$ 400	NA	
Opinions of Probable Cost ¹	\$	5,600	\$ 5,340	\$ 3,338	\$ -	\$ 1,068	\$ 1,500	
Total Opinion of Probable Cost¹		\$ 16,846						

¹ Opinion of Probable Cost (OPC) is intended to address the first three years of restoration/management work. Monitoring and perpetual management will be required thereafter.

Notes:

Overseed altered forest/woodland and herbaceous lowland following brush/weed removal.



Iowa City Natural Areas Inventory and Management Plan

Windsor Ridge Park

- City Limits
- Iowa City Park or Natural Area
- Existing Land Cover**
 - Altered Forest/Woodland
 - Herbaceous Lowland
 - Open Water
 - Woodland with Turf
 - Recreation Area
 - Other Impervious Cover
 - Contour (5ft interval)
 - Trail
 - Drainageway

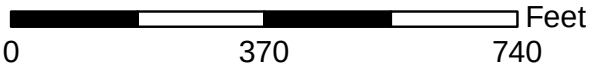
A,B,C,D Natural Community Quality Rank

Data Sources:
- City of Iowa City
- Johnson County

AES Project Number: 16-0777
Date: 12/12/17
File Name: IA City_Mgmt Brief Maps_2018-02-01



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Appendix C. Compiled Flora of Iowa City, including Invasive Species of Concern

Appendix C. Compiled Flora of Iowa City, including Invasive Species of Concern (in red)

State Listings: E=endangered; T=threatened; S=special concern

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
Trees			
<i>Acer negundo</i>	Boxelder; Ash-Leaf Maple	Native	
<i>Acer nigrum</i>	Black Maple	Native	
<i>Acer platanoides</i>	Norway Maple	Not Native	
<i>Acer saccharinum</i>	Silver Maple	Native	
<i>Acer saccharum</i>	Sugar Maple	Native	
<i>Aesculus glabra</i>	Ohio Buckeye	Native	
<i>Ailanthus altissima</i>	Tree of Heaven	Not Native	
<i>Amelanchier arborea</i>	Common Serviceberry	Native	
<i>Betula alleghaniensis</i>	Yellow Birch	Native	
<i>Betula nigra</i>	River Birch	Native	
<i>Carya cordiformis</i>	Bitternut Hickory	Native	
<i>Carya ovata</i>	Shagbark Hickory	Native	
<i>Catalpa speciosa</i>	Northern Catalpa; Cigar Tree	Native	
<i>Celtis occidentalis</i>	Hackberry	Native	
<i>Cercis canadensis</i>	Eastern Redbud; Judas Tree	Native	
<i>Crataegus crus-galli</i>	Cockspur Hawthorn	Native	
<i>Fraxinus nigra</i>	Black Ash	Native	
<i>Fraxinus americana</i>	White Ash	Native	
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	
<i>Gleditsia triacanthos</i>	Honey Locust	Native	
<i>Gymnocladus dioica</i>	Kentucky Coffeetree	Native	
<i>Juglans cinerea</i>	Butternut; White Walnut	Native	
<i>Juglans nigra</i>	Black Walnut	Native	
<i>Juniperus virginiana</i>	Eastern Red Cedar	Native	
<i>Maclura pomifera</i>	Osage Orange	Not Native	
<i>Malus ioensis</i>	Wild Crabapple	Native	
<i>Morus alba</i>	White Mulberry; Russian Mulberry; Silkworm Mulberry	Not Native	
<i>Morus rubra</i>	Red Mulberry	Native	
<i>Ostrya virginiana</i>	Ironwood; Eastern Hop Hornbeam	Native	
<i>Picea sp.</i>	Unknown Spruce	Not Native	
<i>Pinus strobus</i>	White Pine; Eastern White Pine	Native	
<i>Pinus sp.</i>	Unknown Pine	Undetermined	
<i>Platanus occidentalis</i>	American Sycamore	Native	
<i>Populus alba</i>	White Poplar	Not Native	
<i>Populus deltoides</i>	Eastern Cottonwood	Native	
<i>Populus tremuloides</i>	Quaking Aspen	Native	
<i>Prunus serotina</i>	Black Cherry	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Quercus alba</i>	White Oak	Native	
<i>Quercus bicolor</i>	Swamp White Oak	Native	
<i>Quercus borealis</i>	Northern Red Oak	Native	
<i>Quercus ellipsoidalis</i>	Hill's Oak; Northern Pin Oak	Native	
<i>Quercus macrocarpa</i>	Bur Oak	Native	
<i>Quercus palustris</i>	Pin Oak; Swamp Spanish Oak	Native	
<i>Quercus rubra</i>	Red Oak	Native	
<i>Quercus sp.</i>	Unknown Oak	Native	
<i>Quercus velutina</i>	Black Oak	Native	
<i>Rhus sp.</i>	Unknown Sumac	Undetermined	
<i>Robinia pseudoacacia</i>	Black Locust	Not Native	
<i>Salix babylonica</i>	Weeping Willow	Not Native	
<i>Salix nigra</i>	Black Willow	Native	
<i>Salix petiolaris</i>	Meadow Willow	Native	
<i>Tilia americana</i>	American Basswood	Native	
<i>Ulmus americana</i>	American Elm	Native	
<i>Ulmus parvifolia</i>	Chinese Elm	Not Native	
<i>Ulmus pumila</i>	Siberian Elm	Not Native	
<i>Ulmus rubra</i>	Slippery Elm	Native	
<i>Ulmus sp.</i>	Unknown Elm	Undetermined	
Shrubs/Vines			
<i>Acer ginnala</i>	Amur Maple	Not Native	
<i>Ampelopsis brevipedunculata</i>	Amur Peppervine	Not Native	
<i>Amphicarpaea bracteata</i>	Hog Peanut	Native	
<i>Alnus sp.</i>	Unknown Alder	Undetermined	
<i>Berberis thunbergii</i>	Japanese Barberry	Not Native	
<i>Calystegia sepium</i>	Hedge Bindweed; Morning Glory	Native	
<i>Campsis radicans</i>	Trumpet Creeper	Not Native	
<i>Celastrus orbiculatus</i>	Oriental Bittersweet	Not Native	
<i>Celastrus scandens</i>	American Bittersweet	Native	
<i>Cornus alternifolia</i>	Pagoda Dogwood; Alternate-Leaved Dogwood	Native	
<i>Cornus drummondii</i>	Roughleaf Dogwood	Native	
<i>Cornus obliqua</i>	Swamp Dogwood; Silky Dogwood; Blue-Fruited Dogwood	Native	
<i>Cornus racemosa</i>	Gray Dogwood	Native	
<i>Cornus sericea</i>	Red Osier Dogwood	Native	
<i>Corylus americana</i>	American Hazelnut; American Hazel	Native	
<i>Crataegus mollis</i>	Downy Hawthorn	Native	
<i>Dioscorea villosa</i>	Wild Yam; Yam or Colic Root	Native	
<i>Elaeagnus angustifolia</i>	Russian Olive	Not Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Elaeagnus umbellata</i>	Autumn Olive	Not Native	
<i>Euonymus alatus</i>	Burning Bush; Winged Euonymus; Winged Wahoo	Not Native	
<i>Euonymus atropurpureus</i>	Wahoo	Native	
<i>Fraxinus</i> sp.	Unknown Ash	Undetermined	
<i>Humulus japonicus</i>	Japanese Hop	Not Native	
<i>Ligustrum vulgare</i>	Common Privet	Not Native	
<i>Lonicera maackii</i>	Amur Honeysuckle; Bush Honeysuckle	Not Native	
<i>Lonicera morrowi</i>	Morrow's Honeysuckle	Not Native	
<i>Lonicera reticulata</i>	Grape Honeysuckle	Native	
<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Not Native	
<i>Lonicera x bella Zabel</i>	Honeysuckle	Not Native	
<i>Malus pumila</i>	Orchard Apple	Native	
<i>Malus</i> sp.	Unknown Apple	Undetermined	
<i>Menispermum canadense</i>	Canada Moonseed	Native	
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native	
<i>Parthenocissus vitacea</i>	Woodbine	Native	
<i>Physocarpus opulifolius</i>	Ninebark	Native	
<i>Populus</i> sp.	Unknown poplar/aspen/cottonwood	Undetermined	
<i>Prunus americana</i>	American Plum; Wild Plum	Native	
<i>Prunus caroliniana</i>	Carolina Cherry; Carolina Laurelcherry	Not Native	
<i>Prunus x cistena</i>	Purple Leaf Sand Cherry; Dwarf Red Leaf Sand Cherry	Not Native	
<i>Prunus virginiana</i>	Chokecherry	Native	
<i>Pyrus calleryana</i>	Bradford Pear; Callery Pear	Not Native	
<i>Rhamnus cathartica</i>	Common Buckthorn	Not Native	
<i>Rhamnus frangula</i>	Glossy Buckthorn	Not Native	
<i>Rhus aromatica</i>	Fragrant Sumac	Native	
<i>Rhus glabra</i>	Smooth Sumac	Native	
<i>Rhus</i> sp.	Unknown Sumac	Undetermined	
<i>Ribes missouriense</i>	Missouri Gooseberry	Native	
<i>Ribes hirtellum</i>	Pixwell Gooseberry	Not Native	
<i>Rosa arkansana</i>	Prairie Rose	Native	
<i>Rosa blanda</i>	Prairie Rose; Smooth Wild Rose; Early Wild Rose	Native	
<i>Rosa carolina</i>	Carolina Rose; Pasture Rose	Native	
<i>Rosa multiflora</i>	Multiflora Rose	Not Native	
<i>Rosa</i> sp.	Unknown Rose	Undetermined	
<i>Rubus allegheniensis</i>	Allegheny Blackberry; Common Blackberry	Native	
<i>Rubus idaeus</i>	Red Raspberry	Not Native	
<i>Rubus laciniatus</i>	Evergreen Blackberry	Not Native	
<i>Rubus occidentalis</i>	Black Raspberry	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Salix exigua</i>	Sandbar Willow; Narrowleaf Willow	Native	
<i>Smilax herbacea</i>	Carrion Flower	Native	
<i>Smilax hispida</i>	Greenbrier	Native	
<i>Smilax tamnoides</i>	Bristly Greenbrier; China Root; Hellfetter	Native	
<i>Symphoricarpos albus</i>	Snowberry	Native	
<i>Symphoricarpos orbiculatus</i>	Coralberry; Indian currant	Native	
<i>Symphoricarpos</i> sp.	Unknown Snowberry	Undetermined	
<i>Thuja occidentalis</i>	Northern White Cedar; Eastern Arborvitea	Native	
<i>Toxicodendron radicans</i>	Poision Ivy	Native	
<i>Viburnum dentatum</i>	Southern Arrowwood	Native	
<i>Viburnum lantana</i>	Wayfaring Tree	Not Native	
<i>Viburnum lentago</i>	Nannyberry; Sheepberry	Native	
<i>Viburnum opulus</i>	European Highbush Cranberry; European Cranberrybush; Guelder Rose	Not Native	
<i>Viburnum prunifolium</i>	Black Haw	Native	S
<i>Viburnum recognitum</i>	Northern Arrowwood	Native	
<i>Viburnum</i> sp.	Unknown Viburnum	Undetermined	
<i>Vitus riparia</i>	Riverbank Grape; Frost Grape	Native	
<i>Zanthoxylum americanum</i>	Prickly Ash	Native	
Herbaceous (aquatic spp not included)			
<i>Abutilon theophrasti</i>	Velvetleaf	Not Native	
<i>Acalypha virginica</i>	Virginia Threeseed; Common Threeseed; Mercury Threeseed	Native	
<i>Achillea millefolium</i>	Western Yarrow	Native	
<i>Acorus americanus</i>	American Sweet Flag	Native	
<i>Acroptilon repens</i>	Russian Knapweed; Hardheads	Not Native	
<i>Actaea pachypoda</i>	Doll's Eyes; White Baneberry	Native	
<i>Actaea rubra</i>	Red Baneberry	Native	
<i>Adiantum pedatum</i>	Northern Maidenhair Fern	Native	
<i>Agalinis</i> sp.	Unknown False Foxglove	Native	
<i>Agastache foeniculum</i>	Anise Hyssop	Native	E
<i>Agastache nepetoides</i>	Yellow Giant Hyssop	Native	
<i>Ageratina altissima</i>	Common White Snakeroot	Native	
<i>Agrimonia gryposepala</i>	Tall Agrimony; Hairy Agrimony; Common Agrimony	Native	
<i>Agrimonia parviflora</i>	Swamp Agrimony; Small-Flowered Agrimony	Native	
<i>Agrimonia pubescens</i>	Soft Agrimony	Native	
<i>Agrostis gigantea</i>	Redtop; Black Bent	Not Native	
<i>Agrostis stolonifera</i>	Creeping Bent	Not Native	
<i>Alisma subcordatum</i>	American Water Plantain	Native	
<i>Alliaria petiolata</i>	Garlic Mustard	Not Native	
<i>Allium canadense</i>	Wild Onion	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Allium cernuum</i>	Nodding Wild Onion	Native	T
<i>Allium tricoccum</i>	Wild Leek; Ramp	Native	
<i>Allium sp.</i>	Unknown Garlic	Undetermined	
<i>Ambrosia artemisiifolia</i>	Common Ragweed; Annual Ragweed	Native	
<i>Ambrosia psilostachya</i>	Western Ragweed; Perennial Ragweed	Native	
<i>Ambrosia trifida</i>	Giant Ragweed	Native	
<i>Amelanchier alnifolia</i>	Seviceberry	Native	S
<i>Amorpha canescens</i>	Lead Plant	Native	
<i>Andropogon gerardii</i>	Big Bluestem	Native	
<i>Anemone acutiloba</i>	Sharp-Lobed Hepatica	Native	
<i>Anemone canadensis</i>	Canada anemone	Native	
<i>Anemone cylindrica</i>	Thimbleweed	Native	
<i>Anemone virginiana</i>	Thimbleweed; Tall Anemone	Native	
<i>Anemone sp.</i>	Unknown Anemone	Undetermined	
<i>Antennaria neglecta</i>	Pussytoes	Native	
<i>Apios americana</i>	Potato Bean; Groundnut	Native	
<i>Apocynum cannabinum</i>	Prairie Dogbane; Indian Hemp	Native	
<i>Apocynum sibiricum</i>	Clasping Dogbane	Native	
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	Native	
<i>Aralia racemosa</i>	American Spikenard	Native	
<i>Arctium minus</i>	Common Burdock; Lesser Burdock	Not Native	
<i>Arisaema dracontium</i>	Green Dragon; Dragon Root	Native	
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit; Indian Turnip	Native	
<i>Aronia melanocarpa</i>	Black Chokeberry	Native	
<i>Artemisia ludoviciana</i>	White Sage	Native	
<i>Asarum canadense</i>	Canada Wild Ginger	Native	
<i>Asclepias exaltata</i>	Poke Milkweed	Native	
<i>Asclepias incarnata</i>	Swamp Milkweed	Native	
<i>Asclepias purpurascens</i>	Purple Milkweed	Native	
<i>Asclepias syriaca</i>	Common Milkweed	Native	
<i>Asclepias tuberosa</i>	Butterfly Milkweed; Butterfly Weed	Native	
<i>Asclepias verticillata</i>	Whorled Milkweed	Native	
<i>Asclepias sp.</i>	Unknown Milkweed	Native	
<i>Aster azureus</i>	Sky Blue Aster	Native	
<i>Aster novae-angliae</i>	New England Aster	Native	
<i>Aster pilosus</i>	Hairy White Oldfield Aster; Frost Aster	Native	
Asteraceae	Unknown Aster	Undetermined	
<i>Astragalus canadensis</i>	Canadian Milk Vetch	Native	
<i>Athyrium filix-femina</i>	Northern Lady Fern; Common Lady Fern	Native	
<i>Baptisia alba</i>	Wild White Indigo	Native	
<i>Baptisia australis</i>	Wild Blue Indigo	Native	S

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Baptisia sp.</i>	Unknown Wild Indigo	Native	
<i>Barbarea vulgaris</i>	Yellow Rocket; Common Winter Cress	Not Native	
<i>Berteroa incana</i>	Hoary Alyssum	Not Native	
<i>Bidens bipinnata</i>	Spanish Needles	Native	
<i>Bidens cernua</i>	Nodding Beggartick; Nodding Bur Marigold	Native	
<i>Bidens frondosa</i>	Common Beggartick; Devil's Beggartick	Native	
<i>Boehmeria cylindrica</i>	Smallspike False Nettle; Bog Hemp	Native	
<i>Boltonia asteroides</i>	False Aster; White Doll's Eyes; White Doll's Daisy	Native	
<i>Botrychium dissectum</i>	Dissected Grapefern	Native	
<i>Botrychium virginianum</i>	Rattlesnake Fern; Common Grapefern	Native	
<i>Bouteloua curtipendula</i>	Sideoats Grama	Native	
<i>Bouteloua hirsuta</i>	Hairy Grama	Native	
<i>Bromus inermis</i>	Smooth Brome	Not Native	
<i>Bromus japonicus</i>	Japanese Brome	Not Native	
<i>Bromus tectorum</i>	Downy Brome; Downy Chess; Cheatgrass	Not Native	
<i>Buchloe dactyloides</i>	Buffalo Grass	Native	
<i>Calamagrostis canadensis</i>	Blue Joint Grass; Bluejoint	Native	
<i>Callirhoe bushii</i>	Bush's Poppy Mallow	Native	
<i>Caltha palustris</i>	Marsh Marigold	Native	
<i>Campanula americana</i>	Tall Bellflower	Native	
<i>Campanula rotundifolia</i>	Harebell	Native	
<i>Cannabis sativa</i>	Marijuana	Not Native	
<i>Capsella bursa-pastoris</i>	Shepard's Purse	Not Native	
<i>Cardamine concatenata</i>	Cutleaf Toothwort	Native	
<i>Cardamine douglassii</i>	Purple Cress; Northern Bitter Cress	Native	
<i>Cardamine pensylvanica</i>	Pennsylvania Bittercress	Native	
<i>Cardaria draba</i>	Whitetop; Perennial Pepper-Grass	Not Native	
<i>Carduus nutans</i>	Musk Thistle	Not Native	
<i>Carex amphibola</i>	Eastern Narrowleaf Sedge	Native	
<i>Carex aggregata</i>	Smooth Clustered Sedge; Glomerate Sedge	Native	S
<i>Carex annectens</i>	Yellow Fox Sedge; Yellowfruit Sedge	Native	
<i>Carex bebbii</i>	Bebb's Sedge	Native	
<i>Carex bicknellii</i>	Bicknell's Sedge; Copper-Shouldered Oval Sedge	Native	
<i>Carex blanda</i>	Common Woodland Sedge; Eastern Woodland Sedge	Native	
<i>Carex brevior</i>	Plains Oval Sedge	Native	
<i>Carex bushii</i>	Bush's Sedge	Native	
<i>Carex cephaloidea</i>	Thin-Leaf Sedge	Native	
<i>Carex cephalophora</i>	Oval-Leaf Sedge	Native	
<i>Carex comosa</i>	Bristly Sedge; Longhair Sedge	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Carex conjuncta</i>	Soft Fox Sedge	Native	
<i>Carex convoluta</i>	Sedge	Native	
<i>Carex crinita</i>	Fringed Sedge	Native	S
<i>Carex cristatella</i>	Crested Sedge; Crested Oval Sedge	Native	
<i>Carex davisii</i>	Davis' Sedge	Native	
<i>Carex frankii</i>	Frank's Sedge; Bristly Cattail Sedge	Native	
<i>Carex gracillima</i>	Graceful Sedge	Native	
<i>Carex granularis</i>	Limestone Meadow Sedge; Pale Sedge	Native	
<i>Carex gravida</i>	Heavy Sedge	Native	
<i>Carex grayi</i>	Gray's Sedge	Native	
<i>Carex grisea</i>	Wood Gray Sedge; Inflated Narrow-Leaf Sedge	Native	
<i>Carex hirtifolia</i>	Pubescent Sedge; Hairy Wood Sedge	Native	
<i>Carex hystericina</i>	Porcupine Sedge; Bottlebrush Sedge	Native	
<i>Carex intumescens</i>	Greater Bladder Sedge; Shining Bur Sedge	Native	
<i>Carex jamesii</i>	James' Sedge	Native	
<i>Carex lacustris</i>	Lake Sedge; Hairy Sedge	Native	
<i>Carex lupulina</i>	Hop Sedge	Native	
<i>Carex meadii</i>	Mead's Sedge	Native	
<i>Carex molesta</i>	Troublesome Sedge; Field Oval Sedge	Native	
<i>Carex normalis</i>	Greater Straw Sedge; Spreading Oval Sedge	Native	
<i>Carex pensylvanica</i>	Pennsylvania Sedge	Native	
<i>Carex rosea</i>	Rosy Sedge; Curly Wood Sedge	Native	
<i>Carex scoparia</i>	Broom Sedge; Lance-Fruited Oval Sedge	Native	
<i>Carex shortiana</i>	Short's Sedge	Native	
<i>Carex sprengei</i>	Sprengel's Sedge; Long-Beaked Sedge	Native	
<i>Carex stipata</i>	Prickly Sedge; Awl-Fruited Sedge	Native	
<i>Carex stricta</i>	Tussock Sedge; Upright Sedge	Native	
<i>Carex tenera</i>	Quill Sedge; Narrow-Leaf Oval Sedge; Remote Sedge	Native	
<i>Carex trichocarpa</i>	Hairy-Fruited Sedge; Hairy-Fruited Lake Sedge	Native	
<i>Carex vulpinoidea</i>	Fox Sedge	Native	
<i>Carex sp.</i>	Unknown Sedge	Native	
<i>Carex spp.</i>	Unknown Sedges	Native	
<i>Ceanothus americanus</i>	New Jersey Tea	Native	
<i>Centaurea solstitialis</i>	Yellow Starthistle	Not Native	
<i>Centaurea stoebe</i>	Spotted Knapweed	Not Native	
<i>Cephalanthus occidentalis</i>	Buttonbush	Native	
<i>Cerastium nutans</i>	Nodding Mouse-Ear Chickweed	Native	
<i>Cerastium vulgatum</i>	Mouse-ear Chickweed	Not Native	
<i>Chamaecrista fasciculata</i>	Partridge Pea	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Chenopodium album</i>	Lamb's Quarters	Not Native	
<i>Chenopodium desiccatum</i>	Aridland Goosefoot; Desert Goosefoot; Narrow Leaf Goosefoot	Native	
<i>Cichorium intybus</i>	Chicory	Not Native	
<i>Cicuta maculata</i>	Water Hemlock; Spotted Water Hemlock	Native	
<i>Cinna arundinacea</i>	Sweet Woodreed; Stout Woodreed	Native	
<i>Circaea lutetiana</i>	Broadleaf Enchanter's Nightshade	Native	
<i>Cirsium arvense</i>	Canada thistle	Not Native	
<i>Cirsium discolor</i>	Field Thistle; Pasture Thistle	Native	
<i>Cirsium vulgare</i>	Bull Thistle	Not Native	
<i>Claytonia virginica</i>	Eastern Spring Beauty	Native	
<i>Clematis pitcheri</i>	Pitcher's Leather Flower; Purple Leather Flower; Bluebill	Native	
<i>Commelina communis</i>	Day-flower	Not Native	
<i>Conium maculatum</i>	Poison Hemlock	Not Native	
<i>Convolvulus arvensis</i>	European Morning Glory; Field Bindweed	Not Native	
<i>Conyza canadensis</i>	Canadian Horseweed	Native	
<i>Coreopsis lanceolata</i>	Lance-Leaved Coreopsis	Native	
<i>Coreopsis palmata</i>	Prairie Coreopsis	Native	
<i>Coreopsis tripteris</i>	Tall Tickseed; Tall Coreopsis	Native	
<i>Corylus americana</i>	Hazelnut	Native	
<i>Cryptotaenia canadensis</i>	Honewort	Native	
<i>Cuscuta sp.</i>	Unknown Dodder	Undetermined	
<i>Cystopteris protrusa</i>	Fern, Southern Bladder	Native	
<i>Dactylis glomerata</i>	Orchardgrass	Not Native	
<i>Dalea purpurea</i>	Purple Prairie clover	Native	
<i>Daucus carota</i>	Queen Anne's Lace; Wild Carrot	Not Native	
<i>Desmanthus illinoensis</i>	Illinois Bundleflower	Native	
<i>Desmodium canadense</i>	Showy Tick Trefoil	Native	
<i>Desmodium cuspidatum</i>	Hairy-Bracted Tick Trefoil; Large-Bracted Tick Trefoil	Native	
<i>Desmodium glutinosum</i>	Pointed Leaf Tick Trefoil; Clustered Leaf Tick Trefoil	Native	
<i>Dianthus armeria</i>	Deptford Pink	Not Native	
<i>Dicentra cucullaria</i>	Dutchman's Breeches	Native	
<i>Dichanthelium clandestinum</i>	Deer-Tongue Grass; Deertongue	Native	
<i>Dichanthelium implicatum</i>	Rosette Panic Grass	Native	
<i>Dichanthelium latifolium</i>	Broad Leaf Panic Grass	Native	
<i>Dichanthelium oligosanthes</i>	Scribner's Panic Grass	Native	
<i>Dichanthelium sp.</i>	Unknown Panic Grass	Native	
<i>Dipsacus fullonum</i>	Common Teasel; Wild Teasel; Fuller's Teasel	Not Native	
<i>Dipsacus laciniatus</i>	Cut-Leaved Teasel	Not Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Dodecatheon meadia</i>	Shooting Star	Native	
<i>Dryopteris carthusiana</i>	Spinulose Fern; Toothed Wood Fern	Native	
<i>Dryopteris sp.</i>	Unknown Wood Fern	Undetermined	
<i>Duchesnea indica</i>	Mock Strawberry; Indian Strawberry; False Strawberry	Native	
<i>Echinacea pallida</i>	Pale Purple Coneflower	Native	
<i>Echinacea purpurea</i>	Purple Coneflower; Eastern Purple Coneflower	Native	
<i>Echinacea sp.</i>	Unknown Purple Coneflower	Undetermined	
<i>Echinochloa crus-galli</i>	Common Barnyard Grass; Barnyard Millet; Cockspur	Not Native	
<i>Echinocystis lobata</i>	Wild Cucumber	Native	
<i>Eleocharis erythropoda</i>	Bald Spikerush; Creeping Spikerush	Native	
<i>Eleocharis palustris</i>	Common Spikerush	Native	
<i>Ellisia nyctelea</i>	Aunt Lucy; Water-pod	Native	
<i>Elymus canadensis</i>	Canada Wild Rye	Native	
<i>Elymus hystrix</i>	Bottlebrush Grass; Glumeless Wild Rye	Native	
<i>Elymus repens</i>	Quackgrass	Not Native	
<i>Elymus riparius</i>	Riverbank Wild Rye	Native	
<i>Elymus villosus</i>	Silky Wild Rye	Native	
<i>Elymus virginicus</i>	Virginia Wild Rye	Native	
<i>Enemion biternatum</i>	False Rue Anemone	Native	
<i>Epilobium coloratum</i>	Cinnamon Willow Herb; Purpleleaf Willow Herb	Native	
<i>Epipactis helleborine</i>	Broad-Leaved Helleborine; Broadleaf Helleborine	Not Native	
<i>Equisetum arvense</i>	Common Horsetail; Field Horsetail	Native	
<i>Equisetum sylvaticum</i>	Wood Horsetail; Woodland Horsetail	Native	
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	Native	
<i>Erigeron annuus</i>	Eastern Daisy Fleabane	Native	
<i>Erigeron canadensis</i>	Horseweed; Canadian Horseweed; Canadian Fleabane	Native	
<i>Erigeron pulchellus</i>	Robin's Plantain	Native	
<i>Erigeron strigosus</i>	Daisy Fleabane	Native	
<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native	
<i>Erythronium albidum</i>	White Trout Lily; White Fawn Lily; White Dogtooth Violet	Native	
<i>Euonymus fortunei</i>	Purple Winter Creeper; Climbing Euonymus; Wintercreeper	Not Native	
<i>Eupatorium altissimum</i>	Tall Boneset	Native	
<i>Eupatorium coelestinum</i>	Mist Flower	Native	
<i>Eupatorium maculatum</i>	Joe Pye Weed	Native	
<i>Eupatorium perfoliatum</i>	Boneset	Native	

SCIENTIFIC NAME	COMMON NAME	ORIGIN	STATE LISTING
<i>Eupatorium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	
<i>Eupatorium serotinum</i>	Lateflowering Thoroughwort	Native	
<i>Euphorbia corollata</i>	Flowering Spurge	Native	
<i>Euphorbia cyparissias</i>	Cypress Spurge	Not Native	
<i>Euphorbia esula</i>	Leafy Spurge	Not Native	
<i>Eutrochium purpureum</i>	Sweet Joe-Pye Weed; Sweetscented Joe-Pye Weed	Native	
<i>Festuca arundinacea</i>	Tall Fescue	Not Native	
<i>Festuca subverticillata</i>	Nodding Fescue	Native	
<i>Filipendula rubra</i>	Queen of the Prairie	Native	T
<i>Fragaria virginiana</i>	Virginia Strawberry; Wild Strawberry	Native	
<i>Gaillardia pulchella</i>	Blanket Flower; Indian Blanket; Rose-Ring Gaillardia	Not Native	
<i>Galearis spectabilis</i>	Showy Orchis	Native	
<i>Galium aparine</i>	Annual Bedstraw; Common Bedstraw; Cleavers; Stickywilly	Native	
<i>Galium circaezans</i>	Liquorice Bedstraw	Native	
<i>Galium concinnum</i>	Shining Bedstraw	Native	
<i>Galium triflorum</i>	Fragrant Bedstraw; Sweet-scented Bedstraw	Native	
<i>Galium sp.</i>	Unknown Bedstraw	Undetermined	
<i>Gentiana alba</i>	Cream gentian	Native	
<i>Geranium maculatum</i>	Wild Geranium; Spotted Geranium	Native	
<i>Geum aleppicum</i>	Yellow Avens	Native	
<i>Geum canadense</i>	White Avens; Canada Avens	Native	
<i>Geum triflorum</i>	Prairie Smoke	Native	
<i>Geum vernum</i>	Spring Avens	Native	
<i>Geum sp.</i>	Unknown Avens	Undetermined	
<i>Glechoma hederacea</i>	Creeping Charlie	Not Native	
<i>Glyceria striata</i>	Fowl Mannagrass; Ridged Glyceria	Native	
<i>Glyceria maxima</i>	Reed Mannagrass; Great Mannagrass	Not Native	
<i>Gypsophila paniculata</i>	Baby's Breath	Not Native	
<i>Hackelia virginiana</i>	Stickseed	Native	
<i>Helenium autumnale</i>	Sneezeweed	Native	
<i>Helianthus annuus</i>	Wild Sunflower	Not Native	
<i>Helianthus giganteus</i>	Giant Sunflower; Tall Sunflower	Native	
<i>Helianthus grosseserratus</i>	Sawtooth Sunflower	Native	
<i>Helianthus mollis</i>	Downy Sunflower	Native	
<i>Helianthus rigidus</i>	Prairie Sunflower	Native	
<i>Helianthus strumosus</i>	Woodland Sunflower; Pale-Leaved Sunflower; Pale-Leaf Woodland Sunflower	Native	
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native	

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<i>Helianthus sp.</i>	Unknown Sunflower	Undetermined	
<i>Heliopsis helianthoides</i>	Oxeye; False Sunflower	Native	
<i>Hemerocallis fulva</i>	Orange Daylily; Ditch Lily	Not Native	
<i>Heracleum mantegazzianum</i>	Giant Hogweed	Not Native	
<i>Heracleum maximum</i>	Cow Parsnip	Native	
<i>Hesperis matronalis</i>	Dame's Rocket	Not Native	
<i>Heuchera x 'Amethyst Mist'</i>	Amethyst Mist Coral Bells	Not Native	
<i>Heuchera richardsonii</i>	Prairie Alumroot	Native	
<i>Hibiscus moscheutos</i>	Swamp Rose Mallow; Crimson-Eyed Rose Mallow	Native	
<i>Hieracium aurantiacum</i>	Orange Hawkweed	Not Native	
<i>Hordeum jubatum</i>	Foxtail Barley; Squirrel-Tail Grass	Native	
<i>Hosta sp.</i>	Unknown Hosta	Not Native	
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf; Eastern Waterleaf	Native	
<i>Hypericum ascyron</i>	Giant St. John's Wort	Native	
<i>Hypericum perforatum</i>	Common St. John's Wort	Not Native	
<i>Hypericum punctatum</i>	Spotted St. John's Wort	Native	
<i>Hypericum pyramidatum</i>	Great St. John's Wort	Native	
<i>Impatiens capensis</i>	Orange Jewelweed; Spotted Jewelweed; Spotted Touch-Me-Not	Native	
<i>Impatiens pallida</i>	Yellow Jewelweed; Pale Jewelweed; Pale Touch-Me-Not	Native	
<i>Iodanthus pinnatifidus</i>	Purple Rocket; Violet Rocket	Native	
<i>Iris versicolor</i>	Harlequin Blue Flag Iris	Not Native	
<i>Iris virginica</i>	Virginia Iris; Southern Blue Flag Iris	Native	
<i>Juncus dudleyi</i>	Dudley's Rush	Native	
<i>Juncus effusus</i>	Common Rush; Soft Rush	Native	S
<i>Juncus nodosus</i>	Knotted Rush	Native	
<i>Juncus tenuis</i>	Path Rush; Poverty Rush	Native	
<i>Juncus torreyi</i>	Torrey's Rush	Native	
<i>Juncus sp.</i>	Unknown Rush	Undetermined	
<i>Koeleria macrantha</i>	June Grass; Prairie June Grass	Native	
<i>Lactuca biennis</i>	Tall Blue Lettuce	Native	
<i>Lactuca canadensis</i>	Canada Lettuce; Wild Lettuce	Native	
<i>Lactuca floridana</i>	Woodland Lettuce	Native	
<i>Lactuca serriola</i>	Prickly Lettuce	Not Native	
<i>Laportea canadensis</i>	Wood Nettle	Native	
<i>Lathyrus odoratus</i>	Sweet Pea	Not Native	
<i>Leersia oryzoides</i>	Rice Cutgrass	Native	
<i>Leersia virginica</i>	Whitegrass; White Cutgrass; Virginia Cutgrass	Native	
<i>Leonurus cardiaca</i>	Motherwort	Not Native	
<i>Lepidium virginicum</i>	Virginia Peppergrass; Common Peppergrass	Native	

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<i>Lespedeza capitata</i>	Roundheaded bushclover	Native	
<i>Lespedeza cuneata</i>	Sericea Lespedeza	Not Native	
<i>Leucanthemum vulgare</i>	Oxeye Daisy	Not Native	
<i>Liatris pycnostachya</i>	Prairie Blazing Star	Native	
<i>Liatris spicata</i>	Dense Blazing Star	Native	
<i>Liparis liliifolia</i>	Twayblade	Native	
<i>Liparis loeselii</i>	Fen Orchid, Yellow Widelif Orchid; Bog Twayblade	Native	
<i>Lithospermum caroliniense</i>	Carolina Puccoon; Hairy Puccoon	Native	
<i>Lobelia cardinalis</i>	Cardinal Flower	Native	
<i>Lobelia inflata</i>	Indian Tobacco	Native	
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Native	
<i>Lolium perenne</i>	Perennial Rye Grass	Not Native	
<i>Lotus corniculatus</i>	Birds-foot Trefoil	Not Native	
<i>Ludwigia sp.</i>	Unknown Water Primrose	Undetermined	
<i>Lycopus americanus</i>	American Water Horehound; American Bugleweed	Native	
<i>Lysimachia nummularia</i>	Moneywort	Not Native	
<i>Lysimachia sp.</i>	Unknown Loosestrife	Undetermined	
<i>Lythrum alatum</i>	Winged Loosestrife	Native	
<i>Lythrum salicaria</i>	Purple Loosestrife	Not Native	
<i>Maianthemum racemosum</i>	Large False Solomon's Seal; False Spikenard; Solomon's Plume	Native	
<i>Maianthemum stellatum</i>	Little False Solomon's Seal; Starry Solomon's Seal; Starflower Solomon's Seal	Native	
<i>Medicago lupulina</i>	Black Medic	Not Native	
<i>Medicago sativa</i>	Alfalfa	Not Native	
<i>Melilotus alba</i>	White Sweet Clover	Not Native	
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Not Native	
<i>Mentha arvensis</i>	Wild Mint; Field Mint; Corn Mint	Native	
<i>Mentha spicata</i>	Spearmint; Common Mint	Not Native	
<i>Mertensia virginica</i>	Virginia Bluebells; Cowslip	Native	
<i>Microstegium vimineum</i>	Japanese stiltgrass	Not Native	
<i>Mimulus ringens</i>	Monkey Flower; Allegheny Monkeyflower; Square-Stemmed Monkeyflower	Native	
<i>Mirabilis nyctaginea</i>	Wild Four O'Clock	Native	
<i>Miscanthus sp.</i>	Unknown Silvergrass	Not Native	
<i>Moehringia lateriflora</i>	Bluntleaf Sandwort; Grove Sandwort	Native	
<i>Monarda didyma</i>	Scarlet Bee Balm 'Jacob Cline'	Not Native	
<i>Monarda fistulosa</i>	Wild Bergamot; Bee Balm	Native	
<i>Muhlenbergia mexicana</i>	Mexican Muhly; Leafy Satin Grass	Native	
<i>Nepeta cataria</i>	Catnip	Not Native	

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<i>Nymphaea odorata</i>	American White Water Lily; Fragrant Water Lily	Native	
<i>Oenothera biennis</i>	Evening Primrose	Native	
<i>Oenothera macrocarpa</i>	Bigfruit Evening Primrose; Missouri Evening Primrose; Ozark Sundrops	Native	
<i>Oenothera pilosella</i>	Prairie Sundrops	Native	
<i>Onoclea sensibilis</i>	Sensitive Fern	Native	
<i>Osmorhiza claytonii</i>	Sweet Cicely; Woolly Sweet Cicely	Native	
<i>Osmorhiza longistylis</i>	Anise Root; Sweet Anise	Native	
<i>Osmunda claytoniana</i>	Interrupted Fern	Native	
<i>Oxalis stricta</i>	Yellow Wood Sorrel; Yellow Oxalis	Native	
<i>Packera plattensis</i>	Prairie Ragwort; Prairie Groundsel	Native	
<i>Panax quinquefolius</i>	Ginseng; American Ginseng	Native	
<i>Panicum virgatum</i>	Switchgrass	Native	
<i>Parthenium integrifolium</i>	Wild Quinine; Feverfew	Native	
<i>Pastinaca sativa</i>	Wild Parsnip	Not Native	
<i>Penstemon digitalis</i>	Foxglove Beardtongue	Native	
<i>Penthorum sedoides</i>	Ditch Stonecrop	Native	
<i>Persicaria amphibia</i>	Longroot Smartweed; Water Smartweed	Native	
<i>Persicaria hydropiper</i>	Water Pepper; Marshpepper Knotweed	Not Native	
<i>Persicaria hydropiperoides</i>	False Water Pepper; Mild Waterpepper; Swamp Smartweed	Native	
<i>Persicaria punctata</i>	Dotted Smartweed	Native	
<i>Persicaria virginiana</i>	Jumpseed	Native	
<i>Phalaris arundinacea</i>	Reed Canary Grass	Not Native	
<i>Phleum pratense</i>	Timothy	Not Native	
<i>Phlox divaricata</i>	Blue Phlox; Wild Blue Phlox; Woodland Phlox	Native	
<i>Phlox paniculata</i>	Garden Phlox	Native	
<i>Phlox pilosa</i>	Prairie Phlox	Native	
<i>Phragmites australis</i>	Giant Reed Grass	Not Native	
<i>Phryma leptostachya</i>	Lopseed	Native	
<i>Phyla lanceolata</i>	Lanceleaf fogfruit; Frogfruit	Native	
<i>Physostegia virginiana</i>	Obedient Plant	Native	
<i>Phytolacca americana</i>	Pokeweed; Poke; Inkberry; Pigeonberry	Native	
<i>Pilea pumila</i>	Clearweed	Native	
<i>Plantago lanceolata</i>	Buckhorn Plantain	Not Native	
<i>Plantago major</i>	Common Plantain	Not Native	
<i>Plantago rugelii</i>	Rugel's Plantain; Blackseed Plantain	Native	
<i>Poa compressa</i>	Canada Bluegrass	Not Native	
<i>Poa nemoralis</i>	Wood Bluegrass	Not Native	
<i>Poa palustris</i>	Fowl Bluegrass	Native	
<i>Poa pratensis</i>	Kentucky Bluegrass	Not Native	

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<i>Poa trivialis</i>	Rough Bluegrass; Meadow Grass	Not Native	
<i>Poa</i> sp.	Unknown Bluegrass	Undetermined	
<i>Podophyllum peltatum</i>	Mayapple; Indian Apple; Wild Mandrake	Native	
<i>Polemonium reptans</i>	Jacob's Ladder	Native	
<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native	
<i>Polygonum aviculare</i>	Knotweed	Not Native	
<i>Polygonum cuspidatum</i>	Japanese Knotweed	Not Native	
<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	Native	
<i>Polygonum persicaria</i>	Spotted Ladythumb	Not Native	
<i>Polygonum virginianum</i>	Jumpseed	Native	
Polygonaceae	Unknown Knotweed	Undetermined	
<i>Potamogeton crispus</i>	Curly Pondweed; Curly-Leaf Pondweed	Not Native	
<i>Potamogeton natans</i>	Floating Pondweed; Broad-Leaved Pondweed	Native	
<i>Potentilla arguta</i>	Prairie Cinquefoil	Native	
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	Native	
<i>Potentilla recta</i>	Sulphur Cinquefoil	Not Native	
<i>Potentilla simplex</i>	Common Cinquefoil	Native	
<i>Prunella vulgaris</i>	Self-Heal; Heal-All	Native	
<i>Pycnanthemum pilosum</i>	Hairy Mountain Mint	Native	
<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	Native	
<i>Pycnanthemum virginianum</i>	Common Mountain Mint; Virginia Mountain Mint	Native	
<i>Pycnanthemum</i> sp.	Unknown Mountain Mint	Undetermined	
<i>Ranunculus abortivus</i>	Littleleaf Buttercup	Native	
<i>Ranunculus fascicularis</i>	Early Buttercup	Native	
<i>Ranunculus hispidus</i>	Bristly Buttercup	Native	
<i>Ranunculus sceleratus</i>	Cursed Buttercup; Celery-Leaved Buttercup	Native	
<i>Ranunculus septentrionalis</i>	Swamp Buttercup	Native	
<i>Ratibida columnifera</i>	Upright Prairie Coneflower; Long-Headed Coneflower	Native	
<i>Ratibida pinnata</i>	Yellow Coneflower; Gray-Headed Coneflower	Native	
<i>Rudbeckia fulgida</i>	Orange Coneflower	Native	
<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native	
<i>Rudbeckia laciniata</i>	Goldenglow; Cutleaf Coneflower	Native	
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan; Sweet Coneflower	Native	
<i>Rudbeckia triloba</i>	Brown-Eyed Susan	Native	
<i>Rumex acetosella</i>	Sheep Sorrel	Not Native	
<i>Rumex altissimus</i>	Tall Dock; Pale Dock	Native	
<i>Rumex crispus</i>	Curly Dock	Not Native	
<i>Rumex</i> sp.	Unknown Dock or Sorrel	Undetermined	
<i>Sagittaria latifolia</i>	Broadleaf Arrowhead	Native	

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<i>Salsola collina</i>	Slender Russian Thistle	Not Native	
<i>Sambucus canadensis</i>	Elderberry	Native	
<i>Sanguinaria canadensis</i>	Bloodroot	Native	
<i>Sanicula canadensis</i>	Canada Black Snakeroot	Native	
<i>Sanicula gregaria</i>	Clustered Black Snakeroot	Native	
<i>Sanicula odorata</i>	Common Black Snakeroot; Clustered Black Snakeroot	Native	
<i>Saponaria officinalis</i>	Common Soapwort; Bouncing Bet	Not Native	
<i>Schizachyrium scoparium</i>	Little Bluestem	Native	
<i>Schoenoplectus acutus</i>	Hard Stem Bulrush; Common Tule	Native	
<i>Schoenoplectus pungens</i>	Three-Square Bulrush; Common Threesquare	Native	
<i>Schoenoplectus tabernaemontani</i>	Soft Stem Bulrush; Great Bulrush	Native	
<i>Scirpus atrovirens</i>	Green Bulrush; Dark Green Bulrush	Native	
<i>Scirpus cyperinus</i>	Wool Grass	Native	
<i>Scirpus fluviatilis</i>	River Bulrush	Native	
<i>Scrophularia marilandica</i>	Figwort	Native	
<i>Scutellaria ovata</i>	Heartleaf Skullcap	Native	
<i>Securigera varia</i>	Crown Vetch	Not Native	
<i>Senecio pauperculus</i>	Ragwort	Native	
<i>Senecio plattensis</i>	Prairie Ragwort	Native	
<i>Senna hebecarpa</i>	Wild Senna; American Senna	Native	
<i>Setaria faberi</i>	Giant Foxtail; Nodding Foxtail; Japanese Bristlegrass	Not Native	
<i>Setaria glauca</i>	Yellow Foxtail	Not Native	
<i>Silene regia</i>	Royal Catchfly	Native	
<i>Silene stellata</i>	Starry Campion; Widow's Frill	Native	
<i>Silphium integrifolium</i>	Rosinweed	Native	
<i>Silphium laciniatum</i>	Compass Plant	Native	
<i>Silphium perfoliatum</i>	Cup Plant	Native	
<i>Silphium terebinthinaceum</i>	Prairie Dock	Native	S
<i>Sinapis arvensis</i>	Wild Mustard; Field Mustard; Charlock Mustard	Not Native	
<i>Sisyrinchium campestre</i>	Blue-Eyed Grass	Native	
<i>Sisyrinchium montanum</i>	American Blue-Eyed Grass; Mountain Blue-Eyed Grass; Strict Blue-Eyed Grass	Native	
<i>Smilacina racemosa</i>	False Solomon's Seal, False Spikenard	Native	
<i>Smilax ecirrhata</i>	Upright Carrion Flower	Native	
<i>Smilax sp.</i>	Unknown Catbrier	Undetermined	
<i>Solanum carolinense</i>	Horse Nettle; Caroline Horse Nettle	Native	
<i>Solanum dulcamara</i>	Bittersweet Nightshade; Climbing Nightshade	Not Native	
<i>Solidago canadensis</i>	Canada Goldenrod	Native	
<i>Solidago flexicaulis</i>	Zig-Zag Goldenrod; Broadleaf Goldenrod	Native	

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<i>Solidago gigantea</i>	Giant Goldenrod; Early Goldenrod	Native	
<i>Solidago graminifolia</i>	Grass-Leaved Goldenrod	Native	
<i>Solidago nemoralis</i>	Oldfield Goldenrod	Native	
<i>Solidago riddellii</i>	Riddle's Goldenrod	Native	
<i>Solidago rigida</i>	Stiff Goldenrod	Native	
<i>Solidago speciosa</i>	Showy Goldenrod	Native	
<i>Solidago ulmifolia</i>	Elm-Leaf Goldenrod	Native	
<i>Sonchus arvensis</i>	Perennial Sow Thistle	Not Native	
<i>Sonchus oleraceus</i>	Common Sow Thistle	Not Native	
<i>Sorghastrum nutans</i>	Indian Grass	Native	
<i>Sorghum bicolor</i>	Shattercane	Not Native	
<i>Sparganium eurycarpum</i>	Broadfruit Bur-Reed; Giant Bur-Reed	Native	
<i>Spartina pectinata</i>	Prairie Cordgrass	Native	
<i>Sphenopholis intermedia</i>	Slender Wedge Grass; Slender Wedgescale	Native	
<i>Sporobolus asper</i>	Rough Dropseed	Native	
<i>Sporobolus heterolepis</i>	Prairie Dropseed	Native	
<i>Stachys hyssopifolia</i>	Hyssop-Leaved Hedge Nettle	Native	
<i>Stachys palustris</i>	Woundwort	Native	
<i>Stachys tenuifolia</i>	Hedge Nettle	Native	
<i>Stellaria aquatica</i>	Giant Chickweed	Not Native	
<i>Stellaria graminea</i>	Grass-Leaved Chickweed; Lesser Stitchwort	Not Native	
<i>Stellaria media</i>	Chickweed; Common Chickweed	Not Native	
<i>Stellaria sp.</i>	Unknown Chickweed	Not Native	
<i>Symphyotrichum laeve</i>	Smooth Blue Aster	Native	
<i>Symphyotrichum lanceolatum</i>	Panicked Aster; Lance-Leaved Aster	Native	
<i>Symphyotrichum lateriflorum</i>	Calico Aster; One-Sided Aster; White Wood-land Aster; Starved Aster	Native	
<i>Symphyotrichum prenanthoides</i>	Crooked Stem Aster	Native	
<i>Symphyotrichum puniceum</i>	Purple-Stemmed Aster; Swamp Aster	Native	
<i>Symphyotrichum urophyllum</i>	Arrowleaf Aster; White Arrowleaf	Native	
<i>Taraxacum officinale</i>	Common Dandelion	Not Native	
<i>Teucrium canadense</i>	Canada Germander; Wood-Sage	Native	
<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	Native	
<i>Thalictrum dioicum</i>	Early Meadow Rue	Native	
<i>Thalictrum thalictroides</i>	Rue Anemone	Native	
<i>Thlaspi arvense</i>	Field Pennycress	Not Native	
<i>Torilis arvensis</i>	Field Hedge Parsley	Not Native	
<i>Torilis japonica</i>	Japanese Hedge Parsley	Not Native	
<i>Tradescantia bracteata</i>	Prairie Spiderwort	Native	
<i>Tradescantia ohimensis</i>	Ohio Spiderwort	Native	
<i>Tragopogon dubius</i>	Goat's Beard	Not Native	

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<i>Tribulus terrestris</i>	Goat's Head; Puncture Vine	Not Native	
<i>Trifolium aureum</i>	Golden Clover; Large Hop Trefoil	Not Native	
<i>Trifolium hybridum</i>	Alsike Clover	Not Native	
<i>Trifolium pratense</i>	Red Clover	Not Native	
<i>Trifolium repens</i>	White Clover	Not Native	
<i>Trillium cernuum</i>	Nodding Trillium	Native	
<i>Trillium erectum</i>	Purple Trillium	Native	
<i>Trillium recurvatum</i>	Prairie Trillium	Native	
<i>Trillium sp.</i>	Unknown Trillium	Undetermined	
<i>Triodanis perfoliata</i>	Venus' Looking Glass; Claspig Bellwort	Native	
<i>Triosteum perfoliatum</i>	Horse Gentian; Feverwort	Native	
<i>Typha angustifolia</i>	Narrowleaf Cattail	Not Native	
<i>Typha x glauca</i>	Hybrid Cattail	Not Native	
<i>Typha latifolia</i>	Broadleaf Cattail	Native	
<i>Urtica dioica</i>	Stinging Nettle	Native	
<i>Uvularia grandiflora</i>	Large-flowered Bellwort	Native	
<i>Verbascum x hybrida</i>	Verbascum 'Southern Charm'	Not Native	
<i>Verbascum blattaria</i>	Moth Mullein	Not Native	
<i>Verbascum thapsus</i>	Common Mullein	Not Native	
<i>Verbena hastata</i>	Blue Vervain	Native	
<i>Verbena stricta</i>	Hoary Vervain	Native	
<i>Verbena urticifolia</i>	White Vervain	Native	
<i>Vernonia fasciculata</i>	Common Ironweed; Prairie Ironweed; Smooth Ironweed	Native	
<i>Vernonia missurica</i>	Missouri Ironweed	Native	
<i>Veronica officinalis</i>	Common Speedwell	Not Native	
<i>Veronicastrum virginicum</i>	Culver's Root	Native	
<i>Vicia americana</i>	American Vetch; Purple Vetch	Native	
<i>Vinca minor</i>	Common Periwinkle	Not Native	
<i>Viola canadensis</i>	Canada Violet	Native	
<i>Viola pubescens</i>	Yellow Violet; Downy Yellow Violet	Native	
<i>Viola sororia</i>	Common Blue Violet	Native	
<i>Viola sp.</i>	Unknown Violet	Undetermined	
<i>Woodsia obtusa</i>	Blunt-Lobed Cliff Fern	Native	
<i>Xanthium strumarium</i>	Spiny Cocklebur	Not Native	
<i>Zizia aptera</i>	Heartleaf Alexanders	Native	
<i>Zizia aurea</i>	Golden Alexanders	Native	

Appendix D. Minnesota Department of Natural Resources Identification and Description of Practices to Avoid the Introduction or Movement of Invasive Species

Appendix D. Minnesota Department of Natural Resources Identification and Description of Practices to Avoid the Introduction or Movement of Invasive Species

It is the MnDNR's policy to limit the introduction of invasive species onto MnDNR managed lands and waters, limit their rate of geographical spread, and reduce their impact on high value resources.

The movement of equipment, organisms, and organic and inorganic material are potential pathways for the introduction or spread of invasive species. Each of these pathways should be considered and addressed to reduce risk associated with invasive species movement.

General Procedures for Intentional Movement of Equipment

1. Before arriving at a work site, inspect for and remove all visible plants, seeds, mud, soil, and animals from equipment.
2. Before leaving a work site, inspect for and remove all visible plants, seeds, mud, soil and animals from equipment.
3. After working on infested waters or waters known to harbor pathogens of concern, clean and dry equipment prior to using in locations not known to be infested with species or pathogens present at the last location visited.

Specific Procedures: Vehicles and Heavy Equipment

1. When possible maintain separate equipment to use on uninfested sites.
2. If working on multiple sites, work in uninfested sites before infested sites and clean equipment after use.
3. When working within a site with invasive species work in uninfested areas before infested areas and clean equipment after use.
4. Avoid entering site under wet conditions to minimize rutting and other soil disturbances.
5. Minimize area of soil disturbance with equipment.
6. Minimize number of access points to site.
7. When creating roads and trails minimize area of vegetation and soil disturbance.
8. Survey site before management treatment and treat or avoid moving equipment through existing patches of invasive species.
9. Conduct post management treatment monitoring and treat any responding invasive species.
10. Inspect all gear and remove vegetation, soil, and organisms prior to arriving and leaving site.
11. On sites that are known to be infested with species such as garlic mustard, spotted knapweed, leafy spurge, etc (species with small seed that can collect on cloth material) wash clothing after work is complete.
12. Carry boot brush in or on all vehicles and clean boots and clothing (in a controlled area) when leaving any site.
13. Use brush to clean gear and equipment such as chainsaws to remove loose soil and plant materials.
14. Avoid parking in patches of invasive species. When unavoidable, clean vehicle of all visible evidence of soil and vegetation when leaving site.
15. Brush off (hand remove) plants, seeds, mud, soil and animals from vehicles, including wheel wells, tracks, humps, blades, grills, etc.
16. Power spray equipment after hand removal if necessary to remove aquatic plant remnants (particularly curly-leaf pondweed, Eurasian watermilfoil, flowering rush, and purple loosestrife) and earthworms.

General Procedures for Intentional Movement of Organisms, Organic and Inorganic Material (including water, fish, plants, mulch, soil, gravel, rock)

1. Do not plant or introduce prohibited or regulated invasive species or other listed invasive species.
2. Do not transport water from infested waters, except by permit. When you must use water from an infested waters, do not drain this water or water that has come in contact with organisms from the infested waters, where it can run into another basin, river, or drain system that does not go to a treatment facility.
3. Use only mulch, soil, gravel, etc. that is invasive species-free or has a very low likelihood of having invasive species.

4. Do not transplant organisms or plant material from any waters with known populations of invasive aquatic invertebrates
5. Do not move soil, dredge material, or raw wood projects that may harbor invasive species from infested sites.

Specific Procedures: Re-vegetation (Aquatic and Terrestrial Plants)

1. Do not plant or introduce prohibited or regulated invasive species or other listed invasive species.
2. Inspect transplanted vegetation for signs of invasive species that may be attached to the vegetation and remove (i.e., other plant material and animals, etc.)
3. Re-vegetate with native species.
4. Preserve existing native vegetation. Peel topsoil that contains natives away from the work zone, stockpile and then replace it at the end of construction. This can help re-establish native species quickly.
5. If stockpiled invasive free topsoil isn't adequate for post-construction landscaping, and black dirt, sand or gravel must be purchased, purchase invasive species (i.e., worm) free material.
6. Purchase certified weed-free mulch.
7. Inspect outside of storage containers and materials for visible presence of invasive species.
8. If possible use seeding material, plants, fill, straw, gravel, and mulch that are certified as uninfested.
9. Monitor areas where materials are added for evidence of invasive species germination.
10. When possible minimize the use of outside materials.

Procedures to Minimize the Risk of Increasing the Dominance of Invasive Species on Site

1. Survey site before burning and treat or avoid moving through patches of invasive species before burn is conducted.
2. Avoid entering site under wet conditions to minimize rutting and other soil disturbances.
3. Conduct post-treatment monitoring and treat any invasive species (such as resprouts and germination).

Site Planning and Management

Construction activities that disturb the soil surface can expose dormant invasive species seed banks and create a growth medium that favors invasive plants. Landscaping can also introduce invasive plant species, as can maintenance activities such as mowing, grading, and stormwater pond maintenance.

Exercise site-level management to minimize the introduction, spread, and impact of invasive species. Site-level management shall include planning, implementation and evaluation procedures that reduce the risk of introduction, spread, and impact of invasive species. Procedures include identification of invasive species, monitoring for invasive species, developing strategies and actions to minimize spread and impact, implementing management actions, and evaluating success.

References

- Minnesota Department of Natural Resources Operational Order #113, Invasive Species, May 31, 2007.
- Minnesota Department of Natural Resources Invasive Species Operational Handbook, May 31, 2007.
- Minnesota Department of Natural Resources Standard Protocols for Invasive Species Prevention on Terrestrial Sites (Draft).

Appendix E. U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) Report for Iowa City

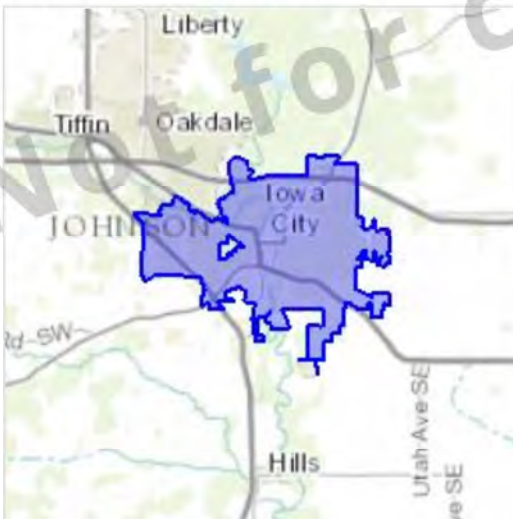
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Johnson County, Iowa



Local office

Illinois-Iowa Ecological Services Field Office

☎ (309) 757-5800

📠 (309) 757-5807

Illinois & Iowa Ecological Services Field Office

1511 47th Ave

Moline, IL 61265-7022

Not for consultation

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

¹ are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Clams

NAME	STATUS
Higgins Eye (pearlymussel) <i>Lampsilis higginsii</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5428	Endangered

Insects

NAME	STATUS
Rusty Patched Bumble Bee <i>Bombus affinis</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9383	Endangered

Flowering Plants

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/601	Threatened
Prairie Bush-clover <i>Lespedeza leptostachya</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4458	Threatened

Western Prairie Fringed Orchid *Platanthera praeclara* Threatened
No critical habitat has been designated for this species.
<https://ecos.fws.gov/ecp/species/1669>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

¹ and the Bald and Golden Eagle Protection Act².

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service

³. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>

- Conservation measures for birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data <http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The migratory birds species listed below are species of particular conservation concern (e.g. [Birds of Conservation Concern](#)) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the [AKN Histogram Tools](#) and [Other Bird Data Resources](#). To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
Acadian Flycatcher <i>Empidonax virescens</i>	Breeding
Bald Eagle <i>Haliaeetus leucocephalus</i> https://ecos.fws.gov/ecp/species/1626	Year-round
Bell's Vireo <i>Vireo bellii</i> https://ecos.fws.gov/ecp/species/9507	Breeding
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> https://ecos.fws.gov/ecp/species/9399	Breeding
Black-crowned Night-heron <i>Nycticorax nycticorax</i> https://ecos.fws.gov/ecp/species/6487	Breeding
Blue-winged Warbler <i>Vermivora pinus</i>	Breeding
Dickcissel <i>Spiza americana</i>	Breeding
Field Sparrow <i>Spizella pusilla</i>	Breeding

Henslow's Sparrow	<i>Ammodramus henslowii</i> https://ecos.fws.gov/ecp/species/3941	Breeding
Kentucky Warbler	<i>Oporornis formosus</i>	Breeding
Least Bittern	<i>Ixobrychus exilis</i> https://ecos.fws.gov/ecp/species/6175	Breeding
Loggerhead Shrike	<i>Lanius ludovicianus</i> https://ecos.fws.gov/ecp/species/8833	Breeding
Northern Flicker	<i>Colaptes auratus</i>	Year-round
Peregrine Falcon	<i>Falco peregrinus</i> https://ecos.fws.gov/ecp/species/8831	Breeding
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Breeding
Prothonotary Warbler	<i>Protonotaria citrea</i>	Breeding
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Year-round
Rusty Blackbird	<i>Euphagus carolinus</i>	Wintering
Short-eared Owl	<i>Asio flammeus</i> https://ecos.fws.gov/ecp/species/9295	Wintering
Swainson's Hawk	<i>Buteo swainsoni</i> https://ecos.fws.gov/ecp/species/1098	Breeding
Upland Sandpiper	<i>Bartramia longicauda</i> https://ecos.fws.gov/ecp/species/9294	Breeding
Willow Flycatcher	<i>Empidonax traillii</i> https://ecos.fws.gov/ecp/species/3482	Breeding

Wood Thrush *Hylocichla mustelina*

Breeding

Worm Eating Warbler *Helmitheros vermivorum*

Breeding

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAA/NCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAA/NCCOS models: the models were developed as part of the NOAA/NCCOS project: [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#). The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the [Northeast Ocean Data Portal](#), which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The [Avian Knowledge Network \(AKN\)](#) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest, survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the [Migratory Bird Programs AKN Histogram Tools](#) webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS [Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project](#) webpage.

Facilities

Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Not for consultation

<https://ecos.fws.gov/ipac/location/BU4TQ7CXO5A37EM2JF3DEEKCAA/resources>

Appendix F. Iowa Natural Areas Inventory State-Listed Species in Johnson County (Iowa DNR 2017b)

Appendix F. Iowa Natural Areas Inventory State-Listed Species in Johnson County (Iowa DNR 2017b)

State and Federal Status: E=Endangered; T=Threatened; S=Special Concern

Common Name	Scientific Name	Class	State Status	Federal Status
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BIRDS	S	
Barn Owl	<i>Tyto alba</i>	BIRDS	E	
King Rail	<i>Rallus elegans</i>	BIRDS	E	
Northern Harrier	<i>Circus cyaneus</i>	BIRDS	E	
Freckled Madtom	<i>Noturus nocturnus</i>	FISH	E	
Orangethroat Darter	<i>Etheostoma spectabile</i>	FISH	T	
Butterfly	<i>Ellipsaria lineolata</i>	FRESHWATER MUSSELS	T	
Creeper	<i>Strophitus undulatus</i>	FRESHWATER MUSSELS	T	
Fat Pocketbook	<i>Potamilus capax</i>	FRESHWATER MUSSELS		E
Higgin's-eye Pearly Mussel	<i>Lampsilis higginsii</i>	FRESHWATER MUSSELS	E	E
Pistolgrip	<i>Tritogonia verrucosa</i>	FRESHWATER MUSSELS	E	
Purple Wartyback	<i>Cyclonaias tuberculata</i>	FRESHWATER MUSSELS	T	
Round Pigtoe	<i>Pleurobema sintoxia</i>	FRESHWATER MUSSELS	E	
Sheepnose	<i>Plethobasus cyphus</i>	FRESHWATER MUSSELS	E	E
Yellow Sandshell	<i>Lampsilis teres</i>	FRESHWATER MUSSELS	E	
Byssus Skipper	<i>Problema byssus</i>	INSECTS	T	
Dion Skipper	<i>Euphyes dion</i>	INSECTS	S	
Pipevine Swallowtail	<i>Battus philenor</i>	INSECTS	S	
Purplish Copper	<i>Lycaena helloides</i>	INSECTS	S	
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	MAMMALS		T
Spotted Skunk	<i>Spilogale putorius</i>	MAMMALS	E	
Cleft Phlox	<i>Phlox bifida</i>	PLANTS (DICOTS)	S	
Cream Violet	<i>Viola striata</i>	PLANTS (DICOTS)	S	
Creeping Bush-clover	<i>Lespedeza repens</i>	PLANTS (DICOTS)	S	
Earleaf Foxglove	<i>Tomanthera auriculata</i>	PLANTS (DICOTS)	S	
Fineberry Hawthorn	<i>Crataegus chrysocarpa</i>	PLANTS (DICOTS)	S	
Frost Grape	<i>Vitis vulpina</i>	PLANTS (DICOTS)	S	
Hedge Nettle	<i>Stachys aspera</i>	PLANTS (DICOTS)	S	
Hill's Thistle	<i>Cirsium hillii</i>	PLANTS (DICOTS)	S	
Hortulan Plum	<i>Prunus hortulana</i>	PLANTS (DICOTS)	S	
Humped Bladderwort	<i>Utricularia gibba</i>	PLANTS (DICOTS)	S	
Lance-leaved Violet	<i>Viola lanceolata</i>	PLANTS (DICOTS)	S	
Limestone Rockcress	<i>Arabis divaricarpa</i>	PLANTS (DICOTS)	S	
Low Hairy Ground-cherry	<i>Physalis pubescens</i>	PLANTS (DICOTS)	S	
Muskroot	<i>Adoxa moschatellina</i>	PLANTS (DICOTS)	S	
Pearly Everlasting	<i>Anaphalis margaritacea</i>	PLANTS (DICOTS)	S	
Pinesap	<i>Monotropa hypopithys</i>	PLANTS (DICOTS)	T	

Common Name	Scientific Name	Class	State Status	Federal Status
Pink Milkwort	<i>Polygala incarnata</i>	PLANTS (DICOTS)	T	
Purple Cress	<i>Cardamine douglassii</i>	PLANTS (DICOTS)	S	
Ricebutton Aster	<i>Aster dumosus</i>	PLANTS (DICOTS)	E	
Sage Willow	<i>Salix candida</i>	PLANTS (DICOTS)	S	
Saskatoon Service-berry	<i>Amelanchier alnifolia</i>	PLANTS (DICOTS)	S	
Slender Copperleaf	<i>Acalypha gracilens</i>	PLANTS (DICOTS)	S	
Smooth Black-haw	<i>Viburnum prunifolium</i>	PLANTS (DICOTS)	S	
Spring Avens	<i>Geum vernum</i>	PLANTS (DICOTS)	S	
St. John's Wort	<i>Hypericum canadense</i>	PLANTS (DICOTS)	S	
Toothcup	<i>Rotala ramosior</i>	PLANTS (DICOTS)	S	
Water Shield	<i>Brasenia schreberi</i>	PLANTS (DICOTS)	S	
Water Starwort	<i>Callitriche heterophylla</i>	PLANTS (DICOTS)	S	
Waxleaf Meadowrue	<i>Thalictrum revolutum</i>	PLANTS (DICOTS)	E	
Winged Monkey Flower	<i>Mimulus alatus</i>	PLANTS (DICOTS)	T	
Wooly Milkweed	<i>Asclepias lanuginosa</i>	PLANTS (DICOTS)	T	
Broom Sedge	<i>Andropogon virginicus</i>	PLANTS (MONOCOTS)	S	
Bur-reed	<i>Sparganium angrocladum</i>	PLANTS (MONOCOTS)	S	
Bush's Sedge	<i>Carex bushii</i>	PLANTS (MONOCOTS)	S	
Capitate Spikerush	<i>Eleocharis olivacea</i>	PLANTS (MONOCOTS)	S	
Chapman Bluegrass	<i>Poa chapmaniana</i>	PLANTS (MONOCOTS)	S	
Crawe Sedge	<i>Carex crawei</i>	PLANTS (MONOCOTS)	S	
Eastern Prairie Fringed Orchid	<i>Platanthera leucophaea</i>	PLANTS (MONOCOTS)	E	T
Field Sedge	<i>Carex conoidea</i>	PLANTS (MONOCOTS)	S	
Glomerate Sedge	<i>Carex aggregata</i>	PLANTS (MONOCOTS)	S	
Grass Pink	<i>Calopogon oklahomensis</i>	PLANTS (MONOCOTS)	S	
Great Plains Ladies'-tresses	<i>Spiranthes magnicamporum</i>	PLANTS (MONOCOTS)	S	
Green Adder's Mouth	<i>Malaxis unifolia</i>	PLANTS (MONOCOTS)	S	
Minute Duckweed	<i>Lemna perpusilla</i>	PLANTS (MONOCOTS)	S	
Oval Ladies'-tresses	<i>Spiranthes ovalis</i>	PLANTS (MONOCOTS)	T	
Pale Green Orchid	<i>Platanthera flava</i>	PLANTS (MONOCOTS)	E	
Shallow Sedge	<i>Carex lurida</i>	PLANTS (MONOCOTS)	S	
Showy Lady's Slipper	<i>Cypripedium reginae</i>	PLANTS (MONOCOTS)	T	
Slender Fimbry	<i>Fimbristylis autumnalis</i>	PLANTS (MONOCOTS)	S	
Slender Ladies'-tresses	<i>Spiranthes lacera</i>	PLANTS (MONOCOTS)	T	
Slim-leaved Panic Grass	<i>Dichanthelium linearifolium</i>	PLANTS (MONOCOTS)	T	
Tall Cotton Grass	<i>Eriophorum angustifolium</i>	PLANTS (MONOCOTS)	S	
Wolf Spike-rush	<i>Eleocharis wolfii</i>	PLANTS (MONOCOTS)	S	
Crowfoot Clubmoss	<i>Lycopodium digitatum</i>	PLANTS (PTERIDOPHYTES)	S	
Ground Pine	<i>Lycopodium clavatum</i>	PLANTS (PTERIDOPHYTES)	E	

Common Name	Scientific Name	Class	State Status	Federal Status
Ledge Spikemoss	<i>Selaginella rupestris</i>	PLANTS (PTERIDOPHYTES)	S	
Limestone Oak Fern	<i>Gymnocarpium robertianum</i>	PLANTS (PTERIDOPHYTES)	S	
Northern Adder's-tongue	<i>Ophioglossum pusillum</i>	PLANTS (PTERIDOPHYTES)	S	
Oak Fern	<i>Gymnocarpium dryopteris</i>	PLANTS (PTERIDOPHYTES)	T	
Blanding's Turtle	<i>Emydoidea blandingii</i>	REPTILES	T	
Bullsnake	<i>Pituophis catenifer sayi</i>	REPTILES	S	
Common Musk Turtle	<i>Sternotherus odoratus</i>	REPTILES	T	
Eastern Massasauga	<i>Sistrurus catenatus</i>	REPTILES	E	T
Ornate Box Turtle	<i>Terrapene ornata</i>	REPTILES	T	
Smooth Green Snake	<i>Liophorophis vernalis</i>	REPTILES	S	

Appendix G. Center for Watershed Protection (CWP) Scorecard for Iowa City

CODE AND ORDINANCE WORKSHEET

About the Adobe Acrobat Form

Note: Acrobat Reader will not save the information entered into a form. Saving changes is only possible with a full version of Acrobat.

- The blue fields indicate that an answer is required.
- The gray fields are for notes and are not required, but highly recommended.
- The green fields will automatically summarize the points – no input is needed here.

To fill out a form:

1. Select the hand tool .
2. Position the pointer inside a form field, and click. The I-beam pointer allows you to type text. If your pointer appears as a pointing finger, you can select an item from a list (i.e., YES or NO).
3. After entering text or making a selection, press Tab to accept the form field change and go to the next or previous field.
4. Once you have filled in the appropriate form fields, do both of the following:
 - Choose File > Export > Form Data to save the form data in a separate FDF file. Type a filename and click save.
 - Print the form so that you have a hard copy for your records.

And Most Importantly...

Send CWP a copy! Let us know how you did!

The Code and Ordinance Worksheet allows an in-depth review of the standards, ordinances, and codes (i.e., the development rules) that shape how development occurs in your community. You are guided through a systematic comparison of your local development rules against the model development principles. Institutional frameworks, regulatory structures and incentive programs are included in this review. The worksheet consists of a series of questions that correspond to each of the model development principles. Points are assigned based on how well the current development rules agree with the site planning benchmarks derived from the model development principles.

The worksheet is intended to guide you through the first two steps of a local site planning roundtable.

Step 1: Find out what the Development Rules are in your community.

Step 2: See how your rules stack up to the Model Development Principles.

The homework done in these first two steps helps to identify which development rules are potential candidates for change.

PREPARING TO COMPLETE THE CODE AND ORDINANCE WORKSHEET

Two tasks need to be performed before you begin in the worksheet. First, you must identify all the development rules that apply in your community. Second, you must identify the local, state, and federal authorities that actually administer or enforce the development rules within your community. Both tasks require a large investment of time. The development process is usually shaped by a complex labyrinth of regulations, criteria, and authorities. A team approach may be helpful. You may wish to enlist the help of a local plan reviewer, land planner, land use attorney, or civil engineer. Their real-world experience with the development process is often very useful in completing the worksheet.

Identify the Development Rules

Gather the key documents that contain the development rules in your community. A list of potential documents to look for is provided in Table 1. Keep in mind that the information you may want on a particular development rule is not always found in code or regulation, and maybe hidden in supporting design manuals, review checklists, guidance document or construction specifications. In most cases, this will require an extensive search. Few communities include all of their rules in a single document. Be prepared to contact state and federal, as well as local agencies to obtain copies of the needed documents.

Table 1: Key Local Documents that will be Needed to Complete the COW
Zoning Ordinance
Subdivision Codes
Street Standards or Road Design Manual
Parking Requirements
Building and Fire Regulations/Standards
Stormwater Management or Drainage Criteria
Buffer or Floodplain Regulations
Environmental Regulations
Tree Protection or Landscaping Ordinance
Erosion and Sediment Control Ordinances
Public Fire Defense Masterplans
Grading Ordinance

Identify Development Authorities

Once the development rules are located, it is relatively easy to determine which local agencies or authorities are actually responsible for administering and enforcing the rules. Completing this step will provide you with a better understanding of the intricacies of the development review process and helps identify key members of a future local roundtable. Table 2 provides a simple framework for identifying the agencies that influence development in your community. As you will see, space is provided not only for local agencies, but for state and federal agencies as well. In some cases, state and federal agencies may also exercise some authority over the local development process (e.g., wetlands, some road design, and stormwater).

USING THE WORKSHEET: HOW DO YOUR RULES STACK UP TO THE MODEL DEVELOPMENT PRINCIPLES?

Completing the Worksheet

Once you have located the documents that outline your development rules and identified the authorities responsible for development in your community, you are ready for the next step. You can now use the worksheet to compare your development rules to the model development principles. The worksheet is presented at the end of this chapter. The worksheet presents seventy-seven site planning benchmarks. The benchmarks are posed as questions. Each benchmark focuses on a specific site design practice, such as the minimum diameter of cul-de-sacs, the minimum width of streets, or the minimum parking ratio for a certain land use. You should refer to the codes, ordinances, and plans identified in the first step to determine the appropriate development rule. The questions require either a yes or no response or specific numeric criteria. If your development rule agrees with the site planning benchmark, you are awarded points.

Calculating Your Score

A place is provided on each page of the worksheet to keep track of your running score. In addition, the worksheet is subdivided into three categories:

- Residential Streets and Parking Lots (Principles No. 1 - 10)
- Lot Development (Principles No. 11 - 16)
- Conservation of Natural Areas (Principles No. 17 - 22).

For each category, you are asked to subtotal your score. This **“Time to Assess”** allows you to consider which development rules are most in line with the site planning benchmarks and what rules are potential candidates for change.

The total number of points possible for all of the site planning benchmarks is 100. Your overall score provides a general indication of your community's ability to support environmentally sensitive development. As a general rule, if your overall score is lower than 80, then it may be advisable to systematically reform your local development rules. A score sheet is provided at end of the Code and Ordinance Worksheet to assist you in determining where your community's score places in respect to the Model Development Principles. Once you have completed the worksheet, go back and review your responses. Determine if there are specific areas that need improvement (e.g., development rules that govern road design) or if your development rules are generally pretty good. This review is key to implementation of better development: assessment of your current development rules and identification of impediments to innovative site design. This review also directly leads into the next step: a site planning roundtable process conducted at the local government level. The primary tasks of a local roundtable are to systematically review existing development rules and then determine if changes can or should be made. By providing a much-needed framework for overcoming barriers to better development, the site planning roundtable can serve as an important tool for local change.

Table 2: Local, State, and Federal Authorities Responsible for Development in Your Community

Development Responsibility		State/Federal	County	Town
Sets road standards	Agency:			
	Contact Name:			
	Phone No.:			
Review/approves subdivision plans	Agency:			
	Contact Name:			
	Phone No.:			
Establishes zoning ordinances	Agency:			
	Contact Name:			
	Phone No.:			
Establishes subdivision ordinances	Agency:			
	Contact Name:			
	Phone No.:			
Reviews/establishes stormwater management or drainage criteria	Agency:			
	Contact Name:			
	Phone No.:			
Provides fire protection and fire protection code enforcement	Agency:			
	Contact Name:			
	Phone No.:			
Oversees buffer ordinance	Agency:			
	Contact Name:			
	Phone No.:			
Oversees wetland protection	Agency:			
	Contact Name:			
	Phone No.:			
Establishes grading requirements or oversees erosion and sediment control program	Agency:			
	Contact Name:			
	Phone No.:			
Reviews/approves septic systems	Agency:			
	Contact Name:			
	Phone No.:			
Review/approves utility plans (e.g., water and sewer)	Agency:			
	Contact Name:			
	Phone No.:			
Reviews/approves forest conservation/tree protection plans	Agency:			
	Contact Name:			
	Phone No.:			

1. Street Width

What is the minimum pavement width allowed for streets in low density residential developments that have less than 500 daily trips (ADT)?

22 feet

If your answer is between **18-22 feet**, give yourself **4 points** • •

4

At higher densities are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?

NO

If your answer is **YES**, give yourself **3 points** • •

Notes on Street Width (include source documentation such as name of document, section and page #):

2. Street Length

Do street standards promote the most efficient street layouts that reduce overall street length?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on Street Length (include source documentation such as name of document, section and page #):

3. Right-of-Way Width

What is the minimum right of way (ROW) width for a residential street?

60 feet

If your answer is **less than 45 feet**, give yourself **3 points** • •

0

Does the code allow utilities to be placed under the paved section of the ROW?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on ROW Width (include source documentation such as name of document, section and page #):

Street width compliance prevented by city requirements for tree planting and utility infrastructure - would add 3 pts to score.

4. Cul-de-Sacs

What is the minimum radius allowed for cul-de-sacs?

39 feet

If your answer is **less than 35 feet**, give yourself **3 points** • •

If your answer is **36 feet to 45 feet**, give yourself **1 point** • •

1

Can a landscaped island be created within the cul-de-sac?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Are alternative turnarounds such as "hammerheads" allowed on short streets in low density residential developments?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on Cul-de-Sacs (include source documentation such as name of document, section and page #):

5. Vegetated Open Channels

Are curb and gutters required for most residential street sections?

YES

If your answer is **NO**, give yourself **2 points** • •

0

Are there established design criteria for swales that can provide stormwater quality treatment (i.e., dry swales, biofilters, or grass swales)?

NO

If your answer is **YES**, give yourself **2 points** • •

0

Notes on Vegetated Open Channel (include source documentation such as name of document, section and page #):

6. Parking Ratios

What is the minimum parking ratio for a professional office building (per 1000 ft² of gross floor area)?

3.3 spaces

If your answer is **less than 3.0 spaces**, give yourself **1 point** • •

0

What is the minimum required parking ratio for shopping centers (per 1,000 ft² gross floor area)?

4.0 spaces

If your answer is **4.5 spaces or less**, give yourself **1 point** • •

1

What is the minimum required parking ratio for single family homes (per home)?

1.0 spaces

If your answer is **less than or equal to 2.0 spaces**, give yourself **1 point** • •

1

Are your parking requirements set as maximum or median (rather than minimum) requirements?

NO

If your answer is **YES**, give yourself **2 points** • •

0

Notes on Parking Ratios (include source documentation such as name of document, section and page #):

7. Parking Codes

Is the use of shared parking arrangements promoted?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Are model shared parking agreements provided?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Are parking ratios reduced if shared parking arrangements are in place?

YES

If your answer is **YES**, give yourself **1 point** • •

1

If mass transit is provided nearby, is the parking ratio reduced?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Notes on Parking Codes (include source documentation such as name of document, section and page #):

8. Parking Lots

What is the minimum stall width for a standard parking space?

9.0 feet

If your answer is **9 feet or less**, give yourself **1 point** • •

1

What is the minimum stall length for a standard parking space?

18.0 feet

If your answer is **18 feet or less**, give yourself **1 point** • •

1

Are at least 30% of the spaces at larger commercial parking lots required to have smaller dimensions for compact cars?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Can pervious materials be used for spillover parking areas?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Notes on Parking Lots (include source documentation such as name of document, section and page #):

9. Structured Parking

Are there any incentives to developers to provide parking within garages rather than surface parking lots?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Notes on Structured Parking (include source documentation such as name of document, section and page #):

10. Parking Lot Runoff

Is a minimum percentage of a parking lot required to be landscaped?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Is the use of bioretention islands and other stormwater practices within landscaped areas or setbacks allowed?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Notes on Parking Lot Runoff (include source documentation such as name of document, section and page #):

• • **Time to Assess:** Principles 1 - 10 focused on the codes, ordinances, and standards that determine the size, shape, and construction of parking lots, roadways, and driveways in the suburban landscape. There were a total of **40** points available for Principles 1 - 10. What was your total score?

Subtotal Page 5 + Subtotal Page 6 + Subtotal Page 7 =

Where were your codes and ordinances most in line with the principles? What codes and ordinances are potential impediments to better development?

Parking requirements were closer in line with principles and only need modifications such as encouraging shared parking, reductions where public transportation is available, and including a minimum landscaping percentage for parking lots.

Minimum street requirements should be reduced, particularly for lower volume roads.

11. Open Space Design

Are open space or cluster development designs allowed in the community?

If your answer is **YES**, give yourself **3** points • •

If your answer is **NO**, skip to question No. 12

YES

3

Is land conservation or impervious cover reduction a major goal or objective of the open space design ordinance?

If your answer is **YES**, give yourself **1** point • •

YES

1

Are the submittal or review requirements for open space design greater than those for conventional development?

If your answer is **NO**, give yourself **1** point • •

YES

0

Is open space or cluster design a by-right form of development?

If your answer is **YES**, give yourself **1** point • •

NO

0

Are flexible site design criteria available for developers that utilize open space or cluster design options (e.g., setbacks, road widths, lot sizes)

If your answer is **YES**, give yourself **2** points • •

YES

2

Notes on Open Space Design (include source documentation such as name of document, section and page #):

12. Setbacks and Frontages

Are irregular lot shapes (e.g., pie-shaped, flag lots) allowed in the community?

If your answer is **YES**, give yourself **1 point** • •

YES

1

What is the minimum requirement for front setbacks for a one half (½) acre residential lot?

If your answer is **20 feet or less**, give yourself **1 point** • •

15.0

feet

1

What is the minimum requirement for rear setbacks for a one half (½) acre residential lot?

If your answer is **25 feet or less**, give yourself **1 point** • •

20.0

feet

1

What is the minimum requirement for side setbacks for a one half (½) acre residential lot?

If your answer is **8 feet or less**, give yourself **1 points** • •

5.0

feet

1

What is the minimum frontage distance for a one half (½) acre residential lot?

If your answer is **less than 80 feet**, give yourself **2 points** • •

45.0

feet

2

Notes on Setback and Frontages (include source documentation such as name of document, section and page #):

13. Sidewalks

What is the minimum sidewalk width allowed in the community?

If your answer is **4 feet or less**, give yourself **2 points** • •

5.0

feet

2

Are sidewalks always required on both sides of residential streets?

If your answer is **NO**, give yourself **2 points** • •

YES

0

Are sidewalks generally sloped so they drain to the front yard rather than the street?

If your answer is **YES**, give yourself **1 point** • •

NO

0

Can alternate pedestrian networks be substituted for sidewalks (e.g., trails through common areas)?

If your answer is **YES**, give yourself **1 point** • •

NO

0

Notes on Sidewalks (include source documentation such as name of document, section and page #):

Sidewalk width compliance prevented by ADA recommendations. Two points credited.

14. Driveways

What is the minimum driveway width specified in the community?

If your answer is **9 feet or less (one lane) or 18 feet (two lanes)**, give yourself **2 points** • •

0.0

feet

2

Can pervious materials be used for single family home driveways (e.g., grass, gravel, porous pavers, etc)?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Can a “two track” design be used at single family driveways?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Are shared driveways permitted in residential developments?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on Driveways (include source documentation such as name of document, section and page #):

15. Open Space Management

Skip to question 16 if open space, cluster, or conservation developments are not allowed in your community.

Does the community have enforceable requirements to establish associations that can effectively manage open space?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Are open space areas required to be consolidated into larger units?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Does a minimum percentage of open space have to be managed in a natural condition?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Are allowable and unallowable uses for open space in residential developments defined?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Can open space be managed by a third party using land trusts or conservation easements?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on Open Space Management (include source documentation such as name of document, section and page #):

16. Rooftop Runoff

Can rooftop runoff be discharged to yard areas?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Do current grading or drainage requirements allow for temporary ponding of stormwater on front yards or rooftops?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Notes on Rooftop Runoff (include source documentation such as name of document, section and page #):

Temporary ponding prohibited due to public health issues regarding disease transmission (Zika). Two points credited.

• • **Time to Assess:** Principles 11 through 16 focused on the regulations which determine lot size, lot shape, housing density, and the overall design and appearance of our neighborhoods. There were a total of **36** points available for Principles 11 - 16. What was your total score?

Subtotal Page 8 + Subtotal Page 9 + Subtotal Page 10 =

Where were your codes and ordinances most in line with the principles? What codes and ordinances are potential impediments to better development?

Open Space Design and Setbacks and Frontages scored well, but sidewalks, open space management, and rooftop runoff

17. Buffer Systems

Is there a stream buffer ordinance in the community?

YES

If your answer is **YES**, give yourself **2** points • •

2

If so, what is the minimum buffer width?

50.0 feet

If your answer is **75 feet or more**, give yourself **1** point • •

0

Is expansion of the buffer to include freshwater wetlands, steep slopes or the 100-year floodplain required?

YES

If your answer is **YES**, give yourself **1** point • •

1

Notes on Buffer Systems (include source documentation such as name of document, section and page #):

18. Buffer Maintenance

If you do not have stream buffer requirements in your community, skip to question No. 19

Does the stream buffer ordinance specify that at least part of the stream buffer be maintained with native vegetation?

NO

If your answer is **YES**, give yourself **2** points • •

0

Does the stream buffer ordinance outline allowable uses?

YES

If your answer is **YES**, give yourself **1** point

1

Does the ordinance specify enforcement and education mechanisms?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Notes on Buffer Systems (include source documentation such as name of document, section and page #):

Need to require natives plants in buffers.

19. Clearing and Grading

Is there any ordinance that requires or encourages the preservation of natural vegetation at residential development sites?

NO

If your answer is **YES**, give yourself **2 points** • •

0

Do reserve septic field areas need to be cleared of trees at the time of development?

NO

If your answer is **NO**, give yourself **1 point** • •

1

Notes on Buffer Maintenance (include source documentation such as name of document, section and page #):

20. Tree Conservation

If forests or specimen trees are present at residential development sites, does some of the stand have to be preserved?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Are the limits of disturbance shown on construction plans adequate for preventing clearing of natural vegetative cover during construction?

YES

If your answer is **YES**, give yourself **1 point** • •

1

Notes on Tree Conservation (include source documentation such as name of document, section and page #):

21. Land Conservation Incentives

Are there any incentives to developers or landowners to conserve non-regulated land (open space design, density bonuses, stormwater credits or lower property tax rates)?

NO

If your answer is **YES**, give yourself **2 points** • •

0

Is flexibility to meet regulatory or conservation restrictions (density compensation, buffer averaging, transferable development rights, off-site mitigation) offered to developers?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Notes on Land Cons. Incentives (include source documentation such as name of document, section and page #):

22. Stormwater Outfalls

Is stormwater required to be treated for quality before it is discharged?

NO

If your answer is **YES**, give yourself **2 points** • •

0

Are there effective design criteria for stormwater best management practices (BMPs)?

NO

If your answer is **YES**, give yourself **1 point** • •

0

Can stormwater be directly discharges into a jurisdictional wetland without pretreatment?

YES

If your answer is **NO**, give yourself **1 point** • •

0

Does a floodplain management ordinance that restricts or prohibits development within the 100-year floodplain exist?

YES

If your answer is **YES**, give yourself **2 points** • •

2

Notes on Stormwater Outfalls (include source documentation such as name of document, section and page #):

Code and Ordinance Worksheet

Subtotal Page 13

2

• • **Time to Assess:** Principles 17 through 22 addressed the codes and ordinances that promote (or impede) protection of existing natural areas and incorporation of open spaces into new development. There were a total of 24 points available for Principles 17 - 22. What was your total score?

Subtotal Page 11 **4** + Subtotal Page 12 **6** + Subtotal Page 13 **2** =

12

Where were your codes and ordinances most in line with the principles? What codes and ordinances are potential impediments to better development?

Better natural area and open space protections needed.

Three categories missed due to external compliance (sidewalks, ROW, and ponding) would increase score to 65 pts.

To determine final score, add up subtotal from each • **Time to Assess**

Principles 1 - 10 (Page 8)

21

Principles 11 - 16 (Page 11)

29

Principles 17 - 22 (Page 13)

12

TOTAL**62**

SCORING (A total of **100** points are available):**Your Community's Score**

90- 100	● ●	Congratulations! Your community is a real leader in protecting streams, lakes, and estuaries. Keep up the good work.
80 - 89	● ●	Your local development rules are pretty good, but could use some tweaking in some areas.
79 - 70	● ●	Significant opportunities exist to improve your development rules. Consider creating a site planning roundtable.
60 - 69	● ●	Development rules are inadequate to protect your local aquatic resources. A site planning roundtable would be very useful.
less than 60	● ●	Your development rules definitely are not environmentally friendly. Serious reform of the development rules is needed.

Appendix H. Native Species Lists for Ecological Restoration and Enhancement of Iowa City Natural Areas

Appendix H. Native Species Lists for Ecological Restoration and Enhancement of Iowa City Natural Areas

The native woody plants in the following two tables are indigenous to Iowa City and the surrounding ecological region. They are adapted to local conditions of soils, climate, diseases and competition. While some of these species may not have existed historically in the City, they are suitable for landscape plantings with the goal of visual screening, ecological buffering, and wildlife habitat enhancement.

Certain species are recommended because they have a high wildlife value as food (e.g., oak, serviceberry, aspen) or as nesting sites (conifers). These and other species are also attractive or have natural history interest because they are used by people or have interesting physical properties.

As a precaution, wild genetic stock within a 200-mile radius of the city is preferred over cultivars and more distant genetic strains. Some research suggests that wild strains benefit wildlife to a greater extent than cultivated strains of the same species. Some research also suggests that local genetic strains of certain species are better able to survive local soil, climate, disease and competitive conditions than more distant genetic strains. Additionally a few listed woody species are not indigenous to the area but are innocuous in landscape plantings, and fulfill particular landscape design needs.

Upland Native Trees (for multiple land cover types)

Common Name	Scientific Name	Notes
Black Maple	<i>Acer nigrum</i>	
Ohio Buckeye	<i>Aesculus glabra</i>	
River Birch	<i>Betula nigra</i>	moist areas
Paper Birch	<i>Betula papyrifera</i>	
Shagbark Hickory	<i>Carya ovata</i>	
Hackberry	<i>Celtis occidentalis</i>	
Honeylocust	<i>Gleditsia triacanthos</i>	
Kentucky Coffee-tree	<i>Gymnocladus dioica</i>	use male species if desired
Black Walnut	<i>Juglans nigra</i>	
Eastern Red Cedar	<i>Juniperus virginiana</i>	evergreen
Eastern White Pine	<i>Pinus strobus</i>	evergreen
Eastern Cottonwood	<i>Populus deltoides</i>	use male species if desired
Quaking Aspen	<i>Populus tremuloides</i>	
Black Cherry	<i>Prunus serotina</i>	
White Oak	<i>Quercus alba</i>	
Swamp White Oak	<i>Quercus bicolor</i>	
Bur Oak	<i>Quercus macrocarpa</i>	
Chinkapin Oak	<i>Quercus muhlenbergii</i>	
Red Oak	<i>Quercus rubra</i>	
Black Oak	<i>Quercus velutina</i>	
Black Willow	<i>Salix nigra</i>	wet areas
Eastern White Cedar	<i>Thuja occidentalis</i>	evergreen
Basswood	<i>Tilia americana</i>	

Upland Native Understory Trees, Shrubs and Vines (for multiple land cover types)

Common Name	Scientific Name	Form	Notes
Low Serviceberry	<i>Amelanchier humilis</i>	Shrub	
Smooth Serviceberry	<i>Amelanchier laevis</i>	Short Tree	
Black Chokeberry	<i>Aronia melanocarpa</i>	Shrub	
American Hornbeam	<i>Carpinus caroliniana</i>	Short Tree	
Pagoda Dogwood	<i>Cornus alternifolia</i>	Shrub	
Gray Dogwood	<i>Cornus racemosa</i>	Shrub	
Red-twig Dogwood	<i>Cornus sericea</i>	Shrub	
American Hazelnut	<i>Corylus americana</i>	Shrub	
Fireberry Hawthorn	<i>Crataegus chrysocarpa</i>	Short Tree	
Bush Honeysuckle	<i>Diervilla lonicera</i>	Shrub	
Witch Hazel	<i>Hamamelis virginiana</i>	Shrub	
Prairie Crab Apple	<i>Malus ioensis</i>	Shrub	
Ironwood	<i>Ostrya virginiana</i>	Short Tree	
Ninebark	<i>Physocarpus opulifolius</i>	Shrub	
Wild Plum	<i>Prunus americana</i>	Shrub	
Chokecherry	<i>Prunus virginiana</i>	Shrub	
Smooth Sumac	<i>Rhus glabra</i>	Shrub	
Smooth Rose	<i>Rosa blanda</i>	Shrub	
Pussy willow	<i>Salix discolor</i>	Shrub	wet areas
Prairie Willow	<i>Salix humilis</i>	Shrub	
American Black Elderberry	<i>Sambucus nigra ssp canadensis</i>	Shrub	
Nannyberry	<i>Viburnum lentago</i>	Shrub	moist areas
Highbush Cranberry	<i>Viburnum opulus var. americanum (trilobum)</i>	Shrub	
Riverbank Grape	<i>Vitis riparia</i>	Vine	

The plant species included in the following seed lists are indigenous to Iowa City and the surrounding ecological region. They are adapted to local conditions of soils, climate, diseases and competition. As mentioned above regarding recommended woody plantings, “wild-type” seed with a genetic origin from within a 200-mile radius of the city is preferred over cultivars and more distant genetic strains. Site-specific factors must be considered to develop seed mixes (and/or live plant lists) to achieve particular project goals. Also, cover crop is not included in these seed lists; cover crop species and rate will depend on site conditions and timing of seeding.

Dry-Mesic Forest/Woodland Seed List (enhancement overseeding)

Common Name	Scientific Name	Notes
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	
Rosy Sedge	<i>Carex rosea</i>	graminoid
Honewort	<i>Cryptotaenia canadensis</i>	
Pointed-leaved Tick-trefoil	<i>Desmodium glutinosum</i>	legume
Bottlebrush Grass	<i>Elymus hystrix</i>	graminoid
Virginia Wild Rye	<i>Elymus virginicus</i>	graminoid
Purple Joe-pye Weed	<i>Eupatorium purpureum</i>	
Wild Geranium	<i>Geranium maculatum</i>	
Woodland Sunflower	<i>Helianthus strumosus</i>	
Sweet Cicely	<i>Osmorhiza claytonii</i>	
Giant Solomon's Seal	<i>Polygonatum biflorum</i>	
Jumpseed	<i>Polygonum virginianum</i>	
Clustered Black Snakeroot	<i>Sanicula gregaria</i>	
Common False Solomon's Seal	<i>Smilacina racemosa</i>	
Elm-leaved goldenrod	<i>Solidago ulmifolia</i>	
Early Meadow-rue	<i>Thalictrum dioicum</i>	
Rue Anemone	<i>Thalictrum thalictroides</i>	

Mesic Forest Seed List (enhancement overseeding)

Common Name	Scientific Name	Notes
Canada Columbine	<i>Aquilegia canadensis</i>	
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	
Long-beaked sedge	<i>Carex spengelii</i>	graminoid
Virginia Wild Rye	<i>Elymus virginicus</i>	graminoid
Woodland Sunflower	<i>Helianthus strumosus</i>	
Virginia Waterleaf	<i>Hydrophyllum virginianum</i>	
Common False Solomon's Seal	<i>Smilacina racemosa</i>	
Zig-zag Goldenrod	<i>Solidago flexicaulis</i>	
Early Meadow-rue	<i>Thalictrum dioicum</i>	

Savanna Seed List (ground layer, relatively short, some shade tolerance)

Common Name	Scientific Name	Notes
Lead Plant	<i>Amorpha canescens</i>	legume
Thimbleweed	<i>Anemone virginiana</i>	
Wild Columbine	<i>Aquilegia canadensis</i>	
Butterfly Milkweed	<i>Asclepias tuberosa</i>	
Canadian Milk Vetch	<i>Astragalus canadensis</i>	legume
Side-oats Grama	<i>Bouteloua curtipendula</i>	graminoid
Bicknell's Sedge	<i>Carex bicknellii</i>	graminoid
Plains Oval Sedge	<i>Carex brevior</i>	graminoid
Partridge Pea	<i>Chamaecrista fasciculata</i>	legume
Prairie Coreopsis	<i>Coreopsis palmata</i>	
Purple Prairie Clover	<i>Dalea purpurea</i>	legume
Canada Wild Rye	<i>Elymus canadensis</i>	graminoid
Bottlebrush Grass	<i>Elymus hystrix</i>	graminoid
Virginia Wild Rye	<i>Elymus virginicus</i>	graminoid
Early Sunflower	<i>Heliopsis helianthoides</i>	
Prairie Alumroot	<i>Heuchera richardsonii</i>	
Round-headed Bush Clover	<i>Lespedeza capitata</i>	legume
Cylindrical Blazing Star	<i>Liatris cylindracea</i>	
Wild Bergamot	<i>Monarda fistulosa</i>	
Common Evening Primrose	<i>Oenothera biennis</i>	
Common Mountain Mint	<i>Pycnanthemum virginianum</i>	
Upright Prairie Coneflower	<i>Ratibida columnifera</i>	
Black-eyed Susan	<i>Rudbeckia hirta</i>	
Little Bluestem	<i>Schizachyrium scoparium</i>	graminoid
Starry False Solomon's Seal	<i>Smilacina stellata</i>	
Gray Goldenrod	<i>Solidago nemoralis</i>	
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	
Side-flowering Aster	<i>Symphyotrichum lateriflorum</i>	
Ohio spiderwort	<i>Tradescantia ohiensis</i>	
Hoary Vervain	<i>Verbena stricta</i>	
Golden Alexanders	<i>Zizia aurea</i>	

Prairie Seed List

Common Name	Scientific Name	Notes
Big Bluestem	<i>Andropogon gerardii</i>	graminoid
Lead Plant	<i>Amorpha canescens</i>	legume
Canada Anemone	<i>Anemone canadensis</i>	
Common Milkweed	<i>Asclepias syriaca</i>	
Butterfly Milkweed	<i>Asclepias tuberosa</i>	
Whorled Milkweed	<i>Asclepias verticillata</i>	
Canadian Milk Vetch	<i>Astragalus canadensis</i>	legume
Side-oats Grama	<i>Bouteloua curtipendula</i>	graminoid
Bicknell's Sedge	<i>Carex bicknellii</i>	graminoid
Plains Oval Sedge	<i>Carex brevior</i>	graminoid
Partridge Pea	<i>Chamaecrista fasciculata</i>	legume
Prairie Coreopsis	<i>Coreopsis palmata</i>	
Purple Prairie Clover	<i>Dalea purpurea</i>	legume
Showy Tick Trefoil	<i>Desmodium canadense</i>	legume
Purple Coneflower	<i>Echinacea purpurea</i>	
Canada Wild Rye	<i>Elymus canadensis</i>	graminoid
Early Sunflower	<i>Heliopsis helianthoides</i>	
Prairie Alumroot	<i>Heuchera richardsonii</i>	
Round-headed Bush Clover	<i>Lespedeza capitata</i>	legume
Cylindrical Blazing Star	<i>Liatris cylindracea</i>	
Wild Bergamot	<i>Monarda fistulosa</i>	
Common Evening Primrose	<i>Oenothera biennis</i>	
Common Mountain Mint	<i>Pycnanthemum virginianum</i>	
Upright Prairie Coneflower	<i>Ratibida columnifera</i>	
Yellow Coneflower	<i>Ratibida pinnata</i>	
Black-eyed Susan	<i>Rudbeckia hirta</i>	
Little Bluestem	<i>Schizachyrium scoparium</i>	graminoid
Stiff Goldenrod	<i>Solidago rigida</i>	
Indian Grass	<i>Sorghastrum nutans</i>	graminoid
Smooth Blue Aster	<i>Symphyotrichum laeve</i>	
Side-flowering Aster	<i>Symphyotrichum lateriflorum</i>	
Ohio spiderwort	<i>Tradescantia ohiensis</i>	
Hoary Vervain	<i>Verbena stricta</i>	
Heartleaf Alexanders	<i>Zizia aptera</i>	

Herbaceous Lowland Seed List

Common Name	Scientific Name	Notes
Canada Anemone	<i>Anemone canadensis</i>	
Swamp Milkweed	<i>Asclepias incarnata</i>	
New England Aster	<i>Aster novae-angliae</i>	
Nodding Beggartick	<i>Bidens cernua</i>	
Bristly Sedge	<i>Carex comosa</i>	graminoid
Prickly Sedge	<i>Carex stipata</i>	graminoid
Fox Sedge	<i>Carex vulpinoidea</i>	graminoid
Boneset	<i>Eupatorium perfoliatum</i>	
Fowl Manna Grass	<i>Glyceria striata</i>	graminoid
Autumn Sneezeweed	<i>Helenium autumnale</i>	
Spotted Jewelweed	<i>Impatiens capensis</i>	
Blue Flag Iris	<i>Iris versicolor</i>	
Torrey's Rush	<i>Juncus torreyi</i>	graminoid
Great Blazing Star	<i>Liatris pycnostachya</i>	
Great Lobelia	<i>Lobelia siphilitica</i>	
Wild Mint	<i>Mentha arvensis</i>	
Switchgrass	<i>Panicum virgatum</i>	graminoid
Fowl Bluegrass	<i>Poa palustris</i>	graminoid
Virginia Mountain Mint	<i>Pycnanthemum virginianum</i>	
Prairie Cordgrass	<i>Spartina pectinata</i>	graminoid; best planted as live material
Wool Grass	<i>Scirpus cyperinus</i>	graminoid
Grass-Leaved Goldenrod	<i>Solidago graminifolia</i>	
Blue Vervain	<i>Verbena hastata</i>	
Golden Alexanders	<i>Zizia aurea</i>	

**Appendix I. City-wide Prioritization,
Phasing and Costs of Natural Resources
Management**

Appendix I. City-wide Prioritization, Phasing and Costs of Natural Resources Management

Iowa City Natural Areas (16-0777)

Prioritization, Phasing & Opinions of Probable Cost

Scenario: ~\$100K/yr for 10 yrs (assumes City contribution \$75K/yr, remaining \$25K/yr from grants or other sources); costs assume 2% annual inflation

= top priority site

= initial restoration & management

= perpetual management (avg. \$300/ac/yr)

= blended initial resto & mgmt and perpetual mgmt

Prioritization Rationale and Natural Areas/Parks	Natural Area Investments (ac)	Estimated Initial Resto & Mgmt Costs for Entire Site	Year										Total Cost	Avg. Annual Management Cost per Acre	Notes
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027			
Grand Totals (from prioritization categories 1-4 below)	902.1	\$ 4,195,166	\$ 100,292	\$ 102,298	\$ 115,581	\$ 114,225	\$ 116,509	\$ 118,840	\$ 121,216	\$ 123,641	\$ 126,114	\$ 128,636	\$ 1,167,352	\$ 1,294	
1. Manage areas where already City NR investments															
Ryerson's Woods (estimated acres of brushed forest & restored prairie)	8.0	\$ 17,745	\$ 5,856	\$ 5,973	\$ 6,092	\$ 2,547	\$ 2,598	\$ 2,650	\$ 2,703	\$ 2,757	\$ 2,812	\$ 2,868	\$ 36,855	\$ 4,607	heavy lifting done, so 3-yr costs halved
Hickory Hill Park (2017 REAP grant areas)	36.0	\$ -	REAP	REAP	\$ 11,236	\$ 11,461	\$ 11,690	\$ 11,924	\$ 12,163	\$ 12,406	\$ 12,654	\$ 12,907	\$ 96,441	\$ 2,679	
Iowa City Kickers Soccer Park (incl. Oxeye Prairie)	51.5	\$ 179,090	\$ 8,954	\$ 9,134	\$ 9,316	\$ 9,503	\$ 9,693	\$ 9,886	\$ 10,084	\$ 10,286	\$ 10,492	\$ 10,701	\$ 98,049	\$ 1,903	initial resto & mgmt required through at least 2037
Sand Prairie	37.2	\$ 192,252	\$ 9,613	\$ 9,805	\$ 10,001	\$ 10,201	\$ 10,405	\$ 10,613	\$ 10,825	\$ 11,042	\$ 11,263	\$ 11,488	\$ 105,255	\$ 2,829	initial resto & mgmt required through at least 2037
Sycamore Greenway	68.9	\$ 351,103	\$ 17,555	\$ 17,906	\$ 18,264	\$ 18,630	\$ 19,002	\$ 19,382	\$ 19,770	\$ 20,165	\$ 20,569	\$ 20,980	\$ 192,224	\$ 2,789	initial resto & mgmt required through at least 2037
Terry Trueblood Recreation Area	94.7	\$ 606,788	\$ 30,339	\$ 30,946	\$ 31,565	\$ 32,196	\$ 32,840	\$ 33,497	\$ 34,167	\$ 34,850	\$ 35,547	\$ 36,258	\$ 332,208	\$ 3,507	initial resto & mgmt required through at least 2037
Waterworks Prairie Park	158.4	\$ 559,502	\$ 27,975	\$ 28,535	\$ 29,105	\$ 29,687	\$ 30,281	\$ 30,887	\$ 31,505	\$ 32,135	\$ 32,777	\$ 33,433	\$ 306,320	\$ 1,934	initial resto & mgmt required through at least 2037
Landfill Wetland	8.9	\$ 36,763											\$ -	\$ -	
Rohret Road Prairie	0.8	\$ 4,060											\$ -	\$ -	
Whispering Meadows Wetlands	10.1	\$ 51,134											\$ -	\$ -	
420th St Wetland	10.8	\$ 28,863											\$ -	\$ -	
ESRC Biocells	0.6	\$ 4,240											\$ -	\$ -	
Fire Station 4 Biocell	0.1	\$ 2,000											\$ -	\$ -	
Riverfront Crossings Park	18.0	\$ -											\$ -	\$ -	
Brookland Park	1.3	\$ 8,903											\$ -	\$ -	
Kiwanis Park	5.3	\$ 29,698											\$ -	\$ -	
Makada Wetland Mitigation	3.8	\$ 14,639											\$ -	\$ -	
Subtotals	514.4	\$ 2,086,779	\$ 100,292	\$ 102,298	\$ 115,581	\$ 114,225	\$ 116,509	\$ 118,840	\$ 121,216	\$ 123,641	\$ 126,114	\$ 128,636	\$ 1,167,352	\$ 2,269	
2. Address early invasions of highest quality natural areas															
Ryerson's Woods (remainder of park's natural areas)	40.3	\$ 196,432											\$ -	\$ -	
Hickory Hill Park (remainder of park's natural areas)	133.5	\$ 729,117											\$ -	\$ -	
Subtotals	173.7	\$ 925,549	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3. Conduct invasives management at sites with water component															
Peninsula Park	89.8	\$ 520,175											\$ -		
City Park	5.7	\$ 29,150											\$ -		
Snyder Creek Greenway	9.7	\$ 72,200											\$ -		
Terrell Mill Park	20.9	\$ 125,178											\$ -		
Rec Center Greenway	0.6	\$ 3,900											\$ -		
Riverfront Crossings Greenway	2.1	\$ 15,105											\$ -		
Court Hill Park	3.1	\$ 17,499											\$ -		
Creekside Park	0.3	\$ 2,800											\$ -		
Glendale Park	0.3	\$ 2,860											\$ -		
Subtotals	132.4	\$ 788,867	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
4. Resto/enhancement of remaining natural areas, prioritizing "Go Wild" parks followed by other non-park natural areas															
Hunters Run Park (Go Wild)	22.4	\$ 94,851											\$ -		
Sturgis Ferry Park (Go Wild)	8.0	\$ 42,997											\$ -		
Bristol Drive Woodlands	19.8	\$ 72,336											\$ -		
Scott Park	16.1	\$ 82,440											\$ -		
Benton Hill Park	2.8	\$ 19,875											\$ -		
Hickory Trail Park	1.7	\$ 12,375											\$ -		
Crandic Park	1.1	\$ 5,040											\$ -		
Lindemann Trail Greenway	1.4	\$ 9,527											\$ -		
Longfellow Nature Trail	1.7	\$ 10,494											\$ -		
Normandy Dr/Ashton House	0.8	\$ 6,650											\$ -		
Duck Creek Detention	0.7	\$ 5,440											\$ -		
Trolley Track Greenway	0.2	\$ 2,750											\$ -		
Villa Park	0.0	\$ -											\$ -		
Walden Detention Area	0.6	\$ 4,455											\$ -		
Wetherby Park	1.6	\$ 7,896											\$ -		
Windsor Ridge Park	2.7	\$ 16,846											\$ -		
Subtotals	81.6	\$ 393,972	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		