




Minnesota River Valley
Natural and Cultural
Systems Plan

 CITY OF
BLOOMINGTON
MINNESOTA

August 6, 2018

MINNESOTA RIVER VALLEY

NATURAL AND CULTURAL SYSTEMS PLAN

The Minnesota River Valley Natural and Cultural Systems Plan focuses on lands in the Minnesota River Valley owned by the City of Bloomington. The City maintains an up-to-date version on its website: BloomingtonMN.gov. For further information contact the Planning Division, Bloomington Civic Plaza, 1800 West Old Shakopee Road, Bloomington MN 55431-3027, PH 952-563-8920.



Contacts and Credits

Thanks to Steve Thomforde and Todd Rexine of Great River Greening. Many of this plan's recommended best practices, photos, species lists, and habitat assessments are based on their field work and research conducted in 2017.

Planning Commission

July 2018

Kalli Bennett	Tom Goodrum	Jon Solberg	Kevin Swanson	*Joanna Goltzman
*Alba Nelly Korman	*Paige Rohman	**Budd Batterson	**Leone Snyder	**Kelley Spiess

*Term began July 12, 2018 **Term ended June 30, 2018

Sustainability Commission

July 2018

Tim Sandry	Sherie Bartsh	Rob Bouta	Paul Erdmann	Steve Flagg
John Jaimez	Dwayne Lowman	Joseph Strommen	Deanna White	

Special thanks is given to the Ecolands Volunteer Group, which is a subgroup of the Sustainability Commission, for their professional advice and guidance. Ecolands volunteers include Caleb Ashling, Rob Bouta, Paul Erdmann, Tim Greenleaf, Brian Henning, Samantha Mallinger, Jim Parker, Laura Perreault, Dave Rickert, Steve Thomforde, and Kara VanKleek

Parks, Arts, and Recreation Commission

July 2018

Lenny Schmitz	Dave Rickert	Maxwell Collins	Tim Greenleaf	AnneMarie Terpstra
Cynthia Deal	Laura Perreault			

City Staff Advisory Committee

July 2018

Randy Quale, <i>Manager of Parks and Recreation</i>	Dave Hanson, <i>Assistant Maintenance Superintendent</i>	Mark Morrison, <i>Recreation Supervisor</i>	Mary Hurliman, <i>Deputy Director of Public Works</i>	Julie Farnham, <i>Senior Planner</i>	Shawn James, <i>Planner</i>
--	---	--	--	---	--------------------------------

Disclaimer: The MN River Valley Natural and Cultural Systems Plan includes original content as well as content “borrowed” from other plans and reports generated previously by the City of Bloomington, MnDNR, USFWS, Hennepin County and others. The City would like to express our sincere appreciation for all the work done previously by others to enrich this strategic plan document.

CONTENTS

[Contacts and Credits](#)

[Foreward](#)

1. Introduction

- [1.1 Purpose](#)
- [1.2 Applicability](#)
- [1.3 Context](#)
- [1.4 Other River Valley Plans](#)
- [1.5 Plan Organization and Approach](#)

2. Historical Perspective

- [2.1 Pre-settlement Vegetation](#)
- [2.2 Cultural History](#)
- [2.3 Aerial Photos](#)
- [2.4 Land and Natural Resource Surveys](#)

3. Current Conditions

- [3.1 Archeological and Cultural Resources](#)
- [3.2 Ecological Communities and Habitat](#)
- [3.3 Resource Threats](#)

4. Resource Management

- [4.1 Goals](#)
- [4.2 Objectives](#)
- [4.3 Strategies](#)
- [4.4 Priorities](#)
- [4.5 Priority Areas](#)

5. Education

- [5.1 Expanding Awareness](#)
- [5.2 Creating Stewards](#)
- [5.3 Sharing Information about Management Goals](#)

6. Administrative Considerations

- [6.1 Flora and Fauna Species Protections](#)
- [6.2 Cultural Resource Regulations and Protections](#)

7. Implementation

- [7.1 Partners](#)
- [7.2 City Regulations](#)
- [7.3 Funding Sources](#)

LIST OF FIGURES

1. Introduction

Figure 1.1: City-owned Land in the River Valley

2. Historical Perspective

Figure 2.1: Abbreviated Natural & Cultural History Timeline

Figure 2.2: Ecological Communities Surveyed in the 2007 NRI

Figure 2.3: Quality Rating of Natural Communities

Figure 2.4: Ecologically Significant Natural Areas

Figure 2.5: Natural Areas with the Potential for Rare Species

3. Current Conditions

Figure 3.1: Known Cultural Sites in the River Valley

Figure 3.2: River Valley Uplands and Lowlands

Figure 3.3: River Valley Waterways and Stormwater Inlets/Outlets

4. Resource Management

Figure 4.1: Ownership and Land Management in the River Valley

Figure 4.2: Inter-relationship of Flora Management Strategies

Figure 4.3: Habitat Assessment Areas

Figure 4.4: River Valley Priority Management Areas

5. Education

Figure 5.1: Existing Trailheads and Trails

6. Implementation

Figure 6.1: Overlay Districts in the River Valley

Figure 6.2: Class I and Class II Historic Sites

LIST OF TABLES

4. Resource Management

Table 4.1: Management Costs

Table 4.2: Priority Areas Scoring

APPENDICES

- A. [Habitat Assessment](#)
- B. [Management Strategies](#)
- C. [Undesirable Species Management Protocols](#)
- D. [Recommended Species](#)
- E. [Flora Species List](#)
- F. [Fauna Species List](#)
- G. [MLCCS Dichotomous Key](#)
- H. [Known Cultural Resources](#)
- I. [Hennepin County Rare & Protected Species](#)

FOREWARD

I pulled the last clump of garlic mustard from the soil, and as I checked for others, I noticed something fascinating. Growing beneath the weedy two-foot-tall garlic mustard plants, struggling for light, water, and nutrients, was another layer of vegetation. I saw a tiny oak tree, baby jack-in-the-pulpits, and many more garlic mustard seedlings. Left unchecked, the garlic mustard will suffocate the oak tree and wildflowers. The majestic bur oaks that once graced the Minnesota River upland bluffs in sweeping savannas are declining. Many acorns sprout into oak seedlings, but never survive to maturity.

The battle between good and bad plants wages far beyond that little patch of garlic mustard. It continues daily, throughout Bloomington, and around the world. Human activity affects our environment, which in turn affects our lives in subtle but important ways. Our environment continues to change. Our actions today determine whether our parks and natural areas decline or thrive for future generations.

Many people think of the River Valley as a “wilderness” that can thrive on its own. But over that past 150 years, the ecosystem has been altered by human activity and development. Active systematic management is needed to preserve what remains of the pre-settlement ecosystem and slow or reverse the degradation. Given limited resources, management must be done judiciously and strategically. The Minnesota River Valley has long been a crown jewel of Bloomington’s open space system. How we manage the River Valley today will determine whether we sustain elements of ecosystem services and biodiversity reflected in the valley’s rich natural history.

The Minnesota River Valley Natural and Cultural Systems Plan prioritizes sites for natural resource restoration and describes management strategies that help restore native plants and ecosystem functions. The plan focuses on maintaining and expanding existing efforts. Additional funding, strategic partnerships, and educational efforts that generate awareness and stewardship of the River Valley’s resources all play a role in the successful implementation of this plan.

Rob Bouta
Bloomington Sustainability
Commissioner

July 5, 2018

SECTION 1: INTRODUCTION

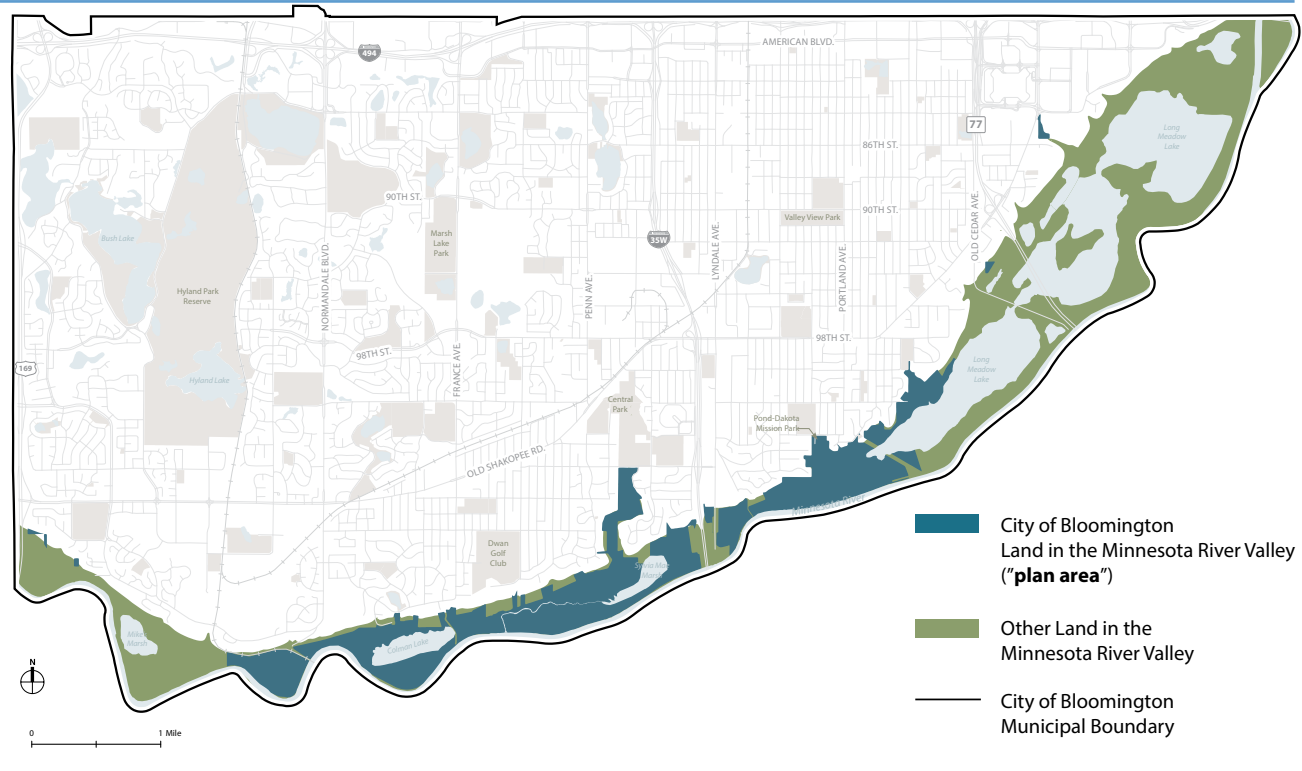
A scenic view of a river flowing through a forest. The river is the central focus, with water splashing over numerous large, dark rocks in the foreground and middle ground. The banks are lined with dense trees, some with green leaves and others bare, suggesting a transitional season. The overall atmosphere is natural and serene.

1.1 Purpose

This Natural and Cultural Systems Plan (“Plan”) provides a strategic framework for short and long-term management of natural and cultural resources located on property owned by the City of Bloomington (“City”) within the Minnesota River Valley (“River Valley”) (Figure 1.1). The area covered in this report encompasses approximately 1,180 acres including escarpments, wetlands, shallow lakes, and alluvial floodplains. The area adjacent to its northern boundary is composed primarily of residential properties. The remainder of the River Valley in Bloomington that is not part of this plan is largely owned by the U.S. Fish and Wildlife Service (USFWS), most of which is within the Minnesota Valley National Wildlife Refuge (“Refuge”).

Preparation of this Plan was recommended in the City’s Minnesota River Valley Strategic Plan (MVSP) adopted in 2016, which recognized the River Valley as one of the city’s most unique assets. The MVSP also acknowledged that additional study is needed to

Figure 1.1 City-owned Land in the River Valley



fully understand and prioritize specific improvements in the River Valley. While the MVSP proposes two separate cultural and natural resources system plans, they are instead combined into one in this plan. The vision, goals, and guiding guiding principles of the MVSP are also relevant to this Plan.

Minnesota River Valley Strategic Plan

Vision Statement:

To enhance awareness, appreciation, and enjoyment of the Minnesota River Valley by ensuring that City-owned land in the River Valley is used and managed in a manner that balances resource preservation with appropriate access and utilization.

Goals:

- *Enhance access to recreational opportunities in the River Valley*
- *Increase awareness and understanding of the River Valley environment*
- *Improve utilization of land and resources in the River Valley*
- *Ensure protection and preservation of natural and cultural resources*

This plan strives to balance wildlife, habitat, and cultural resources management and visitor use within the River Valley. Using existing studies and analysis of natural and cultural resources, this plan assesses management strategies and where they should be applied. Due to limited resources, many of the proposed management strategies are not immediately feasible solely through City resources. However, this plan identifies areas in the River Valley that are of highest priority in the event that resources become available.

1.2 Applicability

While this plan focuses on the River Valley, much of the information, resources, and appendices can be applied in parks and natural areas throughout the City. Specifically, the six criteria used to identify priority areas for resource enhancement are useful anywhere (Section 4.4). Many of the habitat types and invasive species that are found in the River Valley are also present in other areas of the City. The management strategies identified in Section 4 and the Appendices are overarching and applicable in many parks and open space areas in the City.

1.3 Context

The River Valley forms the entire southern and eastern borders of the City, and plays an integral role in telling the story of Bloomington. Despite comprising a large area of the City, many people are unaware of this vast resource, how it can be accessed, its need for resource management, and its history.

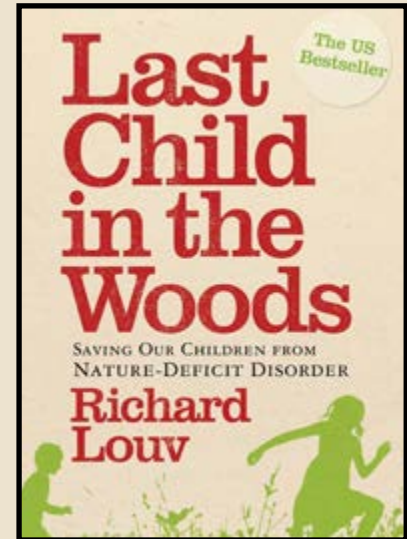
Bloomington's story cannot be told without mention of the River Valley. The River Valley in Bloomington was home to Native American villages, and many of the earliest European settlers established residence along the bluffs. Once Bloomington became a township in 1858, the River provided early residents a means to trade hay, wood, and wheat. The floodplains were farmed until the 1970s when land was purchased by the City and the U.S. Fish and Wildlife Service for the purpose of wildlife and habitat conservation. The River Valley once provided those that lived here a means of safety, sustenance, and economy. Today, it is designated for conservation uses intended to provide habitat protection and wildlife management that balances conservation and public recreation uses. While its purpose has changed over time, its value and significance to the City has remained the same. The River Valley continues to play a role in people's day-to-day lives and is an essential component of Bloomington's identity.

An ecologically well functioning River Valley

environment filters, cleans, and conveys our water, stabilizes the bluff and other slopes from further erosion, and supports native plants and animals. It also provides unique opportunities for nature-based recreation and learning.

In today's world, many people suffer from "nature deficit" and spend most of their free time indoors looking at screens. Research and literature has increasingly found correlations between spending time outdoors and improved mental and physical health. In Bloomington, there's no excuse for nature deficit. Nearly one-third of the City is comprised of reserved park land, almost half of which is in the River Valley. Improved access and awareness of the River Valley and other parks and open spaces help combat nature deficiency among residents.

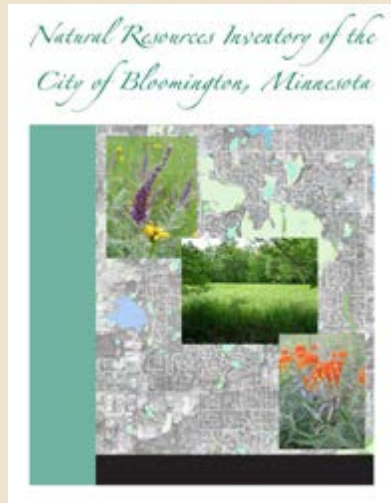
There is much potential in the River Valley to engage people outdoors, promote healthy lifestyles, tell the story of why people settled here, and protect and enhance this resource so that its story can continue to be told for future generations.



Richard Louv's book, *Last Child in the Woods* (2008), states that direct exposure to nature is essential for the physical and emotional development of kids and adults.

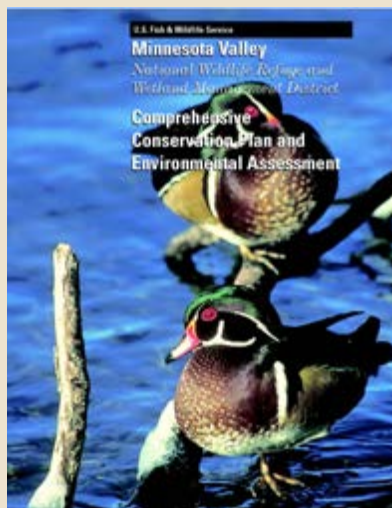
1.4 Other River Valley Plans

Bloomington is one of numerous municipalities that share a boundary and/or ownership within the River Valley. As a natural resource, what happens in one area of the River Valley affects all other areas. Some agencies and organizations have developed previous plans to address natural and cultural resources, recreation, and water quality in the River Valley. Those plans that directly address portions of the River Valley within the City of Bloomington are listed below.



Natural Resources Inventory of the City of Bloomington, Minnesota, 2007 (Hennepin County & Great River Greening)

The Natural Resources Inventory assessed the natural areas within the City by conducting land cover classification mapping using the MLCCS methodology, field checking, and assigning DNR rankings attributed to each land cover area. Remnant natural communities were identified, which represent valuable natural resources that merit protection.



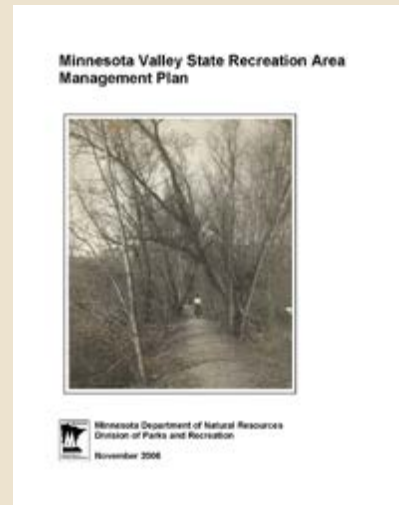
Comprehensive Conservation Plan and Environmental Assessment, 2004 (US Fish & Wildlife Service)

The Comprehensive Conservation Plan (CCP) provides and overarching management direction specific to the Minnesota Valley National Wildlife Refuge (NWR) and Wetland Management District (WMD). The Management goals of the CCP align with the goals and direction of this Plan.

Minnesota Valley State Recreation Area Management Plan, 2006

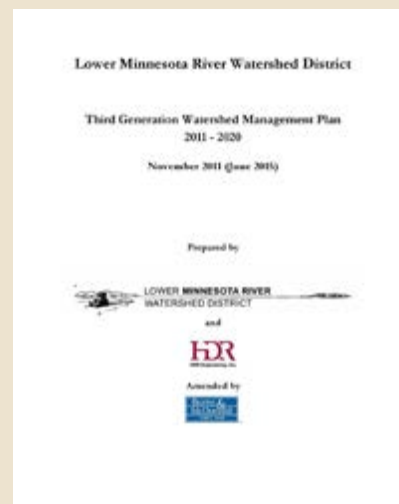
(MN Department of Natural Resources)

The State Recreation Area Management Plan focuses on recreation development and management in the River Valley. A brief overview of the area's natural and cultural resources is provided. Interpretive services and specific recommendations center on trail development.



Watershed Management Plan, 2011-2020 (Lower Minnesota River Watershed District)

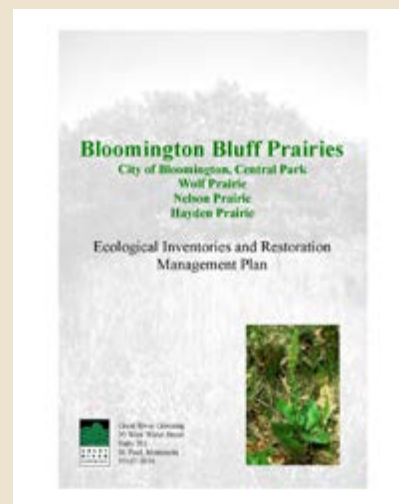
The purpose of this Watershed Management Plan is to protect, preserve, and manage the surface water resources and groundwater within the Lower Minnesota River Watershed District. The Watershed Management Plan is updated every 10 years, and is relevant to this Plan in terms of its recommended Bluff Standard, which is described on page 6.3. A plan for 2021-2030 is being drafted with revised bluff standards (described on page 7.4).



Bloomington Bluff Prairies Ecological Inventory and Restoration Management Plan, 2003

(Great River Greening)

This Bloomington Bluff Prairies Plan identifies and recommends management for remnant prairies in the Nine Mile Creek area, some of which are also mapped and described in this Plan. Detailed management schedules and cost estimates are provided with the intent to restore and preserve remnant native plant communities.



1.5 Plan Organization and Approach

This plan is divided into six sections describing historical and existing conditions, as well as suggestions about how to achieve improved flora and fauna habitat conditions while taking care to protect and preserve the River Valley's sensitive cultural resources.

Section 2 provides historical perspective about the River Valley's condition prior to European settlement, and how it has since evolved.

Historic analysis helps identify significant occurrences that shaped the existing conditions, which are described in **Section 3**. Section 3 also provides general information on the current status of cultural resources and flora and fauna communities found in the River Valley today and the primary threats to the River Valley's resources and ecosystem.

Section 4 explains management approaches and suggests strategies to address the resource threats listed in Section 3. The Management Goals are focused on providing educational opportunities, improving growing conditions for native species, enhancing biodiversity, and building on prior successes. These goals provide a foundation from which management strategies and priorities are formed.

Section 5 explores opportunities for improving visitor awareness and stewardship of the natural resources in the River Valley. An informed public will better understand the natural processes at play, and potentially support and take ownership in restoring the River Valley.

Section 6 describes the Federal, State, and City regulatory framework for resource protection and preservation in the River Valley.

Section 7 summarizes approaches for resource management and enhancement, and identifies potential implementation partners.



SECTION 2:
HISTORICAL
PERSPECTIVE

Years ago, one could have watched a Passenger pigeon light in the sprawling branches of a mature bur oak as elk graze in the meadow at the base of the bluff. An hour's walk downstream, a Native American tribe gathers near a burial mound atop the bluff. And upstream, wisps of smoke rise from embers of small burned cedars. Here, a prairie fire climbed the bluff, recycling nutrients from vegetation and perpetuating the fire-tolerant oaks of the savanna. All three scenes are part of Bloomington's history.

Rob Bouta

Bloomington Sustainability
Commissioner

July 5, 2018

This section describes what the River Valley might have looked like before and after European settlement. Additional context and background about the River Valley's history can be found in the MVSP. However, this is not intended to provide an exhaustive history or analysis of past events. Analysis of how the landscape has changed over time provides clues about what it could become in the future, with or without proper land management. Understanding the historic context and changes to the River Valley's cultural uses and ecological composition can help inform decisions about management strategies.

2.1 Pre-settlement Vegetation

Understanding pre-settlement vegetation provides insights into appropriate restoration objectives. A general overview of the biotic community thought to have been present in Bloomington prior to and since European settlement is described below. The year 1853 is used to distinguish pre- and post-European settlement, since this was the year that the Public Land Survey occurred in Bloomington.

Pre-1853:

Fossil records indicate that prior to European exploration the region consisted of grassland savanna vegetation that was grazed by herbivorous mammals for at least the past 20 million years. The predominant vegetation in the uplands was oak barrens and openings. Characteristic trees included bur oak and northern pin oak. Large areas of the sandplain were characterized by brushland. Upland prairie formed a narrow band along the Mississippi and Minnesota Rivers, with areas of floodplain forest in the lowlands.

By the mid-17th Century, the North American fur trade was firmly established, resulting in elimination of keystone species, such as elk, bison, and moose from large portions of the landscape. Market hunters fed the fur traders with bush meat, which took a heavy toll on these large herbivores. Grazing and browsing by large mammals were fundamental to sustaining pre-settlement prairies. The activities of these animals were important for the movement of seeds and other

plants, and for the persistence of many short-lived species in prairies.

The fur trade also brought firearms and horses to Native American populations, increasing their capacity to hunt large game. At the same time, Europeans introduced diseases resulting in severe declines to indigenous populations. As a consequence, fire wood collecting all but ceased, which caused a shift in plant community regeneration and composition. The reduction of man-made fires resulted in less frequent fires in the landscape, which helped maintain prairie plant communities. European settlement further reduced the frequency of naturally occurring disturbances, such as grazing and fires, which then altered the historic biotic community.



Seth Eastman painting (1847) depicting the view across the Minnesota River Valley to the north toward Bloomington.

2.2 Cultural History

The cultural history of the River Valley spans more than 12,000 years of human habitation. The river initially provided protection as a barrier from adversarial tribes. It was then used for transport and trade, and supported a variety of game and plants that sustained early inhabitants. Archeological resources indicate that indigenous people utilized this area of the River Valley well before the arrival of early Euro-American settlers. These resources allow us to understand how the region was settled and utilized over time. Remnants of indigenous settlements and structures built by pioneer-era white settlers are increasingly rare and important, and contribute to the community's sense of historical context, tradition, and



Seth Eastman painting (1847) of Bloomington Minnesota River Valley, looking east towards the confluence with the Mississippi River.

distinctiveness.

Timeline of Lower Minnesota River Valley Cultural History

- **12,000 years BP** - Indigenous peoples live in the Lower Minnesota River Valley (present day Twin Cities area), utilizing its abundant resources for transportation, food, clothing, and shelter.
- **1673 to 1805**- Early European and later U.S.

sanctioned exploration of the Upper Mississippi River basin, which includes the Minnesota River.

- **1805** – Louisiana Purchase opens the region to further exploration and settlement.
- **1805 to 1900** - Fort Snelling is built by the U.S. Government at a time when the Lower Minnesota River Valley is populated by several bands of Dakota people. First white settlers move to area west of Fort Snelling.
 - **1839** - Dakota Chief moves his village to spot near the Minnesota River in present day Bloomington.
 - **1843 to 1852** - Gideon Pond becomes important early settler of Bloomington and Minnesota, founding the Oak Grove Mission in what is today Pond Dakota Mission Park.
 - **1852 to 1853** - Dakota villages in the Lower Minnesota River Valley are moved to the Upper and Lower Sioux Reservations to the west on the Upper Minnesota River.
 - **1853 to 1900** - Large numbers of white settlers move into the Twin Cities and settle the Minnesota River valley area. The Minnesota River is used as a major transportation corridor to the west, and the prairie oak savanna landscape utilized by Native Americans until the 1850's is turned into agricultural land.
- **1900 to present** -

Throughout the 20th century the river transitioned from a transportation corridor into a recreation area enjoyed by the people of the Twin Cities. In the first half of the 20th century, the area was utilized for recreational hunting, including housing duck hunting camps for area hunters. From the middle 1920s to the 1950s the Bass Ponds were used as a bass rearing and stocking facility. In 1976, the River Valley area was designated as a National Wildlife Refuge focused on conservation of natural resources and wildlife habitat. Today, the Lower Minnesota River Valley is maintained primarily as a natural area and is utilized by hunters, hikers, bikers, birders, and others.

2.3 Aerial Photos

Aerial photos from 1937 to 2015 allow us to see how the extent of development, tree canopy, and open water has changed over the past 70 plus years. By the time aerial photography was available for the River Valley, the surrounding area had already incurred impacts from development. Historically, the River Valley had much fewer trees in the upland bluff area reflecting an Oak Savanna ecosystem. In a relatively short amount of time, commercial farming and urban development vastly altered the River Valley environment.

Figure 2.1 Abbreviated Natural & Cultural History Timeline

Glaciation periods (100,000 - 10,000 years ago)

Glacial meltwater created Lake Agassiz around 12,000 years ago.



Around 9,000 - 12,000 years ago, Lake Agassiz drained through the River Warren, which carved the Minnesota River Valley.

Indigenous Peoples (approximately 12,000+ years ago - 1850s)

Archaeological sites have been discovered in Bloomington spanning several main traditions of periods of Indigenous presence in the River Valley.

Paleo-Indian
(11,000 - 8,500 years before present (BP))

Archaic
(8,500 - 3,000 years BP)

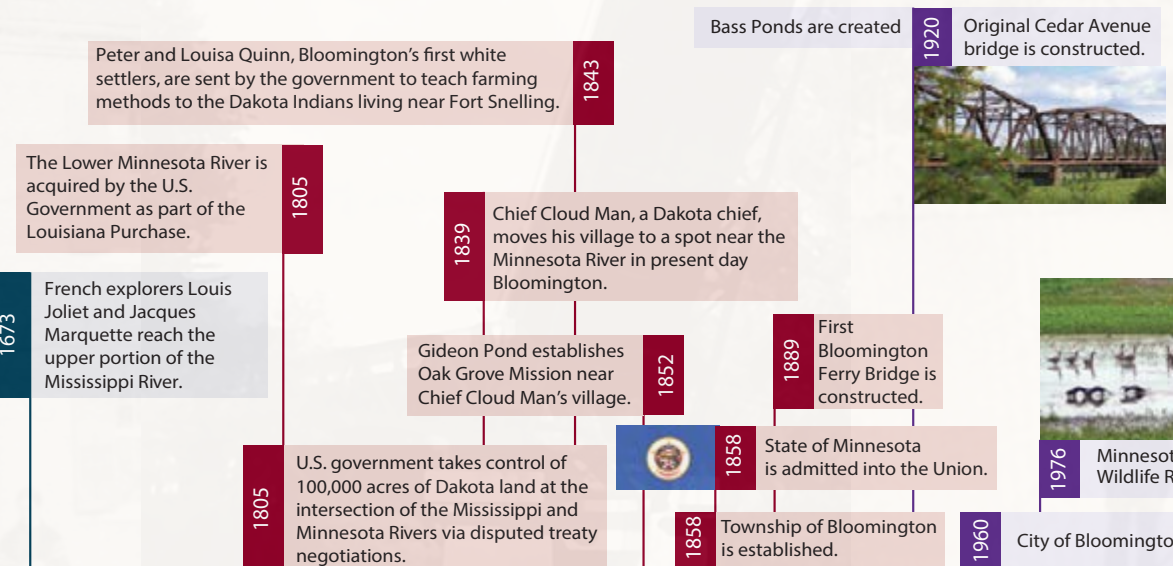
Woodland/Mound Builders
(3,000 - 1,000 years BP)

Oneota/Plains Village
(1,000 BP - 1700s)

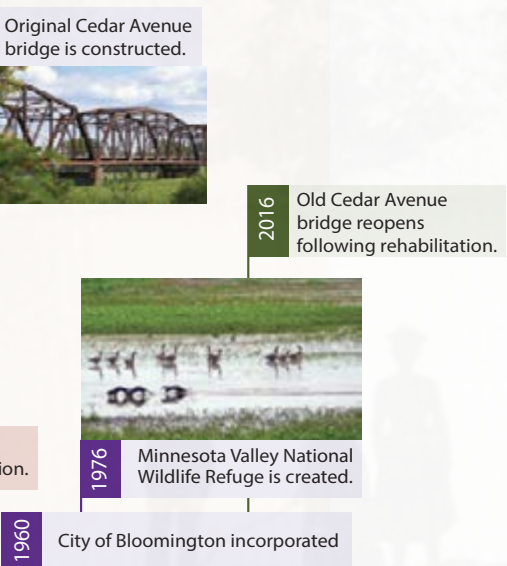
While Oneota or Plains Village sites were present in the River Valley, there is no evidence to suggest that these sites existed in the lower River Valley. The gap between Woodland and Dakota presence in the lower River Valley remains unanswered.

Dakota
(1700s - 1850s)

European Exploration & Early Settlement (approximately 1670s - 1950s)



Suburbanization (1950s to present)



Oak savanna and grasslands were once the predominant landscapes

Keystone grazing species, such as moose, elk, and bison hunted and disappeared from River Valley

Settlement reduced grazing & naturally occurring fires.

Nine Mile Creek Lowlands

1937



Mechanized agriculture permitted large areas of land to be used for production, but it also greatly degraded our natural resources through practices such as deep cultivation of soils, use of drainage tiles, channelization of drainage, and use of fertilizers, insecticides, and herbicides that polluted our soils and waters.

Nine Mile Creek Lowlands

1972



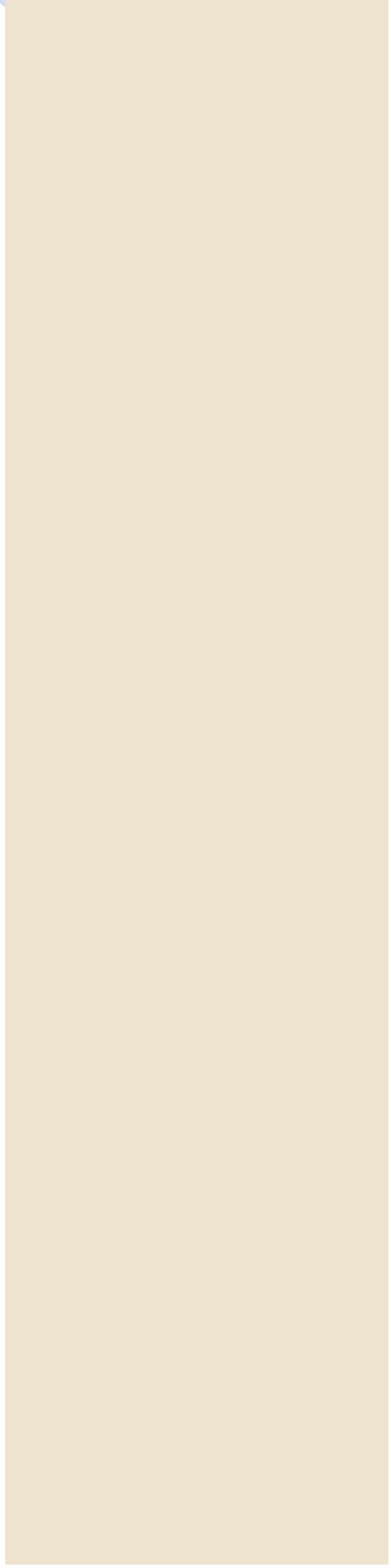
The construction of I-35W and I-494 fostered suburbanization. In the valley uplands, farms began to give way to houses. Some farming remained in the lowlands through the 1970s, which were prone to periodic flooding. Prior to establishment of the National Wildlife Refuge in 1976, the non-farmed areas contained housing for duck hunting camps and gun clubs for area hunters.

Nine Mile Creek Lowlands

2015



Where there were once farms, now there is woody, weedy vegetation mostly left unmanaged. Further urban development has created impacts such as increased stormwater runoff, unbalanced nutrients in soils, and reduced natural disturbances, which created favorable growing conditions for invasive species. Today, walkers, bikers, and birders are the primary users of the River Valley.



**THIS PAGE INTENTIONALLY LEFT
BLANK**

Anderson Park



1937



1972



2015

Mound Springs Park



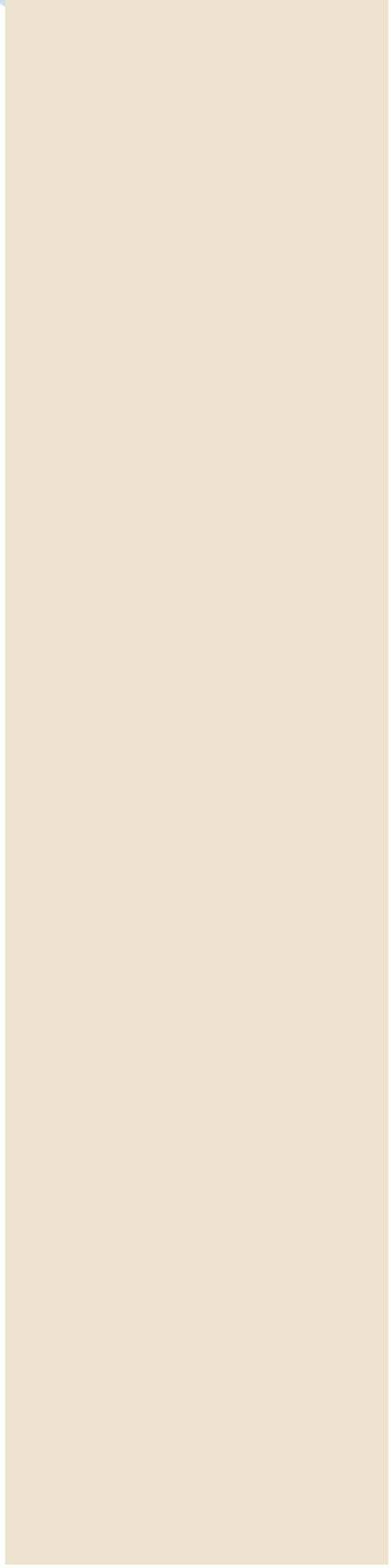
1937



1975



2015

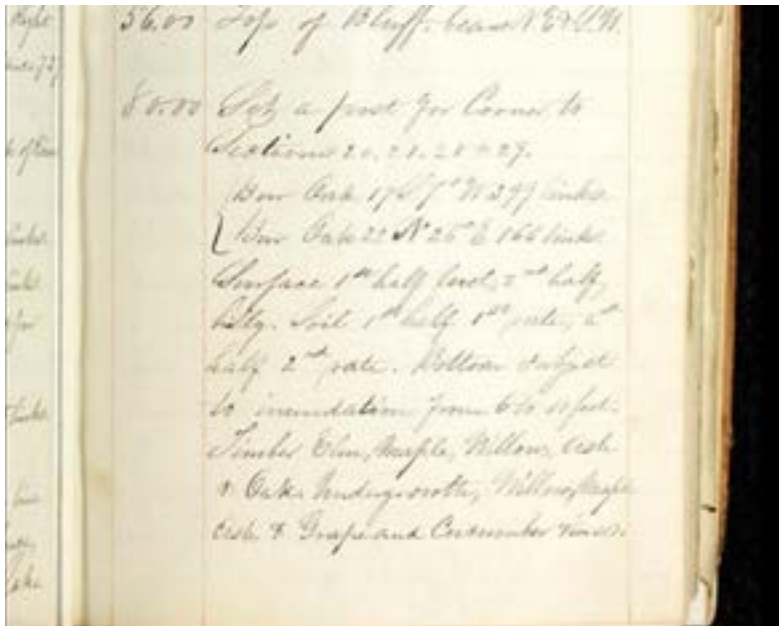


**THIS PAGE INTENTIONALLY LEFT
BLANK**

2.4 Land and Natural Resource Surveys

1853 Public Land Survey (PLS):

By 1853, the influx of European settlers began to significantly impact the flora and fauna of the River Valley region. Quantifiable descriptions of the River Valley are provided in the 1853 Public Land Survey (PLS). Bearing tree analysis and interpretations of the PLS field notes indicate the upland areas consisted of



A page from the Public Land Survey Notebook dated August 1853.

grassland savanna and the floodplain was vegetated by wet to mesic prairie. Upland trees included: bur oak, red oak, and butternut. Floodplain trees included: elm (likely American or red elm), maple (likely silver maple), and cottonwood. PLS field notes on the floodplain describe, "... grass in places as tall as 8 feet, with weeds (e.g. native herbaceous vegetation) as tall as 15 feet", and "timber is very scarce".

Minnesota Land Cover Classification System (MLCCS, 1998 to Present):

The Minnesota Land Cover Classification System (MLCCS) was developed by the Minnesota Department of Natural Resources (MnDNR) in partnership with the Nature Conservancy to map

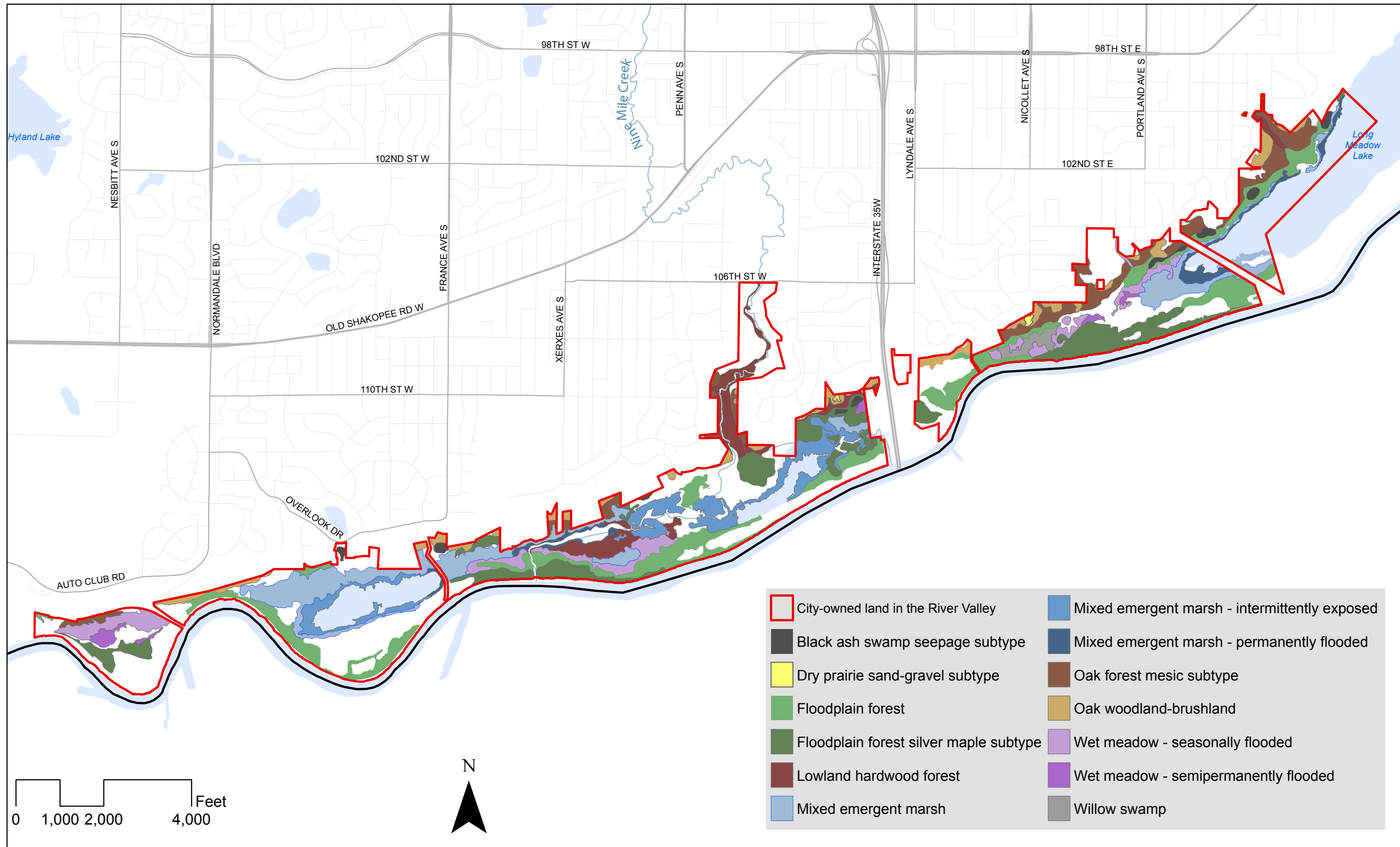
and describe land cover types. It is used by natural resource managers to gain information about the characteristics and composition of a site or particular landscape complex. The mapping system categorizes areas by land cover composition, as opposed to land use, allowing managers and planners to get a feel for the ecological make up of a given area. This mapping system can be juxtaposed with pre-settlement vegetation, soils, and the geological context of the site to give a snapshot of how the site has or has not changed over time.

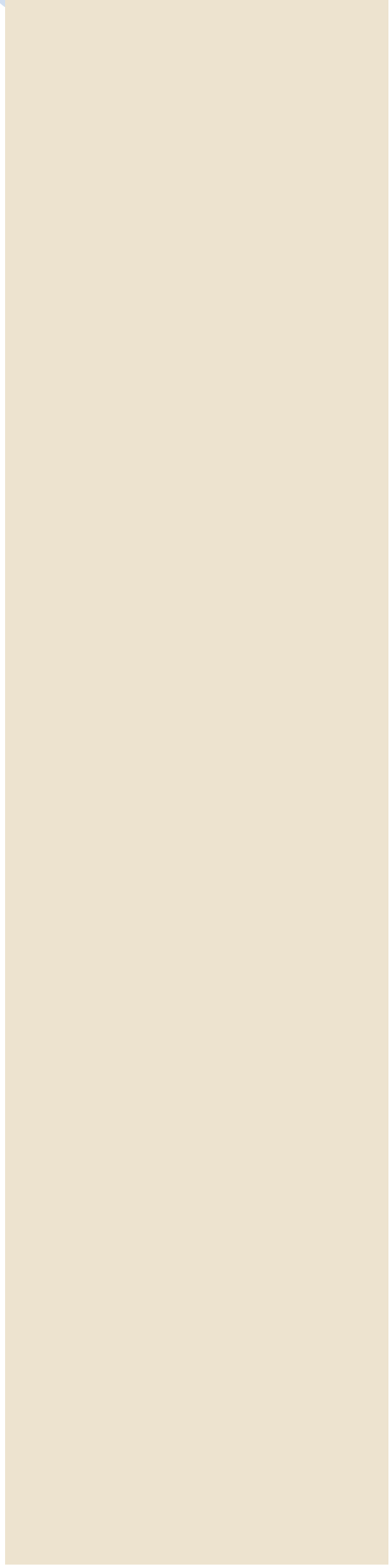
The “Natural Resources Inventory of the City of Bloomington” (2007 NRI)

Completed in 2007 by Hennepin County, this report classified the land cover within the City using the MLCCS system and confirmed the data with field checks. The Natural Areas found within the City were summarized based on MLCCS land types (Figure 2.2). These natural areas were assigned a land quality rating based on the condition of the natural community (Figure 2.3). The report also identified Ecologically Significant Natural Areas (Figure 2.4) and Natural Areas with the potential for rare species (Figure 2.5). The primary land cover types on the City-owned portions of River Valley included:

- Oak woodland-brushland
- Oak forest mesic subtype
- Lowland forest
- Dry prairie sand gravel
- Black ash swamp seepage
- Wet meadow
- Mixed emergent marsh
- Willow swamp
- Floodplain forest

Figure 2.2 Ecological Communities Surveyed in the 2007 NRI





**THIS PAGE INTENTIONALLY LEFT
BLANK**

Figure 2.3 Quality Rating of Natural Communities

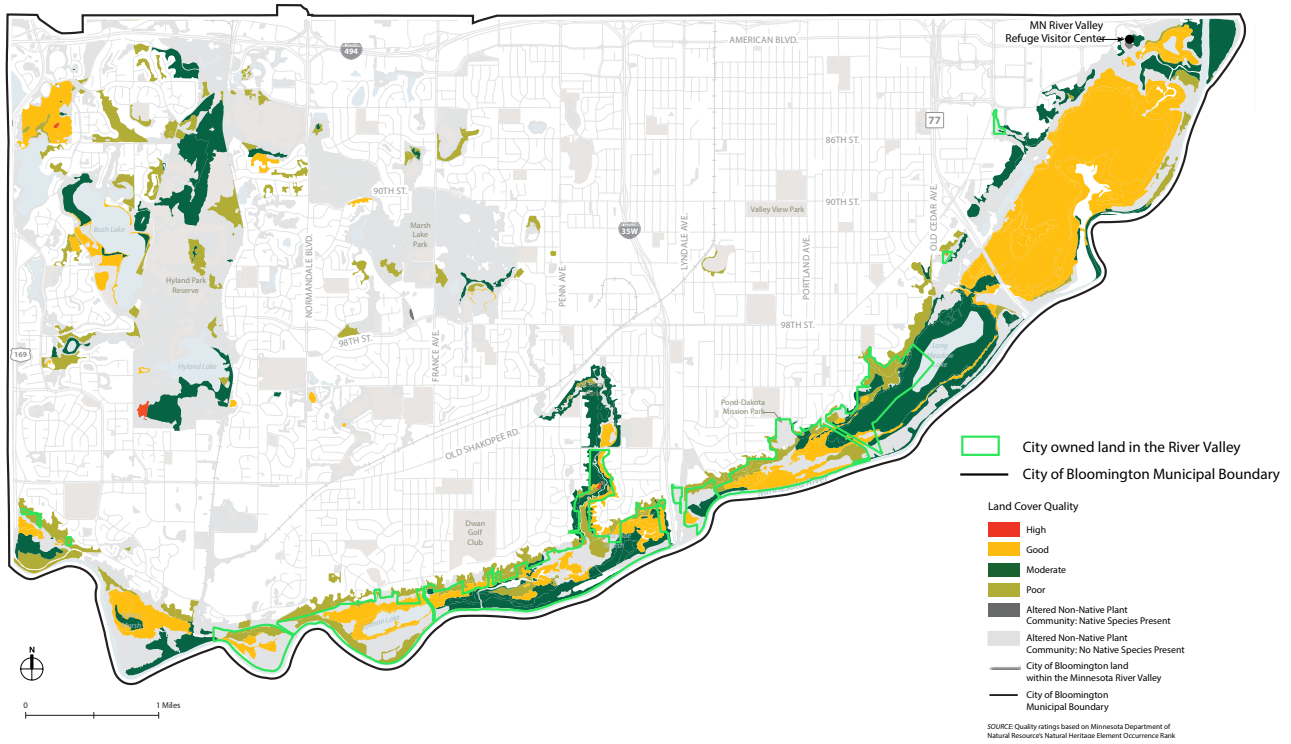


Figure 2.4 Ecologically Significant Natural Areas

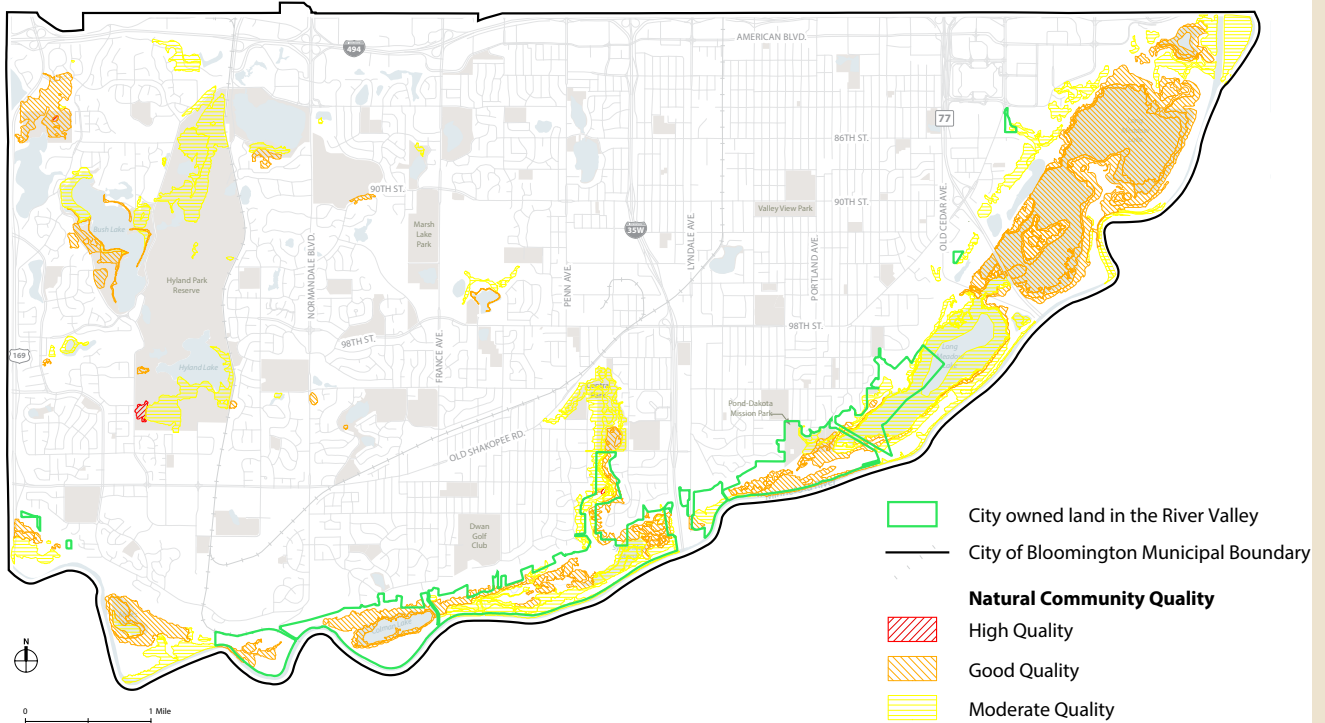
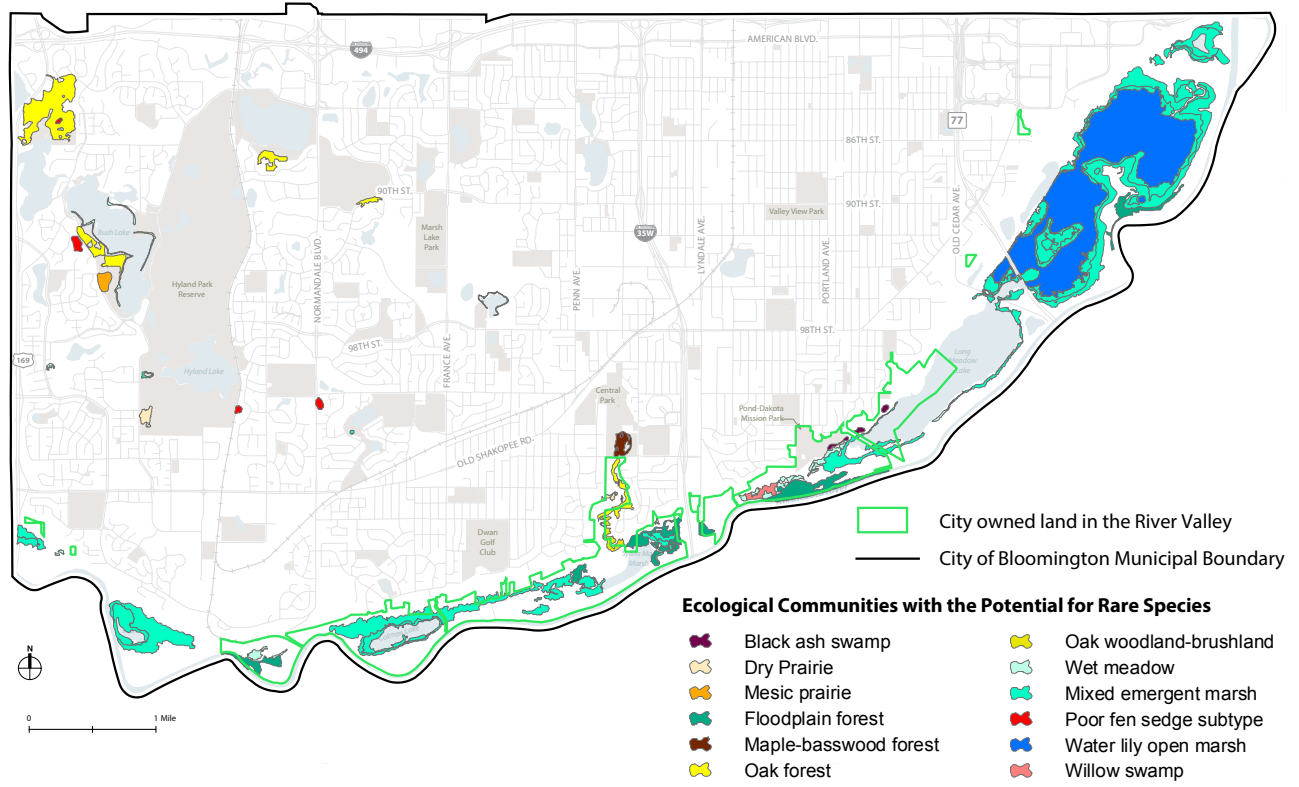
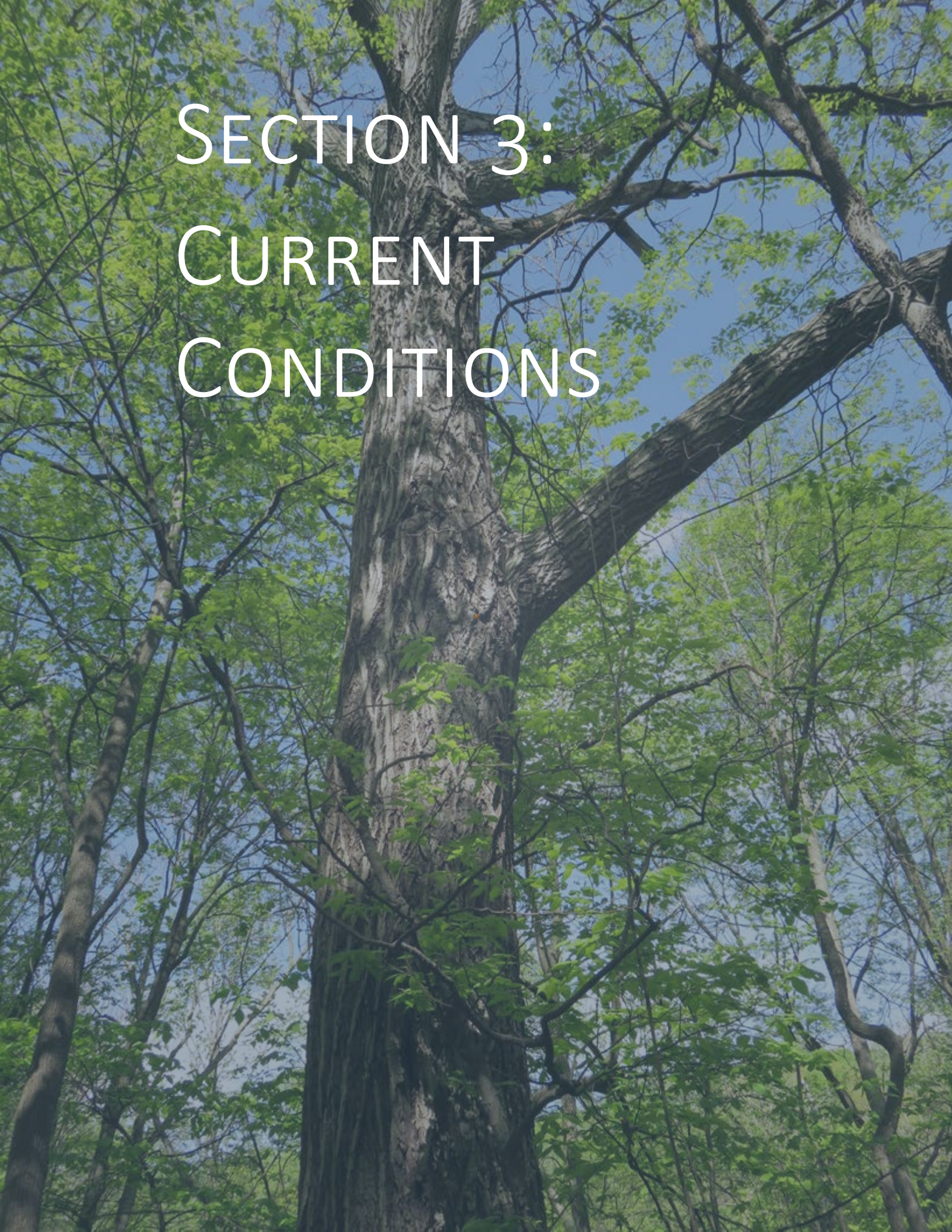


Figure 2.5 Natural Areas with the Potential for Rare Species





SECTION 3:
CURRENT
CONDITIONS

The River Valley environment today is significantly altered from pre-settlement conditions. Many of the River Valley's ecological communities are overgrown with more woody, less diverse vegetation. This leads to lower quality habitat and food source for wildlife. Likewise, overgrowth and land use activities can obscure and damage archeological and cultural resources. The River Valley today is very much a product of its surrounding urban environment. The primary threats to the River Valley are described at the end of this section, and suggestions about how to address the threats are described in Section 4. In 2017, Great River Greening researched the city-owned portions of the River Valley and noted changes from the 2007 NRI. Detailed survey information about each of the areas within the River Valley can be found in the Habitat Assessment in Appendix A.

3.1 Archeological and Cultural Resources

Many historic site locations have been identified in the River Valley, some of which still exist. Numerous archaeological investigations have taken place at locations throughout the River Valley, each of which has provided valuable information about Indigenous and early white settlement of the area. The practice of cultural resource management is an important part of identifying and protecting the valuable cultural resources found in the River Valley.

Cultural Resource Types

Cultural resource means any site, building, structure, object, landscape or area that is of significance to a group of people traditionally associated with it. A cultural resource may be the archaeological remains of a Native American village, a pioneer homestead, and industrial/commercial structures among others. It may be of value to the nation or state as a whole or important only to the local community. In order to be considered important, generally a cultural resource has to be at least 50 years old. The City of Bloomington's rich history is reflected in numerous cultural resources. These cultural resources fall into five broad categories: historic structures, cemeteries,

archaeological sites, historic areas, and traditional use areas. The following list provides an overview of the most common types of cultural resources that existed historically within in Bloomington:

1. Historic Structures

- Houses, barns, outbuildings
- Notable examples of architectural styles or methods of construction
- Buildings reflecting important historical events and trends
- Sole or rare survivors of important architectural types
- Industrial and engineering structures (bridges)
- Churches and schools
- Stores, office buildings

2. Cemeteries

- Platted burial grounds
- Burial mounds
- Family cemeteries
- Graves

3. Archaeological Sites

- Sites of importance to local, regional or state history
- Ruins of historically important buildings
- Villages and camps
- Quarries
- Food-gathering sites such as for wild rice

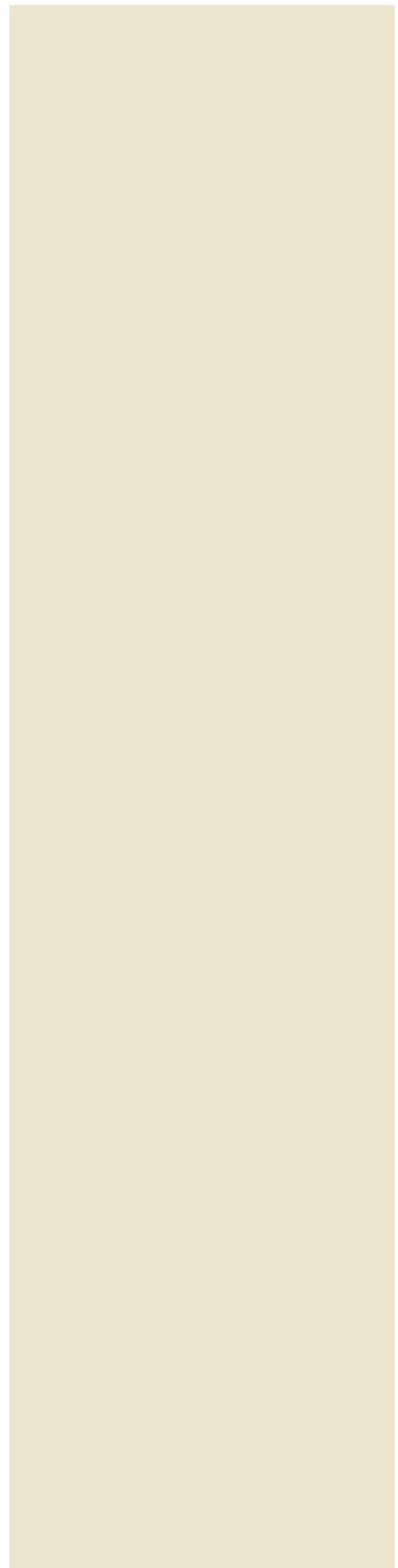
4. Historic Areas

- Areas shaped by historical land uses (such as agriculture, or transportation)
- Roads, trails, and highways
- Clusters of buildings and other features
- Parks, gardens, and other historic plantings

5. Traditional Use Areas

- Areas traditionally or historically used by one or more groups of people for some type of activity
- Locations associated with traditional beliefs
- Shrines and ceremonial sites

A map of the known cultural sites in the River Valley is shown below, and a description of the sites is included in Appendix H.

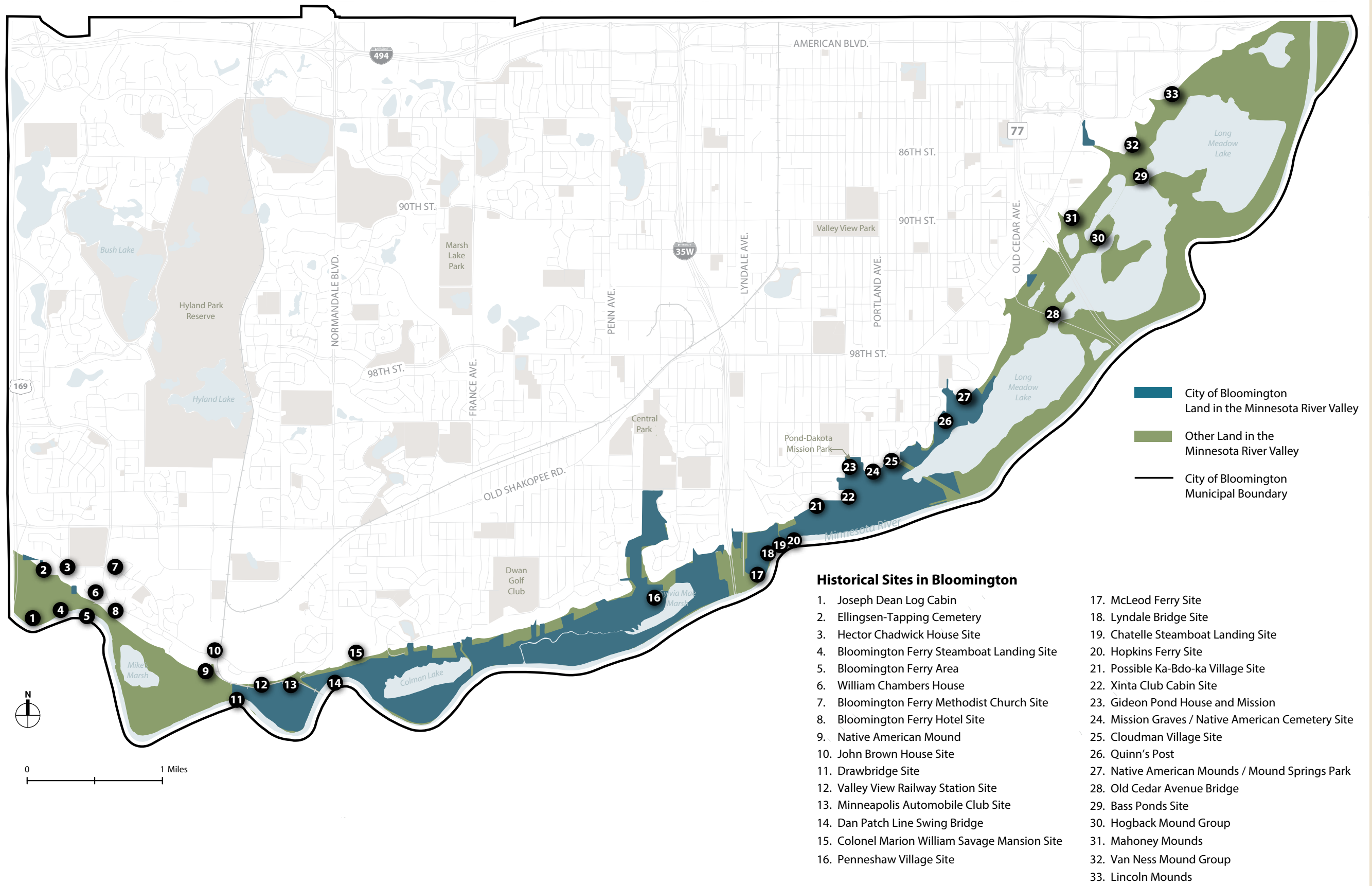


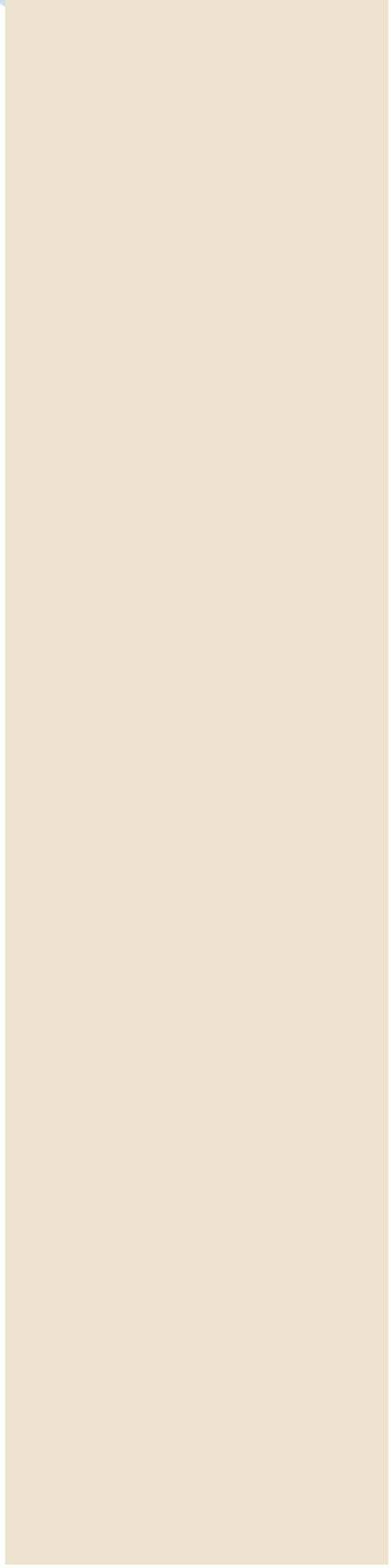
Pre-settlement: Numerous burial mounds and earthworks located in the River Valley and on the adjacent bluffs are primary evidence of the presence of indigenous peoples and cultures. Much of what we know about settlement in Bloomington during the pre-contact period is derived from field studies and notes compiled in a report by N.H. Winchell titled: *The Aborigines of Minnesota* (1911). This report describes several groups of Native American burial mounds in the Minnesota River valley within Bloomington. A more recent survey conducted in 1977, and compiled in the report *Bloomington: A Community Survey of Historic Sites* (Miller-Dunwiddie Architects, Inc.), identifies five existing mound groups and lists eleven destroyed or unlocated mound groups within Bloomington that are protected by State Law and City Ordinance. This report also provided a preliminary survey and an initial compilation of architectural and historical information on a number of structures and sites.

Known/Existing Archeological Surveys

- *"The Aborigines of Minnesota"*, 1911, edited by N.H. Winchell from the collection of Jacob Brower and the field studies and notes of A.J. Hill and T.H. Lewis includes a description and map from a survey of the Van Ness Mounds made on September 7, 1882.
- *"Bloomington: A Community Survey of Historic Sites"* prepared by Miller-Dunwiddie Architects, Inc. in 1977 described two mound groups located in the portion of the South Loop District north of 86th Street, including: Lincoln Mounds and Van Ness Mounds.
- *"Archaeological Investigations of the New Ceridian Corporate Headquarters, and the Lincoln Mounds Site (21 HE 7)"* authored by David Mather, July 1998. Records of this mound group date from the late nineteenth century and indicate a collection of mounds ranging in height from one to five feet. In addition, a management plan (*"Mound Management Plan for the Lincoln Mounds Site (21 HE 7) at the Ceridian Corporate Headquarters"*) was prepared in September 1998.
- *"Work Plan for Providing Assistance in Authentication and Additional Cultural Resources Work at the Lincoln Mound Group (21HE7) for the Bloomington Central Station Project, Hennepin County, Minnesota"* - This investigation was completed during construction of the first phase of the Bloomington Central Station development.
- During Spring/Summer 2016, the MnDNR, Parks and Trails Cultural Resources program completed a cultural resource field investigation relative to the proposed Minnesota Valley State Trail-Bloomington Segment. The field review included visual examination of the ground surface and subsurface testing in the form of 40 cm diameter shovel test pits and 1" soil core probes placed alternately at 50-foot intervals. Project investigators recovered several fragments of prehistoric ceramics in one location and a number of historic period artifacts, including a late 19th century tobacco pipe stem in another location.

Figure 3.1 Known Cultural Sites in the River Valley





**THIS PAGE INTENTIONALLY LEFT
BLANK**

The lowlands occur in the floodplain of the River Valley and include the range of lands that are inundated most of the year as well as those that are occasionally or infrequently flooded. The lowlands are composed of ten land types. Six of the land types experience regular flooding and contain grasses and small to medium shrubs. The areas that are infrequently flooded typically contain large shrubs and trees, and are sometimes referred to as “temporarily flooded or saturated forests.”

The uplands include the bluffs and areas above the 722 foot elevation contour that are not inundated by flood waters from the river or tributary streams. The uplands are made up of oak forest, oak woodland, and prairie, all of which were once part of a larger oak savanna ecological community extending on the uplands flanking the River Valley.

This organization does not imply that these land types are target communities for restoration. Details about specific land cover types for each site in the River Valley, and their corresponding management objectives and strategies can be found in the Habitat Assessment (Appendix A). Detailed descriptions of management strategies can be found in Appendix B.

The naming conventions and descriptions in this report are based on data provided in the MLCCS. Appendix G shows a portion of the MLCCS dichotomous and its relation to the 13 ecological communities found in the River Valley. Additional details can be found at the Minnesota Department of Natural Resource's (MnDNR) website (<http://www.dnr.state.mn.us/mlccs/index.html>).

This Plan recognizes that there are unique characteristics within each of the ecological communities. For instance, there may be a population of unique species in one portion of a wetland that is not present further upstream. Species found within the different communities are listed in Appendix E. Appropriate management considerations are discussed further in Section 4.

Upland Subtypes

Oak forest mesic subtype (62.9 acres) is widespread in Minnesota. It is most common on dry to dry-mesic sites. At least 30% of the tree canopy is made up of oak trees. The plant composition varies considerably in response to variation in soil moisture, soil type, fire history, and climate. Northern red oaks, white oaks, or bur oaks dominate the more mesic stands of Oak Forest. Other species such as basswood, green ash, bitternut hickory, big-toothed aspen, and butternut are commonly present with the oaks. Most existing stands of Oak Forest have been disturbed by grazing, selective cutting, or have been fragmented by development, and many mesic Oak Forests appear to be succeeding to Maple-Basswood forest. Disturbed stands of oak forest commonly have dense subcanopies of prickly ash, or exotic buckthorn and honeysuckle species. Oak regeneration is rare now, as the oak species reproduce poorly under dense forest canopies. Ideal tree canopy should be around 50 – 70% to encourage a ground-level vegetation layer and oak regeneration.

Oak woodland-brushland (34.7 acres) occurs on dry to mesic sites, and is intermediate between Oak Savanna and Oak Forest. It is most common on rich sites where trees and shrubs grow well but where recurrent fires prevent the formation of true forest. It contains a patchy tree canopy and an understory dominated by shrubs and tree saplings. The principal species in the tree canopy are bur oak, northern pin oak, white oak, northern red oak, and occasionally aspen. The brush layer ranges in density from sparse to an impenetrable thicket. Except in scattered prairie openings, the herbaceous layer is sparse and of low quality. It is usually composed of woodland species capable of surviving in the dense shade beneath the brush layer.

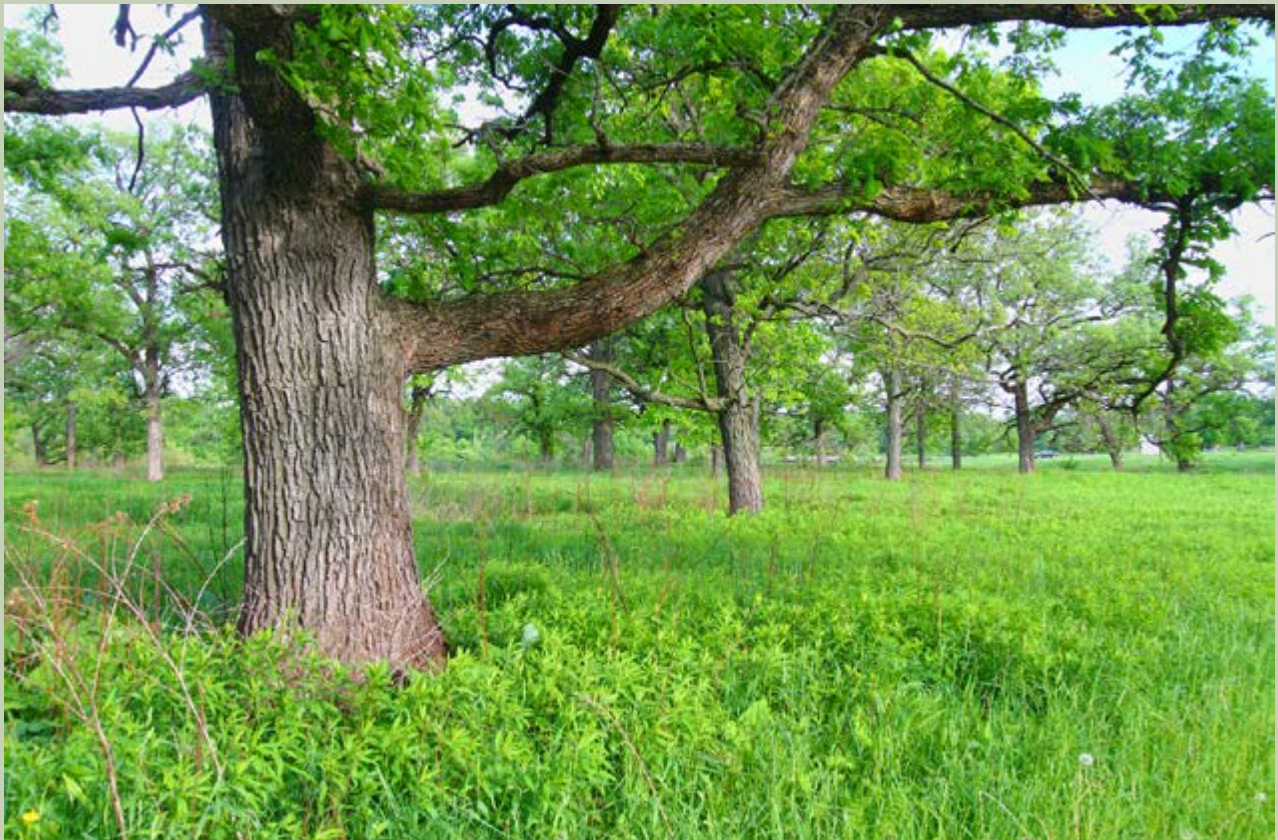


Oak forest mesic subtype at Pond Dakota Mission.



Oak forest mesic subtype at Pond Dakota Mission.

Oak savanna once covered large portions of Minnesota, including the uplands of the River Valley. It has now been reduced to small unconnected patches, and has been identified by The Nature Conservancy as a globally endangered habitat type. Most oak savanna was converted to agricultural lands because trees were sparse and the land was easier to clear for cultivation. Due to urbanization, the remaining oak savanna areas experienced less grazing and fewer fires, which disrupted the ecosystem and led to an overgrown ecological community. As a result, the few overgrown species crowded out those species contributing to the unique diversity in the savanna ecosystem.



Oak Savanna at Oak Ridge Forest Preserve in Illinois

Many of the existing Oak woodland and Oak forest ecological communities should be managed to more closely resemble the Oak Savanna complex. In some areas, this includes maintaining a tree canopy of 25 – 50% and a composition of no more than 12 mature trees per acre.

The remnant prairie habitat in the River Valley is part of a larger Oak Savanna complex that historically covered this region of the State. Many of the prairies are referenced in Great River Greening's 2003 report, "Bloomington Bluff Prairies: Ecological Inventories and Restoration Management Plan." The report includes detailed prairie management plans for some of the prairie areas identified in Figure 2.2. The most important cause of variation in species composition in prairie communities is variation in soil moisture, which is determined by slope, aspect, proximity to the water table, and soil texture.

- **Dry Prairie Sand Gravel subtype** (1.4 acres) typically occurs on gently to steeply sloping sites. This community is a type of upland prairie dominated by grasses. The tall grasses, big bluestem and Indiangrass, are the main vegetation on moist sites. Forbs are generally abundant but are subdominant to the grasses, and may have high local diversity. Taller brush and trees are absent or scattered. However, brush or woodland areas may be interspersed with prairie.

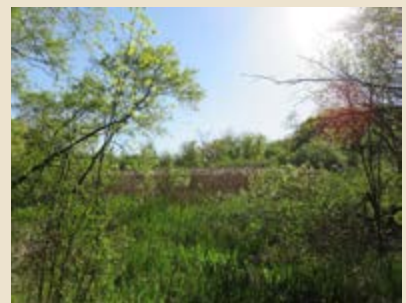
Lowland Subtypes

Wet meadow is present throughout Minnesota and often occurs in depressions, basins, along streams, or adjacent to lakes. The groundlayer is composed of mostly wide-leaved sedges or grasses. Forb cover and diversity usually are high. Shrub cover in Wet Meadows ranges from 0 to 70% and is often composed of Bebb's willows and pussy willows. Mosses are rare or absent. Standing water is present in the spring and after heavy rains, but the water table is generally below the soil surface for most of the growing season. Wet meadows tend to succeed to Shrub Swamp communities in the absence of fire or due to drought. Two types of wet meadow exist in the River Valley.

- **Wet meadow – seasonally flooded** (56 acres)
- **Wet meadow – semipermanently flooded** (9.5 acres)



Remnant prairie at Anderson Park



Wet meadow in the marshlands



Mixed emergent marsh at Nine Mile Creek

When a marsh has a large number of different plant species, but is not clearly dominated by any one, it is called a **mixed emergent marsh**. This community type occurs on gently sloping bottoms of sand, gravel or silt and is very sensitive to wave action. Many Mixed Emergent Marsh species are sensitive to fertilizer run-off and other artificial disturbances. Disturbed Mixed Emergent Marshes tend to convert to Cattail Marshes or become strongly dominated by undesirable reed canary grass or common reed grass populations. The following subtypes are found in the River Valley:

- **Mixed Emergent Marsh – semipermanently flooded** (103.3 acres)
- **Mixed Emergent Marsh – intermittently exposed** (71.4 acres)
- **Mixed Emergent Marsh – permanently flooded** (17.3 acres)

Willow Swamp has a canopy of medium to tall shrubs dominated by willows (especially pussy willow, slender willow, and Bebb's willow) and red-osier dogwood. Herbaceous species characteristic of Wet Meadow communities are common in the more open areas of the community.

- **Willow Swamp – seasonally flooded** (8.7 acres)



Willow swamp in the marshlands

Temporarily flooded deciduous forests are characterized by the presence of surface water for brief periods during the growing season. Though, the water table usually lies well below the soil surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime. Temporarily flooded forests include floodplain forests and lowland hardwood forests.

Floodplain Forest (135.3 acres) is a seasonally wet forest community that occurs throughout Minnesota on the active floodplains of major rivers and their tributary streams. The trees are mostly deciduous, and are tolerant of flooding. The canopy is variable in composition, either composed of a mixture of tree species or strongly dominated by a single tree species.

The tree canopy cover is highly variable within Floodplain Forests, with a continuous canopy in some stands while other stands have open areas.

- **Floodplain forest silver maple subtype** (109.5 acres) is a community where silver maples dominate the tree canopy, and are present in the subcanopy and shrub layer as well. Green ashes, cottonwoods, and American elms are often present in the canopy, but are most common as seedlings and saplings. The understory of the Silver Maple Subtype is open, with less than 25% cover by tree seedlings and saplings.

Lowland hardwood forest (32.6 acres) is a wet-mesic



Overgrown floodplain forest at Anderson Park

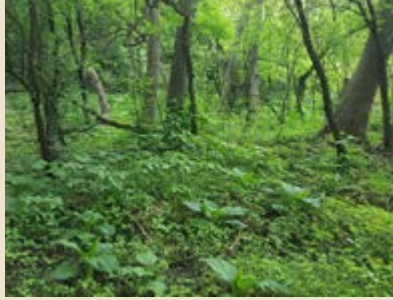
The exact size and extent of forested areas in the floodplain of the River Valley before European settlement is subject to debate. There is question about how much of the forested floodplain areas in the River Valley were previously meadow and marsh, which then transitioned to floodplain forest due to lack of disturbance. Regardless, these areas are now forested and it would be cost prohibitive to restore them all to open areas. A more prudent approach is to manage them as forested tracts and enhance them according to identified priorities.

forest that occurs in sites with seasonally high water tables, but does not flood regularly. It is typically situated just above active floodplains, within an inactive floodplain, or at the upper edge of a wetland basin. American elms and black ashes are common canopy dominants, but most stands are mixed with a variety of woody species. The shrub layer is usually discontinuous and composed of a mixture of upland and lowland shrubs. The ground layer contains mostly upland herbs that do not form roots at the water-table.

Saturated deciduous forests seldom exhibit surface water, but the substrate is saturated to the surface for extended periods during the growing season. In the River Valley, the Black Ash Swamp Seepage Subtype is the only saturated deciduous forest.



Lowland hardwood forest in Mound Springs Park



Black ash swamp seepage subtype at Parker's Picnic Grounds

There are several areas within the River Valley identified in the 2007 NRI as **Black Ash Seepage Swamps** (10.9 acres). These areas are denoted as having potential for rare species. The tree canopy is dominated by black ash with other species such as basswood, green ash, and yellow birch. This habitat occurs at the bottom of steep slopes and at the bases of river terrace slopes.

Water-based Communities

There are two additional communities in the River Valley that relate to water environments and require special attention. They are primarily located in the lowlands, but may also be found in the uplands in select areas. These include shallow water lake environments and spring fed environments. Both of these communities contain and or influence the presence of ecologically significant plant and wildlife species.

While this report focuses on terrestrial management of natural and cultural resources, these water environments contribute to the health and function of ecosystems in the River Valley. Therefore, the presence of these environments is acknowledged when making decisions about priority areas for resource management and they are directly referenced in the Habitat Assessment for enhancement and restoration (Appendix A).

Shallow Water Lake Environments

Large, shallow clear-water aquatic ecosystems, such as Long Meadow Lake, are highly functional and productive ecosystems. The high level of water quality in Long Meadow Lake is indicated by its capacity to continue to sustain a wild rice population. This is due, in part, to the spring-fed streams that flow into Long Meadow Lake.

Long Meadow Lake is protected from adjacent non-point source pollution (NPS) such as agricultural or urban runoff, sediment, and nutrients. However, west of Old Cedar Avenue there are stormwater outfalls that deliver undesirable nutrients and sediments as shown in figure 3.3. There are also outfalls east of Old Cedar, but these are mostly treated by ponds:

- Pond C
- Hohag Ponds A-1, A-2, B, and C
- Old Cedar Pond E

While there is currently high water quality in Long Meadow Lake, this may be threatened by continued flooding and afforestation, which is described in Section 3.3 as the overgrowth of woody vegetation. Both flooding and afforestation increase sediment and nutrient loads deposited into the lake.

Spring-fed Environments

Several spring-fed streams drain into wetlands and shallow water lakes, directly affecting the habitat quality of the River Valley. The main streams on City land include:

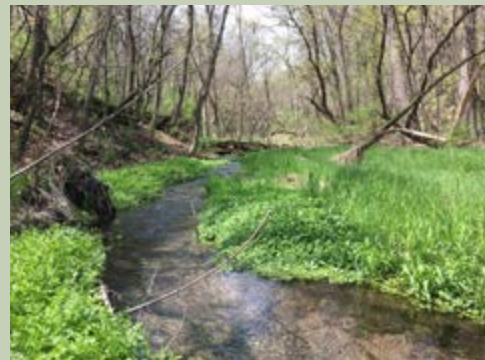
- One stream at Mound Springs Park,
- Big Brook stream to the west of Pond Dakota Mission Park, and
- A stream to the east of Pond Dakota Mission Park.



Spring-fed stream at Mound Springs Park

Ike's Creek

There is a spring-fed stream located south and east of East Old Shakopee Road and 24th Ave, known by some locally as "Ike's Creek" which is located on land owned by the City of Bloomington, the Kelly Farm property, and the U.S. Fish & Wildlife Service (USFWS). The USFWS and the Minnesota Department of Natural Resources (MnDNR) initially stocked the stream with heritage-strain brook trout in 2007. Ike's Creek flows through City parkland (Forest Glen Park), however it is disconnected from the contiguous network of City-owned land in the River Valley and was not evaluated in terms of its resource enhancement feasibility and priority in this Plan. In the past, the City has removed invasive species, trash, and dead, fallen wood from this site. The site was also seeded with native prairie/oak savanna, and woodland seed mixes and plugs were planted to help reestablish native plants in the park. The City continues to remove invasive species and perform additional seeding at the site. One of the management goals in this Plan is to *Maintain and Enhance Existing Accomplishments* (Section 4.1). Therefore, resource management at Ike's Creek is considered a priority apart from the other sites identified in this Plan.



Enhancement and restoration of streams with appropriate riparian vegetation could improve habitat in all areas of the River Valley.

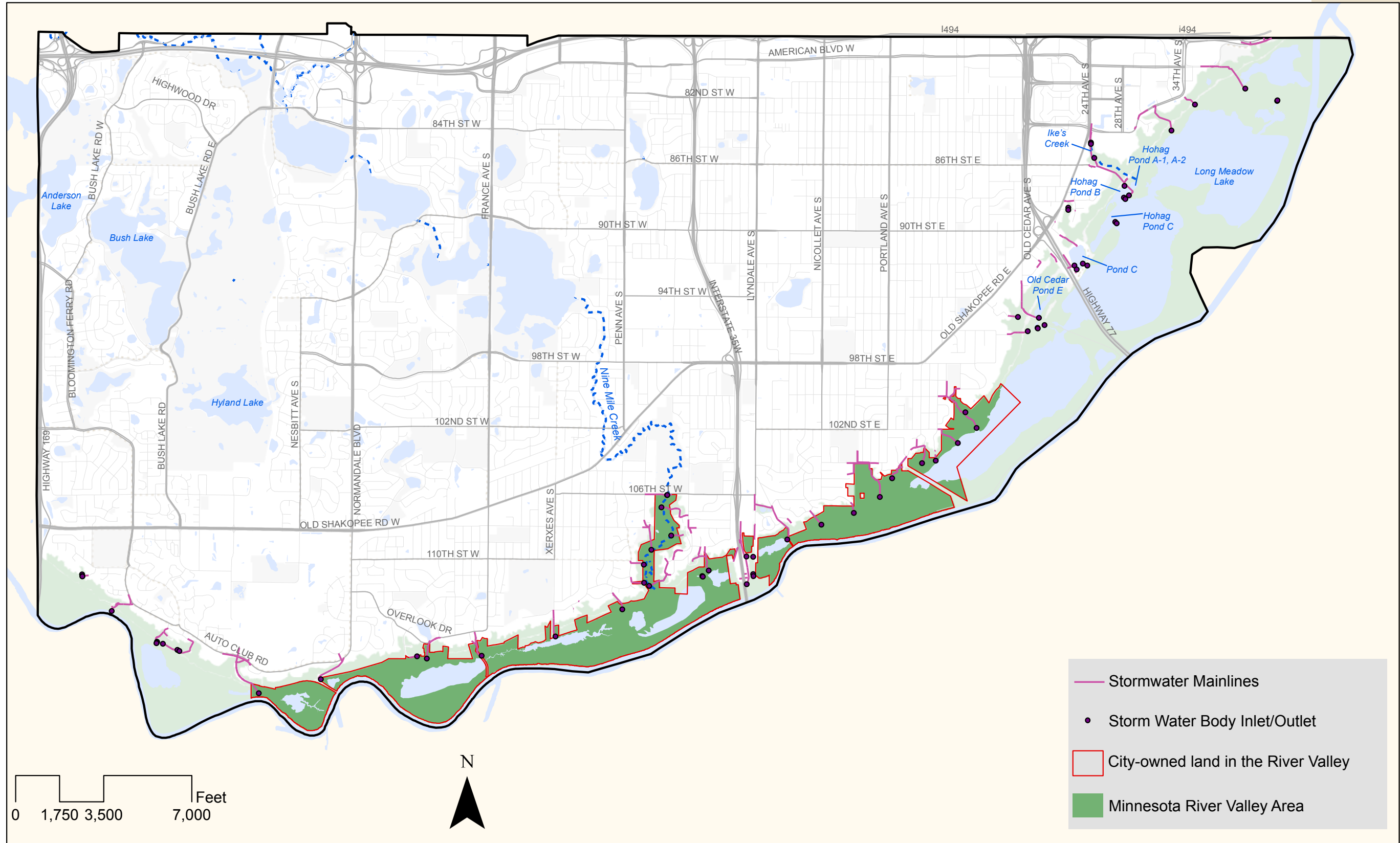
Best Management Practices and Water Quality Monitoring

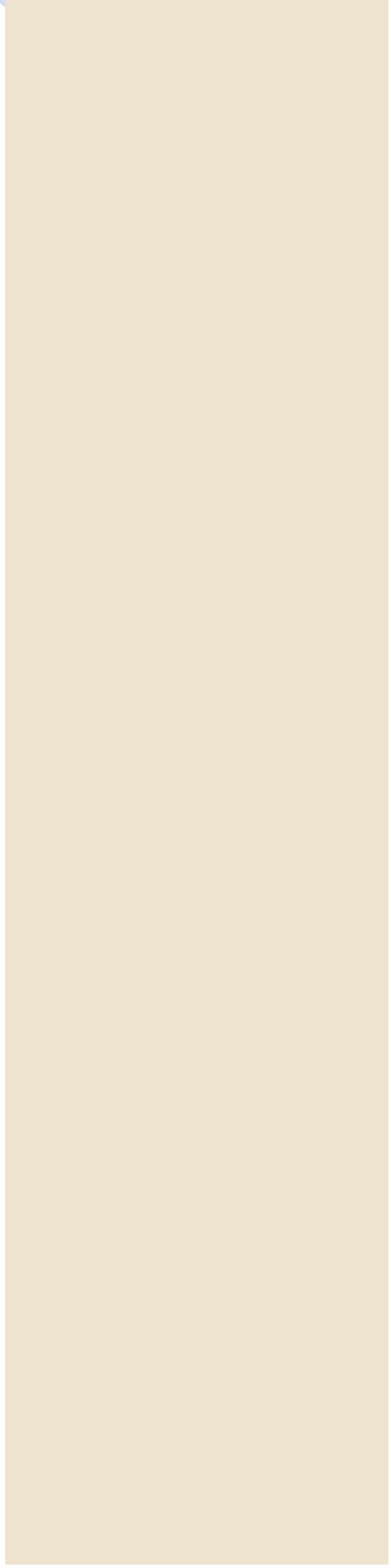
In addition to the series of ponds and wetlands that are part of the storm sewer system, the City has many other stormwater best management practices (BMPs) that help improve the quality of runoff water prior to discharging to downstream resources. BMPs include structural stormwater treatment practices such as trap manholes, underground swirl chambers, and floatable controls. There are also volume retention BMPs such as raingardens, pervious pavements, swales, and underground infiltration chambers. Water quality structures that capture and reduce pollutant loads in stormwater runoff prior to discharging into the River Valley are located at the east end of American Boulevard.

The City partners with other agencies to conduct citizen science programs such as the Citizens Assisted Monitoring Program (CAMP) and the Hennepin County Wetland Health Evaluation Program (WHEP) (see page 5.4 for an overview of citizen science). The Nine Mile Creek Watershed District and the Metropolitan Council operate water quality monitoring stations along Nine Mile Creek at three locations in Bloomington: West 78th Street, West 98th Street, and West 106th Street. The City conducts water quality monitoring throughout the City to collect data, and has also established a surface water sampling program that samples 25 ponds throughout the city over the summer months.

The floodplain lakes in the River Valley are generally healthy with good water quality. They are subject to seasonal inundation by the Minnesota River, which can deposit significant sediment loads and negatively impact lake health and water quality. However, in addition to Long Meadow Lake, Coleman Lake occasionally supports a healthy population of wild rice. Recently, the Lower Minnesota River Watershed District worked with the University of Minnesota to perform lake sediment core sampling in an effort to determine current and historic sedimentation rates.

Figure 3.3 River Valley Waterways and Stormwater Inlets/Outlets





**THIS PAGE INTENTIONALLY LEFT
BLANK**

Fauna

The River Valley is home to a variety of birds, mammals, fish, reptiles, and amphibians. Some of these fauna are permanent residents, others reside part-time or pass through during migration. Since fauna do not abide by jurisdictional boundaries, many of the species listed in this section are present throughout the River Valley.

The River Valley is particularly significant as a migratory bird habitat, and sees over 250 species of birds throughout the year. These include resident and migratory species including the Wood Duck, Great Blue Heron, American Kestrel, and a variety of warblers.

A few of the mammals in the River Valley include the brown bats, red fox, and muskrats. The City manages or monitors some of the more common species such as whitetail deer, coyotes, and beavers. With increased sightings of deer and coyotes in urban areas, there is concern about the declining quality of food and habitat in the River Valley.

Common fish species include northern pike, catfish, and carp, to name a few. The wetlands in the River Valley serve as spawning and nursery habitat for some of these species. There is also a stream with brook trout located in the eastern portion of the River Valley.

Less is known about the reptile and amphibian populations in the River Valley. Species include painted turtles, hognosed snakes, and spring peepers. The 30 species of reptiles and amphibians are found in both the uplands and lowlands of the River Valley.

While the Habitat Assessment is primarily concerned with flora, the table in Appendix F shows how the fauna in the River Valley benefit from the different land types previously identified in this section. Additional information about species found in the River Valley can be found in the U.S. Fish & Wildlife Service's Comprehensive Conservation Plan and Environmental Assessment (2004) for the National Wildlife Refuge and Wetland Management District.

Plants and Animals in the River Valley:

- 50 mammal species
- 30 reptile and amphibian species
- 120 resident bird species
- 130 migrating bird species
- 12 species on the Federal endangered species list
- 100+ species on the Federal and State threatened and sensitive species list

3.3 Resource Threats

The River Valley is subject to a variety of threats to its natural and cultural resources. Some are global in scope and others are specific to environments located in close proximity to urban areas. While many of these threats are beyond the City's ability to fully address, they can be mitigated through appropriate management, maintenance, and enhancement. None of the threats are mutually exclusive. All, in one way or another, relate to and influence other threats.

While all of the threats described below are specific to natural resources, particularly flora, faunal and cultural resources are also impacted by a degraded environment through lower quality habitat and risk of becoming lost and forgotten in overgrowth, respectively. Conversely, some cultural resources might best be preserved by simply leaving them be with no management. The management strategies for natural and cultural resources are further discussed in Section 4.3. The most prevalent threats to natural resources in the River Valley are described below.

1. Climate Change

Studies show increasing ecological change and stress in the Earth's biosphere due to warming temperatures. As a result, some species are migrating into areas previously occupied by other species. Many plant and animal species face increasing competition for survival. Impacts of climate change in the River Valley should continue to be monitored so that short and long term restoration strategies can be performed accordingly.



The May 2017 flood at Anderson Park Lowlands deposited undesired loads of sediment and nutrients, making growing conditions less favorable for desirable species.

2. Flooding

Flooding is a naturally occurring phenomenon in the River Valley. During flooding, the Minnesota River and tributary streams deliver significant loads of sediment and nutrients to adjacent lakes and wetlands. Historically the Minnesota River flooded primarily in the spring. More recently, flooding has become more common throughout the summer and fall. More frequent flood events and off-season flooding have led to water quality degradation and

disruption in the normal lifecycles of many plants and animals.

3. Excessive Dead, Fallen Wood

Excessive dead, fallen wood accumulates in a natural environment as old trees die and are not removed due to the suppression of natural disturbances, such as fire, that would otherwise clear the forest floor. Historically, the River Valley was composed of higher quality trees, such as oaks, which provided quality food and shelter for wildlife, had longer life spans, and decomposed slowly. The current proliferation of lower quality trees provides poor food and shelter options for wildlife, have shorter life spans, and decompose rapidly. The rapid decomposition of woody species releases an influx of nutrients that encourages the growth of undesirable, weedy plant species. The accumulation of dead, fallen wood from lower quality trees also creates favorable conditions for destructive wildfires, provides poor habitat for fauna, and favors the refuge of undesirable species such as pestilent insects. Excess dead, fallen wood also hinders access for public recreation and maintenance crews, as well as movement of wildlife through these habitats. While some dead, fallen wood should remain as it provides habitat for cavity nesting birds and other wildlife, excessive amounts of dead, fallen wood should be removed.

4. Overgrown plant populations, bare soils, and erosion

One-foot tall woody seedlings of buckthorn, hackberry, and ash can easily shade out grassland vegetation immediately under its canopy. Two seasons of woody seedling expansion can quickly transform a site into an afforested state. Bare soils are prevalent in areas where taller vegetation prohibits adequate sunlight from reaching the soils and supporting a ground level vegetation. The absence of ground level vegetation and native species results in a lack of deep root systems. Without these root systems in the soils, there is increased threat of soil erosion, infiltration of precipitation is poor, and the loss organic



Excessive dead, fallen wood in Mound Springs Park



Bare soils are prevalent throughout the River Valley.



Invasive, undesirable garlic mustard at Parker's Picnic Lowlands

Invasive and Undesirable Species Terminology:

The term "invasive species" has become common nomenclature for species that are exotic and come from outside a given environment. However, labeling species as invasive suggests that the environmental transformation was initiated by the arrival of exotic species, whereas in reality changes to the environment occurred first and created a favorable environment for these exotic species to then become dominant. It is important to note that both non-native and native species might be called "invasive." Therefore, this plan uses the term "undesirable" for all species that are noxious and/or not beneficial to the River Valley environment.

matter is exacerbated. In these conditions, the establishment of desirable plant species becomes much more challenging.

5. Undesirable Species

Undesirable, invasive species are introduced from other areas and, without competition or biological controls, they thrive and crowd out the desirable, native species. They tend to invade disturbed areas and can spread quickly. When left unmanaged, these species can quickly dominate an entire ecosystem. Areas that once contained diverse plant communities now only contain one to two low quality species. Undesirable species feature low quality vegetation attributes, such as a lack of nectar and poor structural qualities. The reduction in plant quality and diversity affects the variety of wildlife that rely on the River Valley for food and



Plants are not the only type of undesirable species. The Emerald Ash Borer (EAB) is an invasive, undesirable insect that is a threat to Ash trees, especially in

the wetlands and forested floodplains of the River Valley. The City is currently working to control the spread of EAB, and more information can be found at the City's website:

<https://www.bloomingtonmn.gov/mnt/emerald-ash-borer-eab>

habitat. The presence and proliferation of just a few undesirable species can directly impact the biodiversity of all types of species.

Some of the prevalent, undesirable species that exist in the River Valley include: common buckthorn, glossy buckthorn, exotic honeysuckle, garlic mustard, and reed canary grass. Additionally, there are aggressive native species such as, red cedar, box elder, and green ash that have become undesirable in the River Valley and may cause problems in restoration areas.

6. Dumping

Dumping of wastes such as pet feces, leaves, grass clippings, and dead wood creates unsightly and noxious sites where weed growth occurs, feral animals take refuge, and toxic materials accumulate. Dumping is an ongoing challenge, particularly in urban or suburban locations where large numbers of people have relatively convenient access to natural areas. Providing outreach to citizens that explains the negative side effects of dumping could be an effective way to reduce its occurrence.

7. Plant Harvest


Plants provide food and other resources for humans just as they do for wildlife. However, given the presence of rare species and the limited sources of quality food and habitat for wildlife, the flora in the River Valley should remain unharvested. While much of the River Valley was once farmed, that is no longer the case today. The River Valley is located within the City's Conservation zoning district, the intent of which is to provide areas for habitat protection and wildlife management.

8. Human Disturbance

Agriculture, land development, and vandalism are of particular concern to fragile cultural resources. Lack of awareness of the existence of a cultural resource is the main cause of damage.

Cultural resources are susceptible to the effects of soil erosion, compaction and rutting. These forces can disturb archaeological sites and destabilize historic structures. Traditional use areas may be impacted by timber harvesting, fire management and herbicide use. While changes in site access created by roads and trails make some cultural resources susceptible to looting and vandalism, they also open up opportunities for on-site education, interpretation and visitor experiences.

**THIS PAGE INTENTIONALLY LEFT
BLANK**

A person wearing a grey long-sleeved shirt, orange pants, and an orange hard hat is using a chainsaw to cut through a pile of dry, tangled branches. The person is wearing black gloves with the word 'VALEO' on the back. The chainsaw is orange and black. The background is a blurred natural setting with more branches and a greyish tone.

SECTION 4: RESOURCE MANAGEMENT

In this section, management goals are identified, which lead to the development of objectives and strategies. Then, sites are rated according to a set of criteria to determine their level of priority for land management to occur. The priority sites can be matched with the information in the Habitat Assessment (Appendix A), which provides site specific management strategies.

4.1 Management Goals

This plan calls for an adaptable resource management approach that creates a better functioning ecosystem and protects and preserves cultural resources within the River Valley. Since humans have utilized and altered the landscape for millennia, it is not feasible or appropriate to return to pre-settlement conditions and disregard the role of people in the natural environment. While natural areas located in the River Valley appear “wild”, they require active management to remain ecologically healthy. As described in the Habitat Assessment (Appendix A), the River Valley is directly impacted by adjacent urban land uses. Stormwater runoff finds its way to streams, influencing water and soil nutrient levels. Seeds from exotic and undesirable species on adjacent lands are carried into the River Valley by the wind, birds, and even peoples’ boots. Abutting private residences and limited accessibility along the steep bluffs reduce the ability to safely conduct prescribed burns that historically controlled the overgrowth of weedy species. A management plan is needed in order to address resource threats and define strategies to improve the quality of resources present throughout the River Valley, but particularly on city-owned lands.

A variety of management strategies are proposed. The extent to which these actions are implemented is guided by a range of management objectives outlined as monitoring – maintenance – enhancement – restoration, from least resource intensive to most. This approach is further described in the Management Objectives Section 4.2. The techniques to achieve the objectives are described in the Management Strategies Section 4.3. Due to limited resources, not all of the

proposed strategies can be implemented at once. A list of criteria for scoring and ranking high priority sites for land management is described in Section 4.4. Below are the goals that guide this approach and the proposed management strategies in the River Valley.

1. Maintain and Enhance Existing Accomplishments

The City has engaged in management activities in the River Valley as resources have allowed. There are several City-led habitat restoration efforts underway including:

- The uplands surrounding the Pond Dakota Mission are targeted for oak savanna restoration, and include undesirable species management and tree thinning at the Hopkins Farm site.
- Areas along the Nine Mile Creek trail leading to the river also undergo a similar land management routine.
- Although very limited, current management practices include tree thinning, mowing, and undesirable species control.

The most cost effective land management approach would expand on existing successes and progress. When restoring landscapes, it is often most efficient to begin in one area and expand outward, thus maintaining the desirable state at the core and enhancing areas on the fringes. Landscapes can easily revert to an afforested state if left with little to no management. Therefore, it is crucial to have both short-term and long-term management programs to protect existing restoration efforts.

2. Foster the Growth of Desirable, Native Species

Lack of active management can contribute to natural resource degradation and an increased potential for encroachment by undesirable and exotic species. Several exotic, undesirable species have become established in the River Valley and have the potential to negatively affect the diversity

and quality of the habitats and wildlife in the River Valley.

Complete eradication of all undesirable species is not often an attainable goal given limited funding. A more realistic approach is to modify the local environment to improve conditions for desirable species. For instance, reducing the amount of shade generated by undesirable species fosters the growth of desired native vegetation that cannot thrive in dense shade. In general, land management strategies should reduce the ability of undesirable species to dominate and compromise the integrity of the ecosystem. Short-term and long-term plans are needed to fully manage undesirable populations and restore functioning ecosystems. Establishment and maintenance of diverse native plant communities can help prevent the spread of undesirable species.

3. Establish Continuous Ground-Level Vegetation

A continuous layer of ground-level vegetation is much more efficient at regulating nutrients and reducing soil erosion than the current overgrown woody vegetation and bare forest floor. The root systems of grasses sequester nutrients into long term storage within the soils, whereas woody vegetation typically stores nutrients above ground. Additionally, the deep, fibrous roots of grasses are much more efficient at reducing soil erosion. Even in areas where soils are covered by leaf litter, for instance, roots are still needed to sequester carbon, infiltrate water, and further prevent erosion. In the case of bare stream banks, adjacent slopes need to be revegetated to maintain soils, keep sediments out of the stream, and help streams form narrower and deeper channels. A vegetated stream bank is conducive to improved water quality and aquatic biology.

4. Reintroduce Natural Disturbances

Historically, disturbances such as grazing, fire, and other biological controls occurred naturally. Now, these disturbances have been highly controlled or suppressed in the River Valley to avoid impacts

on nearby urban development and populations. The lack of disturbance has significantly altered the native vegetation with a prevalence of woody, weedy vegetation, a general lack of biodiversity, and a lower quality food source and habitat for wildlife. While prescribed burning may not be feasible at all locations, there are alternative approaches such as grazing and mowing that can be equally effective. The objective is to mimic natural disturbances in order to reestablish and maintain healthy native ecosystems.

5. Strengthen the Potential for Biodiversity

More diverse ecosystems are found to be more resilient and provide a higher quality habitat. The spread of undesirable species threatens biodiversity, and often results in two or three species fully dominating a site. Despite an increase in undesirable populations, there are some areas with unique conglomerations of plant species within the River Valley that should be monitored and protected. Once established, these areas could even provide a viable root stock to transplant elsewhere.

6. Provide Education and Awareness Opportunities

Much of the River Valley feels natural. It is an undeveloped, wooded area for people to explore and escape from the urban environment. However, as explained in Section 3, the River Valley today bears little resemblance to its pre-settlement character. Rather, it is a product of human alteration within an urban setting. Management activities that may appear destructive are, in fact, needed and beneficial in response to urban impacts. Educational programs would help introduce people to the land management process and its benefits. Proper education could also empower individuals to be proactive in promoting the ecological health of the River Valley. Specific strategies are mentioned in the following section, but this goal acknowledges education and awareness about the River Valley as critical to advancing restoration.

4.2 Management Objectives

This section describes a range of management targets. These targets are intentionally broad to allow a range of options. This approach acknowledges that ecosystems in the River Valley are highly complex with a variety of flora, fauna, climate, and human influences. Therefore, they allow for a variety of target plant communities. Given limited resources, a range of management objectives, from restoration to simply monitoring existing conditions, are proposed. The specific management objective will be based on the habitat assessment and what is determined to be feasible, cost-effective, and desirable upon initiation of actual ground work.

- **Restoration** entails changing the current state to a different, more desirable state more closely reflecting pre-settlement characteristics. For instance, the conversion of oak woodlands to oak savanna is proposed in some sites. Other sites recommend management activities that would encourage beaver populations, which are otherwise absent. Restoration involves the most intense level of management in terms of time and money.
- **Enhancement** strives to improve existing site characteristics that are desirable. The expansion of unique, native plant populations is often a suggested enhancement. This requires regular management and maintenance, but is less resource intensive than restoration.
- **Maintenance** suggests a level of management aimed at stabilizing the existing site, rather than increasing its quality. For instance, a site could be mowed occasionally to prevent the spread of undesirable species. Many undesirable species would remain viable after mowing, but they may be deterred from forming seeds and spreading. Maintenance generally requires fewer resources than restoration and enhancement; not only because it involves less intensive management, but also because the desired state is already known. Restoration and enhancement signify that the current state will be changed, whereas

maintenance suggests keeping the site in its current state.

- **Monitoring** is the least resource intensive management objective. Most sites in the River Valley require a more intense level of management. However, limited resources generally prevent the most desired level of management from taking place. At the very least, all sites should be monitored in order to track changes and be able to anticipate needs for habitat improvement.

4.3 Management Strategies

This section describes various strategies for managing the cultural, floral, and faunal resources in the River Valley. The extent to which a site is enhanced or restored will be addressed upon initiation of actual ground work. Specific management strategies for different sites in the River Valley are found in the Habitat Assessment (Appendix A). The strategies listed below provide a general framework from which to make initial decisions about management objectives and priority areas for restoration, and do not take precedence over management decisions made upon initiation of actual ground work.

While the following management strategies do not address the water-based environments identified in Section 3.2, this plan acknowledges that sites adjacent to water-based environments are of significant value when determining high priority management sites (Section 4.4).

Cultural Resource Management (CRM)

Cultural resources are scarce and nonrenewable. Successful cultural resource management entails long-range planning, education, and partnerships. While cultural resources are often thought of as human-made artifacts, natural areas that have been shaped by historical processes of land use may also have value as a cultural resource. In general, good natural resource management is compatible with beneficial cultural resource management practices.

Benefits

While the benefits of cultural resource management cannot always be easily defined, they are nevertheless important and include the following:

- As scarce, nonrenewable parts of the environment, cultural resources provide physical links to the past along with a sense of national, community, and personal identity.
- Historic structures, historic areas, traditional use areas, and other above-ground cultural resources provide environmental diversity, while some structures and artifacts have intrinsic value as works of art.
- The conservation of cultural resources contributes to an understanding of history, fosters an appreciation for heritage, and stimulates learning at all education levels.
- Some kinds of cultural resources, including archaeological sites and historic structures, have value as heritage tourism sites and may help create new visitor experiences.
- A growing number of federal and state laws provide financial incentives for preserving and protecting cultural resources. Federal investment tax credits are available for rehabilitating and reusing historically significant buildings and structures.

Cultural Resource Inventories

The first step in cultural resource management (CRM) planning is to check existing cultural resource inventories to determine whether any important cultural resources are known to be present within a given area. Information is available that can help the City identify cultural resources now and in the future. Cultural resource surveys and their resulting inventories are available for numerous archeological projects in the River Valley.

Conducting a Pre-Field Review

If no surveys of a River Valley site have been previously completed, the City may contract for or conduct its own assessment of the project area’s cultural resource potential. This process may entail checking existing maps, aerial photos, printed historical information, as well as contacting individuals knowledgeable about local history or archaeology.

Documentary information that may be of assistance includes:

Township, county, regional or state histories	Industry and business records
Historical maps, atlases and plats	Aerial photos
Government land surveyor field notes	Reports of previous cultural resource surveys
Information from local Native American communities	Interviews with historians, archaeologists and other knowledgeable individuals

Identification of Cultural Resources

Some locations are more likely than others to contain cultural resources. The following features in the River Valley may have high potential for cultural resources:

Current shorelines or terraces adjacent to a permanent lake, river, or stream	Fieldstone foundations and other structures
Former shorelines, including glacial lakes (such as Agassiz, Upham, Duluth or others), abandoned river channels, solid dry land around large marshes and bogs, and abandoned high-water shorelines on lakes	Areas with traditional resources, especially where gathering is known to occur or evidence exists that the area is used (for example: wild rice, maple "sugar bush," birch bark, boughs, and such wild foods as berries, mushrooms, roots, and herbs)
Junctions of water bodies, including stream inlets and outlets to lakes, and river/creek junctions	Miscellaneous building materials (bricks, roofing materials, plaster, and stucco)
Good places to camp, including areas where people camp now	Metal pipes (such as well pipes)
Islands	Earthen berms and trenches
Peninsulas or points of land along a shoreline	Shallow depressions (such as graves or ricing pits). Note: Such features could indicate possible burial sites.
Areas adjacent to fish spawning beds, good fishing spots, and wild rice beds	Milled lumber (such as boards suitable for use in burial crosses, or building construction).
Transportation routes such as old trails, roads, portages, and railroads (many modern roads follow old trails and wagon roads).	Domestic or exotic plant species (including lilac bushes, fruit trees and daisies)
Areas near community centers, such as towns and villages, especially in combination with transportation routes	Old roads and trails (especially the junction areas where two come together or are associated with a clearing)
High spots offering a panoramic view	Fence materials (wood or metal posts, or wire)
Unusual natural features	Retaining walls
Surface artifacts (anything man made)	Trash dumps
Vegetation that grows in disturbed soils (including poison ivy, ragweed, and nettles)	Objects in or attached to trees
Cellar and well holes	Standing structures and buildings
Cement or asphalt slabs	Clearings in trees

Management Alternatives

1. Protection by law

If the pre-field review indicates that the project area contains a site protected by law (such as a burial site), further action will be determined by statute or regulations.

2. Identification as a low-sensitivity site

If no cultural resources have been recorded and the pre-field review and walk-over inspection yielded no indications of important cultural resources, the site would have low sensitivity. In this case, the site is not likely to contain important cultural resources. In low sensitivity sites, management activities can proceed with caution.

3. Identification as a high-sensitivity site

If cultural resources are known to exist, or if the pre-field review and walk-over inspection indicate their presence, the site has high sensitivity. In this case, the following alternatives are recommended:

- Avoid the highly sensitive areas identified within the project area.
- Protect the cultural resource by means of the treatment and mitigation practices.
- Bring in a cultural resource management professional to carry out a survey for archaeological and above-ground cultural resources.

Assessing Potential Significance

In the event that a cultural resource is identified, a CRM professional (including state or tribal preservation office staff, college and university faculty, or consulting archaeologists and historians) should be contacted in order to determine appropriate protection measures. In most cases, the value of any one archaeological site, building, or area cannot be fully evaluated without comparing it to other cultural resources. The most widely used standard for evaluating the significance of cultural resources is the National Register of Historic Places (NRHP).

CRM professionals will be consulted when the City undertakes new projects in the River Valley in areas of unknown cultural resource presence.

When Accidental Discovery Occurs

Unrecorded cultural resources may be discovered accidentally during projects undertaken in the River Valley, even if previous surveys found no significant cultural resources. Guidelines for proceeding depend upon the nature of the discovery:

- In the case of human burials, temporary suspension of operations in the vicinity of the discovery is required. If a human burial site is accidentally discovered, the City will contact the Office of the State Archaeologist and Bloomington Police.
- For other types of cultural resources, such as general archaeological artifacts, temporary suspension is not required, but is recommended. Suspension of operations in the immediate vicinity of the cultural resource provides time to contact a cultural resource professional or to develop plans to avoid or mitigate potential impacts to the cultural resource.

The following guidelines apply when important cultural resources are discovered during management activities :

- Safeguard the condition of the cultural resource by preventing further damage, loss or deterioration.
- Investigate and document the cultural resource in order to determine its significance and conservation potential.
- Adjust work schedules to allow time for data recovery or other mitigation measures, including following appropriate cultural resource guidelines.

Fauna

While much of this report focuses on improving plant communities, the River Valley is also home to a variety of wildlife that also require protection or management. There are rare and unique species which may or may not be protected under government regulations, as well as those that are overabundant and require management of existing populations. Existing wildlife management or monitoring programs that affect wildlife in the River Valley are described on the following pages.

Better functioning plant communities provide a healthier habitat for wildlife that live in the River Valley. For instance, a variety of habitats with edible, nectar producing vegetation enhances wildlife diversity by providing year-round habitat and food options. This would increase opportunities for wildlife viewing in the River Valley.

Some fauna is managed through City-wide nuisance control programs, whereas other species are protected by federal and state laws (Section 6). In the River Valley, the City manages city-owned properties and the USFWS manages federal lands and a portion of City land via a memorandum of understanding as shown in figure 4.1. However, fauna do not abide by jurisdictional boundaries, and it is not possible to fully protect species when constricted by land ownership. Coordinated efforts are needed to protect the species.

This deer program contains five guidelines:

- Maintain a city-wide deer population under 300.
- Fine tune deer density and distribution in the City using selective sharp shooting according to density standards and aerial survey reports.
- Continue public education programs on how to live with an urban deer population including continuing the deer feeding ban (adopted in 1997, effective annually from November 1 to March 15)
- Continue cooperation with other agencies and surrounding cities on management
- Continue data gathering to ascertain whether the current objective of 15 to 25 deer per square mile of habitat should remain the standard for measuring ecosystem balance.

City Monitoring & Control Programs

Deer

In the late 1980s, rising deer populations in the metropolitan area led to a significant increase in complaints. A Deer Management Task Force (DMTF) was formed among area stakeholders, which completed a study in 1990 that described issues and recommendations along with a three year deer density/population reduction program. The City Council adopted a deer management program in 1991 to reduce the deer population from 1,000 to approximately 300. The approved removal method involved Bloomington Police and USFWS conservation officers conducting sharp shooting at bait sites throughout the habitat areas. In 1994, the City Council adopted a five-year program, from 1994 to 1999, aimed at maintaining rather than reducing the City's deer population.

In 2000, the City Council adopted an annual deer management program continuing the management practices identified in 1994, but reducing the maintained population to 250. Removal sites are determined through staff monitoring of complaints, deer-car collision data, and aerial deer surveys.

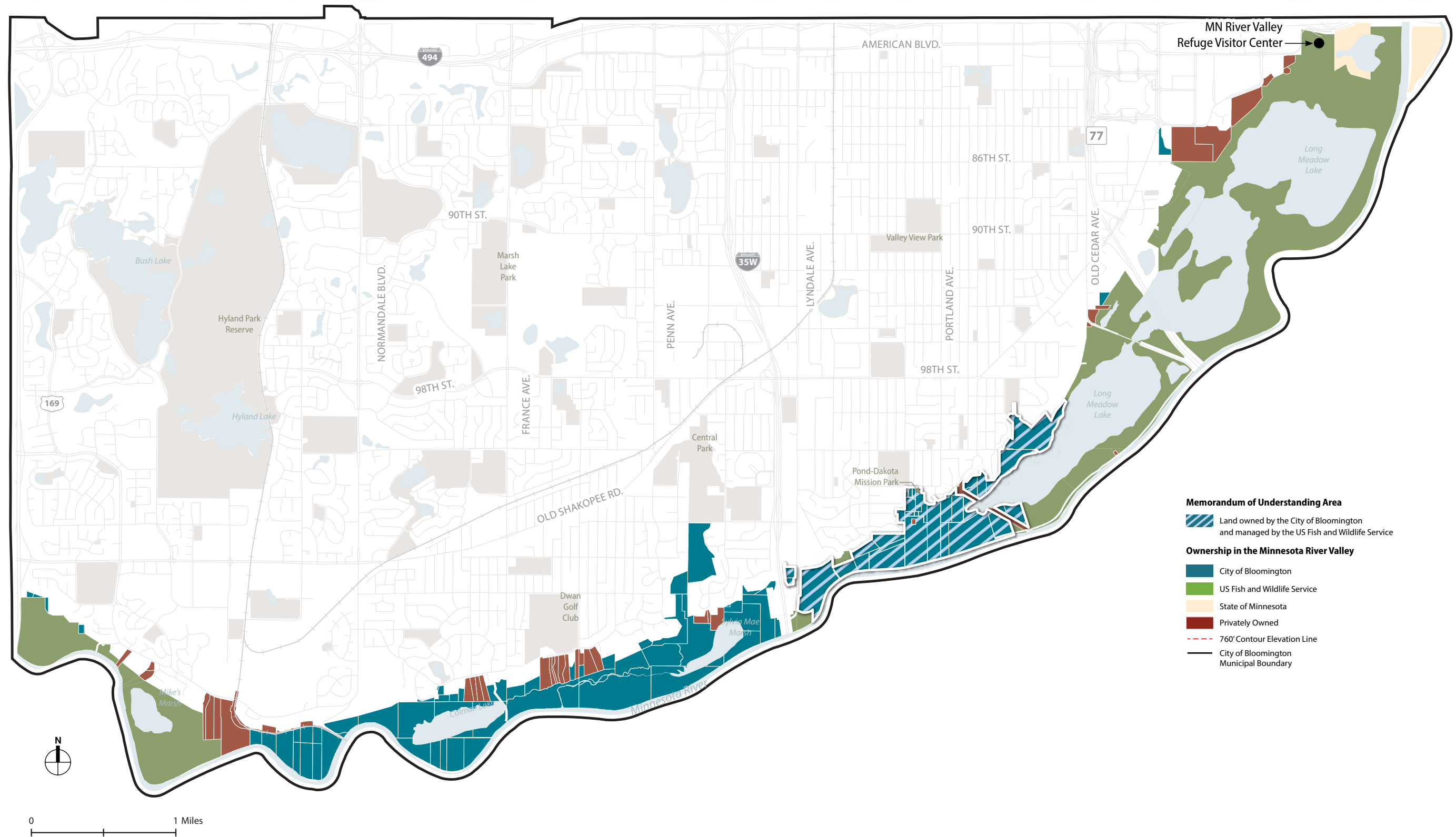
Pollinators

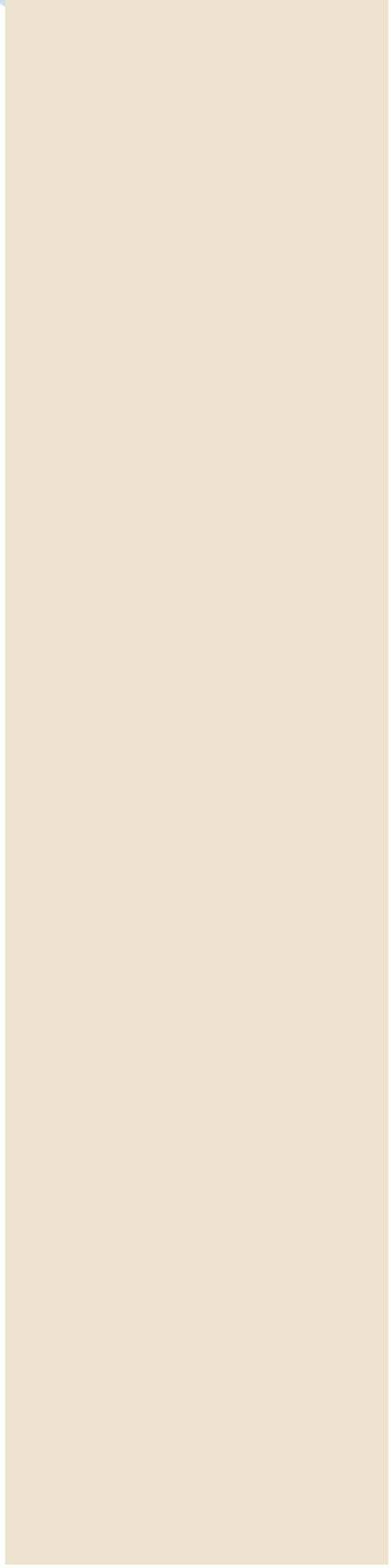
The City supports pollinators through park maintenance practices, and encourages appropriate use of native prairie grasses in the landscape yard requirements. Additionally, the City is partnering with Xcel Energy to plant pollinator habitat along transmission line right-of-ways. In relation to the City's efforts, the State of Minnesota issues an annual report on its Interagency Pollinator Protection efforts. The goals of the State Pollinator report are directly relevant to the River Valley, and are supported in this report by the strategies listed below:

Strategy 1: Improve pollinator habitat and use pollinator friendly seed mixes

The effort to create a "Monarch Highway" is underway among State and Federal agencies to create way stations along the I-35 corridor for migrating monarch butterflies. Educational materials, shared vegetation

Figure 4.1 Ownership and Land Management in the River Valley





**THIS PAGE INTENTIONALLY LEFT
BLANK**

management practices, and creating pollinator-friendly seed mixes for use in parks and right-of-ways are a few of the management strategies that could be used in the River Valley.

Strategy 2: Avoid pesticide & herbicide use

Although pesticides are not part of the River Valley's management plan, the use of herbicides can also be harmful to pollinator populations. For instance, lack of care when spraying might inadvertently kill pollinator friendly plant species. Herbicides should be judiciously used, and limited to the extent possible .

Strategy 3: Education

Providing educational opportunities is an overarching goal in this plan, and should include information on pollinators when appropriate. A variety of partnerships could be developed, and portions of the River Valley could serve as demonstration sites.

Coyotes

Sightings of coyotes are on the rise in the City. The City currently monitors the locations of various incidents through its Animal Control Unit. Mapped reportings, accessible through the City's website, include coyote sightings, coyotes killed by cars, dogs attacked, and dogs killed over the past three years. While the City has no coyote population control program, its website offers tips to private residents and property owners about how to avoid contact with coyotes. These include discouragement of feeding any type of wildlife, removing or sealing areas of potential habitat such as woodpiles or crawlspaces, and a video about how to chase away coyotes. More information can be found on the City's website:

<https://www.bloomingtonmn.gov/pd/living-urbansuburban-wildlife>.

Beaver

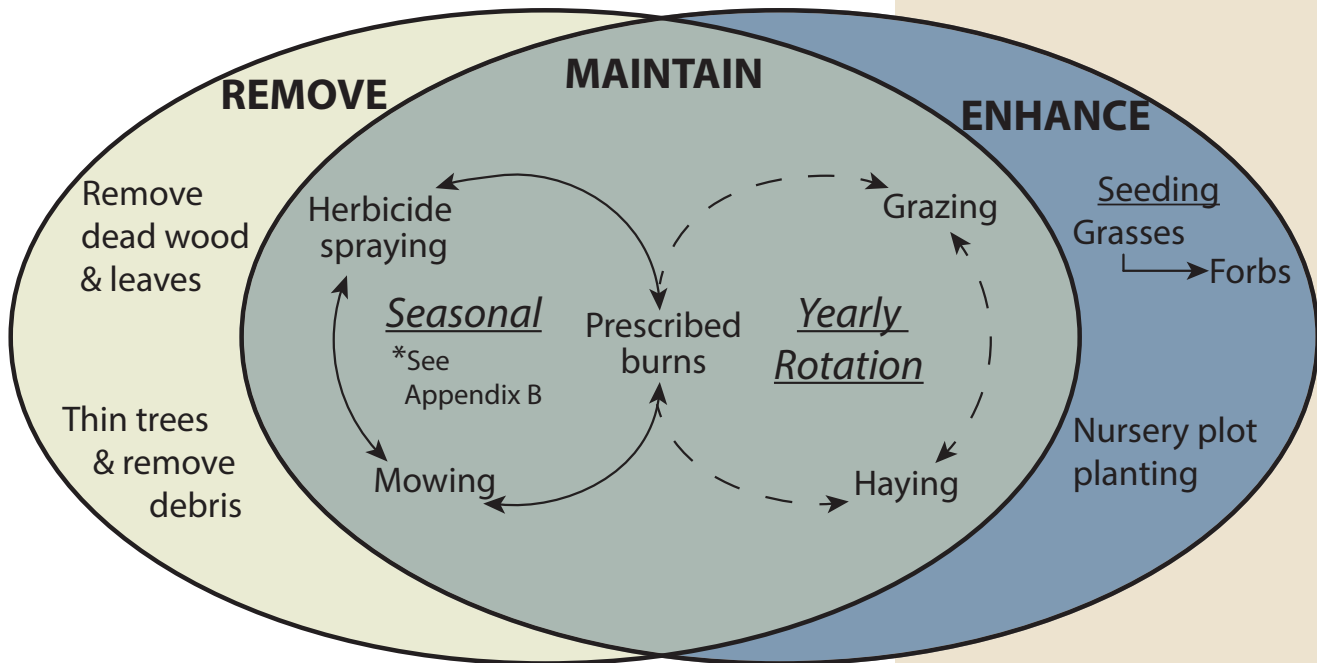
Beavers are both a nuisance to recreation and a resource for ecological restoration in the River Valley. They fell trees, which dam streams and flood trails. However, damming could enhance stream and water

quality. Beavers also actively manage the overgrowth of woody species. In its approach to beaver management, the City seeks to balance the need for ecological restoration with the health and safety of the public that visit the River Valley. Trapping is conducted primarily in the Nine Mile Creek and Anderson Park areas in response to flooding and damaged trails due to felled trees.

In some areas, the City might explore the feasibility of facilitating active beaver management. This involves cutting the stems of older willows, and allowing the trees to resprout younger, more nutritional shoots. Beavers can positively impact plant community assemblages by eating and removing larger woody vegetation, thus regulating nitrogen inputs and allowing more sunlight to reach the ground for an enhanced ground-level vegetation.

Flora

To improve environmental quality and function, management strategies should consider the diversity and density of woody and herbaceous species for each of the predominant terrestrial landscapes. Management often means initial removal of undesirable vegetation through mechanical and chemical means. This removal allows room for more desirable species to grow. Several years of maintenance are needed in order to eradicate undesirable vegetation and achieve a robust ground vegetation layer. When maintained properly, there should be a healthy diversity of desirable species. When the population of desirable vegetation becomes stable with little threat of being overrun by undesirable species, management tactics can be less intense and frequent. Long term management should include natural disturbances to maintain a diverse native plant community. The appropriate strategy depends on a variety of factors, including existing vegetation, land community type, time of year, and access to the site. The types of strategies are outlined below, and further

Figure 4.2 Inter-relationship of flora management strategies

information is found in Appendix B.

Mechanical Strategies

The majority of resource management strategies are mechanical, requiring either equipment that can be used by hand or larger machines that are driven. Limiting factors for use of bulky, heavy machinery include the presence of water or water-logged soils, steep topography, and lack of roads or a clear path for access and maneuverability. Mechanical strategies are often preferable to chemical strategies, which have associated risks such as spills and water and soil contamination. Often, a variety of strategies are needed to fully manage and restore a site. Common mechanical strategies include:

- Tree Thinning
- Mowing (flail, forestry, and spot mowing)
- Haying
- Seeding
- Nursery plot planting

Chemical Strategies

Herbicides applications are useful for targeting specific areas or treating large contiguous areas of

undesirable species. A range of herbicide products are available to use for specific restoration applications. When designing an herbicide plan, the following factors need to be considered:

- Target species
- Site conditions
- Proximity to non-target species
- Type of herbicide
- Herbicide formulation (mix)
- Timing of application

Herbicide application can consist of broadcast or spot treatments depending on the density of the target species and the composition and density of the surrounding desirable species. Broadcast spraying typically entails using some form of utility terrain vehicle, whereas spot spraying can be performed on foot. If a large, flat area is composed mostly of undesirable species, then broadcast spraying is likely the best approach. If an area is interspersed with desirable species or is extremely hilly, then spot spraying may be most efficient.

- Broadcast spray treatment
- Spot spray treatment (foliar, basal bark, cut stem)

Natural Disturbance Strategies

As described in Section 3.3, natural disturbances such as periodic fires, grazing among resident wildlife, and a biodiverse ecosystem once regulated the dominance of one species over another. However, these phenomena are no longer a regular occurrence in the River Valley. Best management practices have identified prescribed burns, grazing, and biological control agents as replacements for the disturbances that no longer occur naturally. The suitability of each approach depends on conditions such as proximity to adjacent residences and availability of material for burning or consuming.

- Prescribed Burn
- Grazing

Management Costs

When determining best management practices, cost is a major factor. High cost strategies may need to be used sparingly or only in high priority areas. Costs in Table 4.1 are generalized estimates to provide a high level comparison and to help anticipate resources needed to implement various strategies. Factors affecting these generalized costs include:

- Access restrictions such as steep slope, lack of roads, and dense vegetation limit the cost-efficiency of operating at a site. Large machinery is typically able to perform a task fastest, but faces greater access restrictions than use of hand-held equipment.
- Frequency. Some strategies may have a high initial cost, but are only needed infrequently. Other strategies should occur regularly, either seasonally, yearly, or on a yearly rotation with other strategies, which can increase costs.
- Complementary strategies are those that are most advantageous when performed in conjunction with one another. Performing one strategy without another may render that strategy ineffective.
- Site Conditions. In addition to access restrictions, some ecosystems may be particularly sensitive to certain strategies. The appropriate management strategy for specific River Valley environments can be found in the Habitat Assessment (Appendix A).

Table 4.1 Management Costs

Activity	Cost	Notes
Mechanical		
Tree thinning	\$4,500*+	Cost dependent on quantity and end use of material. With mobilization and access there is an economy of scale related to timber stand thinning.
Flail mowing	\$125 - \$200 / acre* / occurrence	
Forestry mowing	\$650 - \$850 / acre* / occurrence	Cost dependent on amount of material needing to be mowed
Spot mowing	\$125 - \$200 / acre* / occurrence	
Haying	\$400 - \$800 / acre* / occurrence	
Forb Seeding	\$1,000-\$3,000 / acre / occurrence	Cost dependent on mix and species
Graminoid Seeding	\$600 -\$1,000 / acre / occurrence	
Chemical		
Cut, treat, and stack woody undesirable species	\$1,000 -\$2,500 / acre / occurrence	Cost dependant on size of infestation, equipment accessibility, and terrain
Non-woody undesirable species management (mow & spray)	\$250 - \$750 / acre / occurrence	Cost dependent on size of infestation
Natural Disturbances		
Prescribed Burn	\$3,000 - \$9,000 / occurrence	There is an economy of scale in relation to ease of mobilization, complexity of burn units, and access
Grazing	\$1,200 - \$1,800 / acre	

* Activity and cost dependent on machine access to valley

** Costs are averages and may fluctuate depending on the market. The numbers in Table 4.1 are meant to give an approximation of cost to help with budgeting.

4.4 Management Priorities

While the entire River Valley needs some form of management, limited resources necessitate that activities be strategically prioritized. By identifying priority areas to target for restoration, resources can be allocated in an effective manner. A set of six criteria are used to determine priority:

- Improvement and/or Expansion of Existing Efforts
- Quality of Vegetative Community
- Visibility & Public Perception
- Technical Viability of Short-term Management
- Technical Viability of Long-term Management
- Presence of Biological Resources of Special Significance

The presence of significant cultural resources is taken into account separately because management of cultural resources has varying implications for natural resource management. Some areas will need to be protected and preserved, whereas others can be managed in conjunction with the proposed natural resource management strategies. No priority ranking is assigned to cultural resources, and cultural resources may take precedence and influence the management priorities of natural resources.

A description of the criteria and how they are scored is described below. Some of the criteria are objective, relying on surveys of existing conditions to make informed decisions about scoring. Other criteria are more subjective, requiring an educated decision. Each of the criteria are scored on a scale of zero (0) to two (2). In general, a two (2) score means the criteria is highly applicable to the site, whereas a zero (0) score signifies that the criteria has little to no relevance to the site. The scores for each site are evaluated in a matrix, which is displayed at the bottom of this section. The matrix reflects an average of the scores chosen by staff and volunteer professionals. The sites that score the highest total are identified as the high priority sites described in the following section.

Scoring for Criterion 1

- 2 – Existing restoration area
- 1 – Adjacent to existing restoration site
- 0 – No existing effort present in the area

While these scores identify high priority sites at the moment, there may be unanticipated factors that instantly make a site a higher or lower priority. For instance, if funding suddenly becomes available to restore a particular type of habitat, then that site would become a higher priority. Partnerships with other agencies and organizations could also influence where restoration activities occur. The priority sites provide a plan of action, but allow flexibility in the decision making process.

Criteria

The following criteria are used to recommend areas for management:

1. Improvement and/or Expansion of Existing Efforts

As explained in the Restoration Goals section, there are a few sites where the City has already begun the restoration management process, namely Pond Dakota Mission, Hopkin's Farm, and portions of Nine Mile Creek. In order to sustain what has already been accomplished, it is most cost efficient to continue to maintain and expand out from these restoration areas. When determining which direction to expand efforts, consideration should be given to areas that would create connections to other high quality vegetative communities or existing management areas. From a vegetation management perspective, this tactic is effective when managing the spread of undesirable species.

2. Quality of Vegetative Community

Areas within the River Valley were assigned a letter grade according to their quality of vegetative community (Appendix A). Grades were determined in Hennepin County's 2007 NRI and in Great River Greening's 2017 survey. The grades are based on MnDNR's Natural Heritage Element Occurrence Rankings (EOR). Each grade is distinguished by unique factors according to the habitat type. In general, the grades are determined by the following:

- Disturbances, past or present, to the plant community
- Presence of natural processes
- Composition of plant communities
- Area covered by native species
- Presence of non-native & weedy species

To score this criterion, only the 2017 habitat grades are to be used. There is no assigned score for a letter "A" grade because there are no habitats with that grade currently. The "B" and "C" grades are scored together because there are few of these grade designations in comparison to the "D" and "F" grades. If multiple habitat sites with different grades are present in an area, then the average of those grades should be used to determine the score and may be slightly subjective.

3. Visibility & Public Perception

Visibility is conducive to garnering interest and support, creating educational opportunities, and ease in monitoring for management. The more people that know about and comprehend the restoration process, the more they will appreciate and want to improve their natural environment. Additionally, the location of a site and its surrounding uses plays a significant role in its visibility and public perception. For instance, visitors of the Pond Dakota Mission might venture over to the restoration area along the trail following a tour. In this manner, people inadvertently experience restoration in progress due to its visibility.

Scoring for Criterion 2

- 2 – High or Good quality natural community (B or C ranking)
- 1 – Moderate or Poor quality natural community (D ranking)
- 0 – Altered / non-native plant community (F or NN ranking)

Scoring for Criterion 3

- 2 – Easily visible from parks, trailheads, parking lots, and other highly visited sites
- 1 – Distantly visible from parks, trailheads, parking lots, and other highly visited sites
- 0 – Not visible from highly visited sites

Scoring for Criterion 4

- 2 – Large machinery is able to access the site
- 1 – Only small machinery is able to access the site. Work by hand may need to be performed in some areas
- 0 – All proposed work must be done by hand only

Scoring for Criterion 5

- 2 – Zero (0) to two (2) of the above threats are present
- 1 – Three (3) or four (4) threats are present
- 0 – All threats are present

4. Technical Viability of Initial Management

There are a variety of barriers that affect the startup costs of performing ecological management. Some sites have few or restricted access points. They might be distant from roads and parking lots, or difficult to access due to topography and private land ownership. Steep slopes and minimal trail facilities also restrict machine access and create an obstacle for mobilizing crews and equipment. Slope can also influence the ability to stage equipment and perform management activities such as wood chipping. All of these factors are related to the ability of machinery to access and operate at the site, which ultimately affects the cost-efficiency of a project. To score this criterion, the ability of different types of machinery to access and operate at a site is considered.

5. Technical Viability of Long-term Management

Long-term management is more viable in some areas than others. This criterion requires a comprehensive understanding of a site's situation, its potential for restoration, and the ease in which restoration could occur over time. For instance, a site could be easy to mow, but might be susceptible to frequent flooding. In which case, achieving the site's management objective would require more resources. The following threats to long-term management of an area should be considered when scoring this criterion:

- Disturbance due to high levels of nutrient deposits from previous use (barnyards) or adjacent sites (yard waste)
- Adjacent to areas sensitive to prescribed burns and/or grazing (private property)
- Area is prone to frequent flooding
- Area is susceptible to extreme erosion
- Steepness of terrain and access restrictions prohibit cost-efficient work

6. Presence of Biological Resources of Special Significance

Some sites in the River Valley might have sensitive species that are desirable and need to be maintained or enhanced to avoid the threat of extirpation in the River Valley. Keystone or unique wildflower species, such as white oaks or rue anemone, should be given special consideration. Water resources that are present or nearby also have special significance.

Significant resources might include:

- Water resources present on site or nearby
- Rare, protected, or unique species
- Keystone Species, such as:
 - Bur Oak
 - White Oak
 - Swamp White Oak
 - Aspen
 - Hazel
 - Prunus species (Wild Plum)
 - Prairie Apple
 - Hawthorn species

Scoring for Criterion 6

- 2 – More than one biological asset
- 1 – At least one significant biological asset
- 0 – No significant biological assets

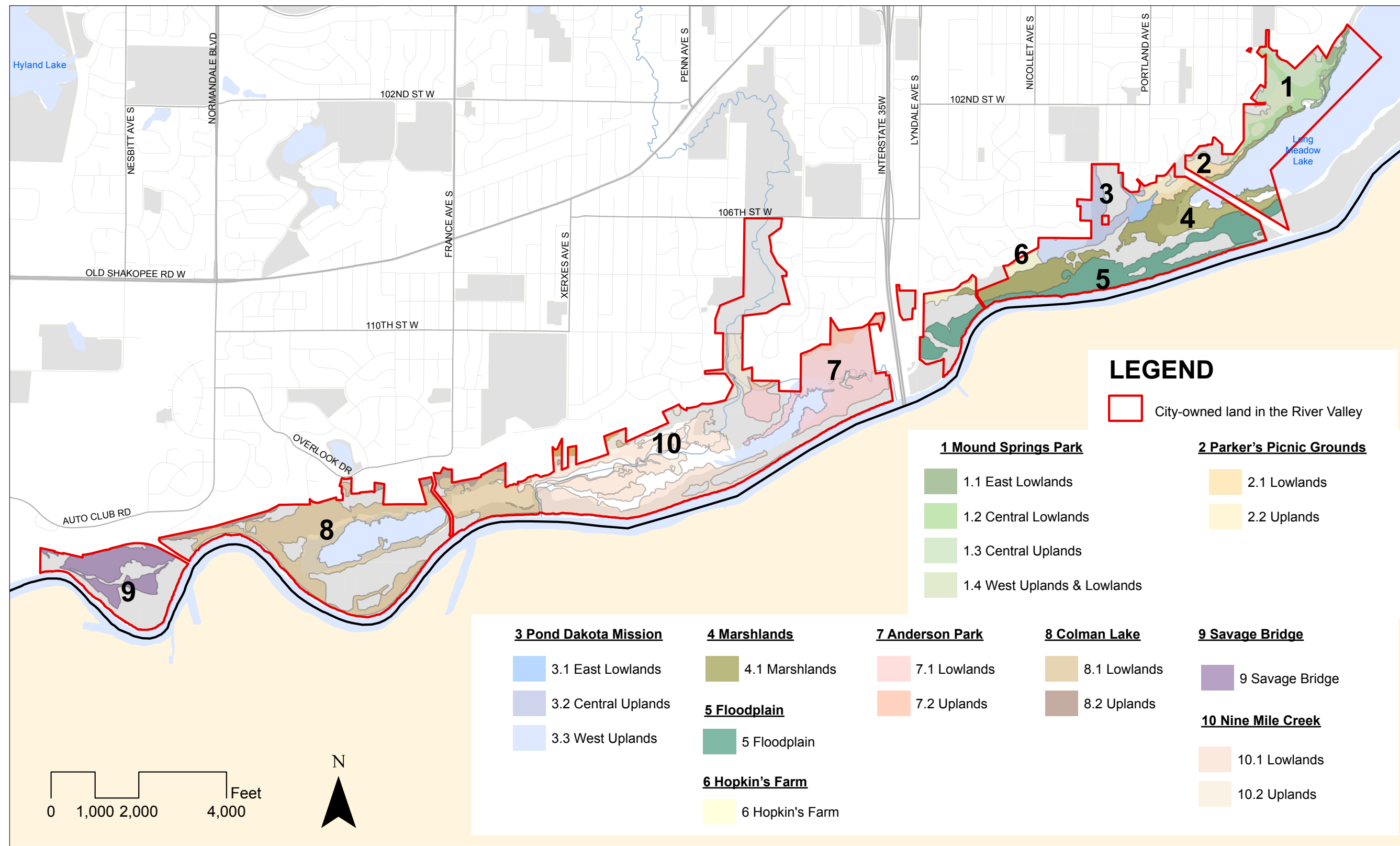
4.5 Priority Areas

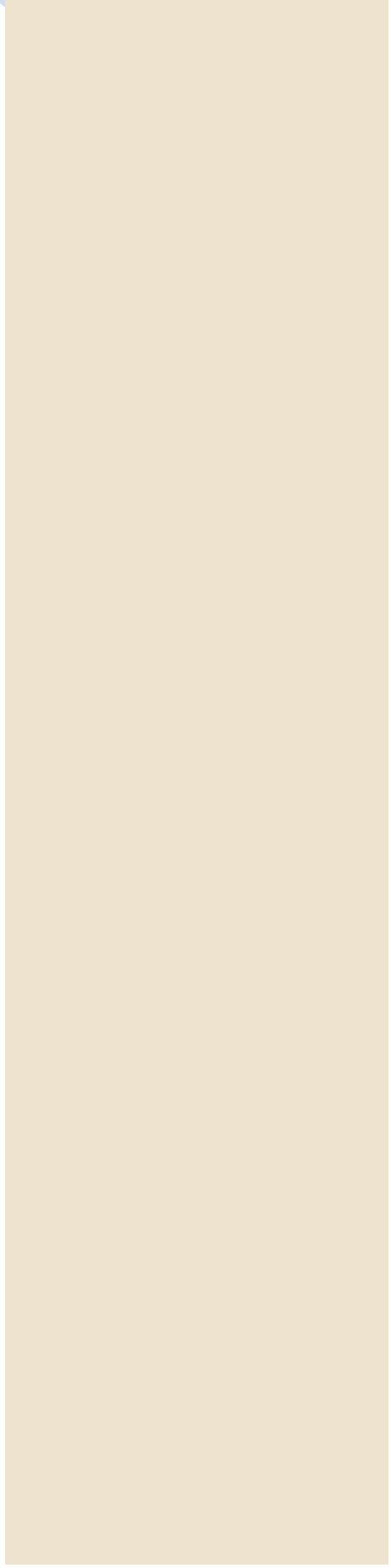
The criteria established above may overlap or coincide with one another. In which case, the high priority areas become more discernible from the low priority areas. While most of the criteria are scored objectively, some are more subjective and require professional judgement.

Areas within the River Valley are defined according to the way land cover parcels were identified in the MLCCS and the 2007 NRI, and how Great River Greening later grouped these parcels in follow-up research. As shown in figure 4.3, there are a total of 10 areas, which are divided into 19 subareas based on location and elevation. A habitat assessment is provided in Appendix A and flora surveys are found in Appendix E for each of the subareas.

Some criteria may need to be reassessed more frequently than others. For instance, each new restoration effort will increase the scores for adjacent sites. Additionally, realigned or newly constructed trails might enhance the visibility of a site or make it more accessible by machinery, thus raising its priority level. Due to a constantly changing environment, all of the criteria may need to be reevaluated every 5-10 years.

Figure 4.3 Habitat Assessment Areas





**THIS PAGE INTENTIONALLY LEFT
BLANK**

A team of City staff and volunteers with professional experience in resource management collaborated to determine scores for each site based on the above criteria. Scoring results are shown in Table 4.2 below:

Table 4.2 Priority Areas Scoring

			Improvement and/or Expansion of Existing Efforts	Quality of Vegetative Community	Visibility & Public Perception	Technical Viability of Initial Management	Technical Viability of Long-term Management	Presence of Cultural & Biological Resources of Special Significance	Total
1	Mound Springs Park	1.1 East Lowlands	0	1	1	0	2	1	5
		1.2 Central Lowlands	0	0	1	2	1.5	2	6.5
		1.3 Central Uplands	0	1	1	2	1	2	7
		1.4 West Uplands & Lowlands	0	1	1	0.5	1	1	4.5
2	Parker's Picnic Grounds	2.1 Lowlands	0	1	1	0	1	2	5
		2.2 Uplands	2	1	2	1	1	1	8
3	Pond Dakota Mission	3.1 East Lowlands	1	1.5	2	1	1	1.5	8
		3.2 Central Uplands	2	1	2	1	1	2	9
		3.3 West Uplands	2	1	1	2	2	1	9
4		4.1 Marshlands	1	1	1	0	1	2	6
5		5.1 Floodplain	0	1	1	2	1.5	1	6.5
6		6.1 Hopkin's Farm	1	0	1	2	1.5	1	6.5
7	Anderson Park	7.1 Lowlands	0	2	1.5	2	1.5	2	9
		7.2 Uplands	0	1.5	0	1	1	2	5.5
8	Colman Lake	8.1 Lowlands	0	2	1	1.5	2	1	7.5
		8.2 Uplands	0	0	0	0.5	1	0.5	2
9		9.1 Savage Bridge	0	1	0.5	1	1	1	4.5
10	Nine Mile Creek	10.1 Lowlands	0	1	1	2	2	1	7
		10.2 Uplands	0	1	1	2	1.5	2	7.5

Summary of the Priority Areas

Areas that scored 8 or greater are identified as high priority sites. Those that score 6 or 7 are labeled as medium priority, and those with a score of 5 or less are considered low priority. Priority areas are shown in Figure 4.4.

High Priority Areas

The whole Pond Dakota Mission area is a high priority site due to its ongoing management regime, its high visibility as a Class I Historic Site, and its potential for partnership opportunities such as volunteer tours and events.

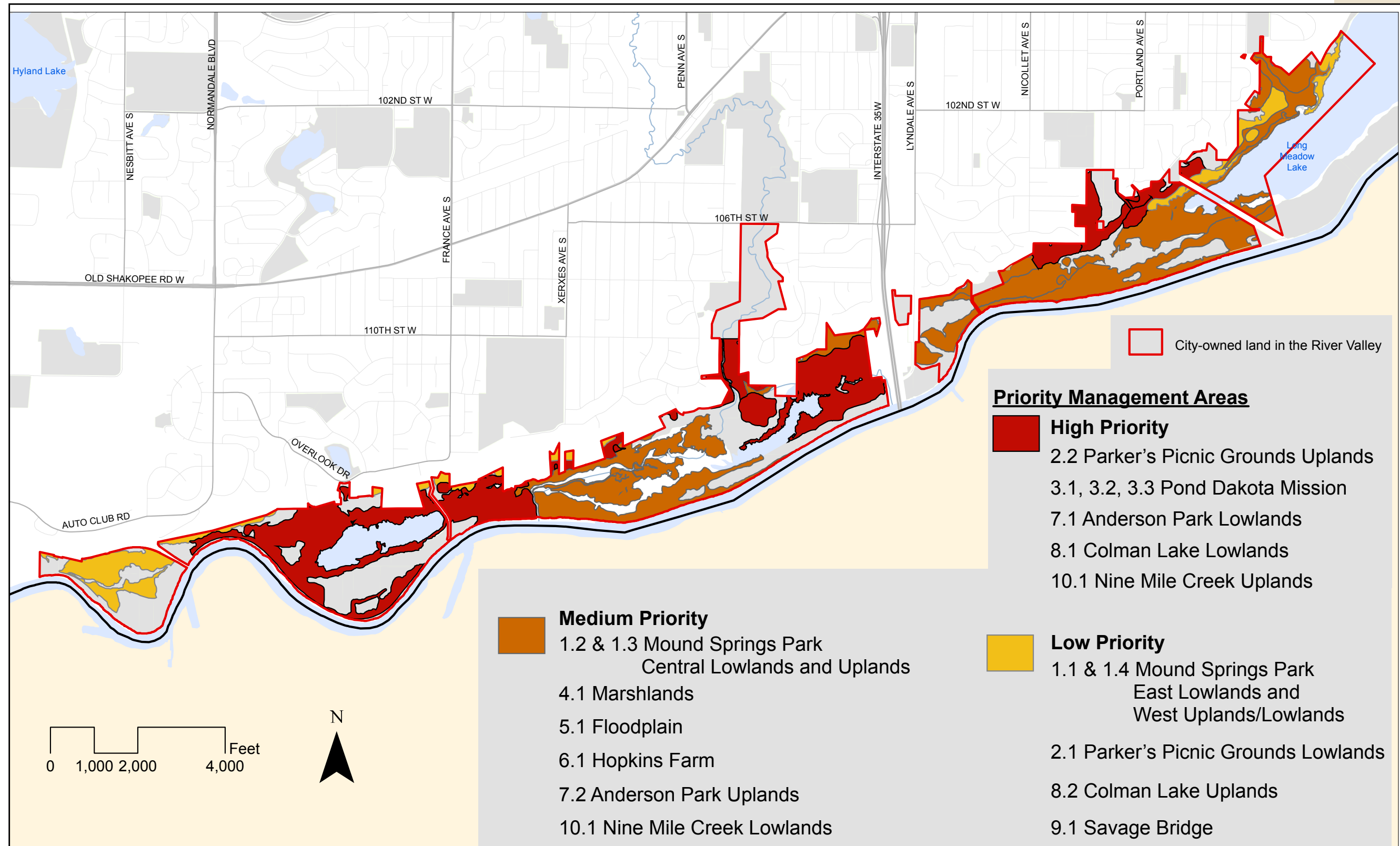
Parker's Picnic Grounds – Uplands serve as a gateway to the River Valley. Large, open growth oaks greet visitors at the trailhead and native wildflowers can be found in the sunlit areas. This area would benefit significantly from restoration with enhanced biodiversity and restored view sheds of the River Valley.

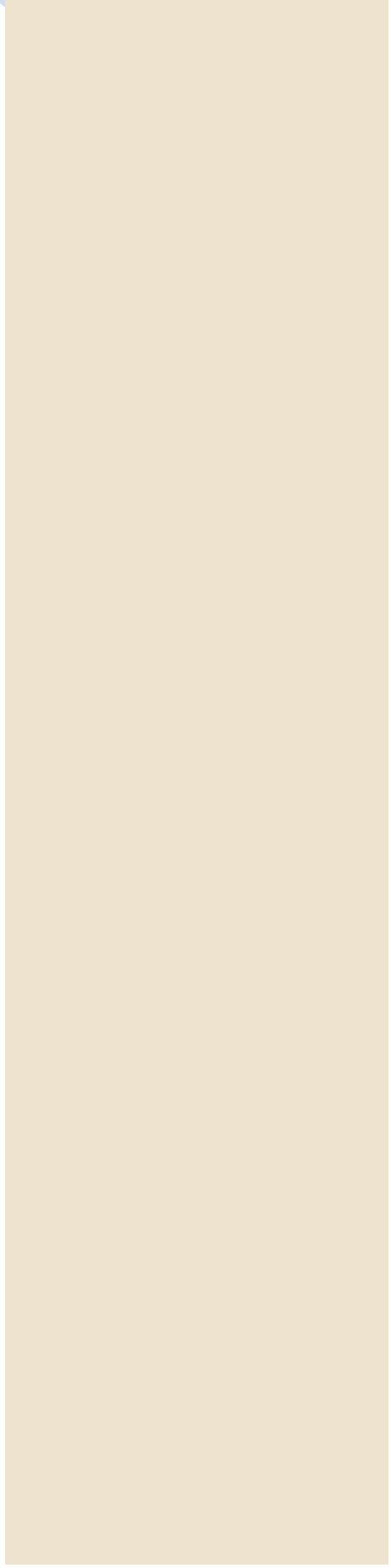
Anderson Park – Lowlands provide an excellent model to help plan floodplain management throughout the River Valley. Conditions are favorable for management strategies to enhance existing plant communities, wildlife habitat, and recreational opportunities.

Colman Lake – Lowlands support a high level of biodiversity in the River Valley. This area features high quality wetlands, a shallow water lake, springs and seeps that feed the lake, open grasslands, an old growth cottonwood and silver maple grove, and a sandy terrace along the Minnesota River where the trail is located. Good machine access lends this area to be readily managed.

Nine Mile Creek - Uplands contain old, open growth bur oaks that can be readily enhanced by thinning trees in the dense understory. This site is another gateway into the River Valley with the adjacent Nine Mile Creek Trail.

Figure 4.4 Minnesota River Valley Priority Management Areas





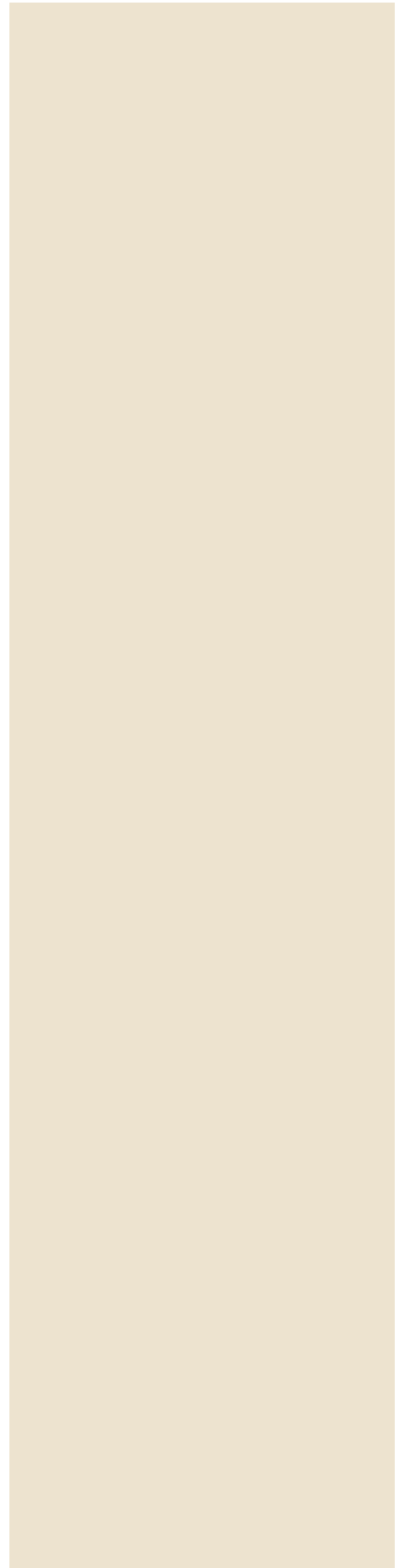
**THIS PAGE INTENTIONALLY LEFT
BLANK**

Medium Priority Areas

- Mound Springs Park – Central Uplands & Lowlands
- Marshlands
- Floodplain
- Hopkin’s Farm
- Savage Bridge
- Nine Mile Creek – Lowlands & Uplands

Low Priority Areas

- Mound Springs Park – East Lowlands & West Uplands/Lowlands
- Parker’s Picnic Grounds – Lowlands
- Anderson Park – Uplands
- Colman Lake – Uplands



**THIS PAGE INTENTIONALLY LEFT
BLANK**

SECTION 5: EDUCATION



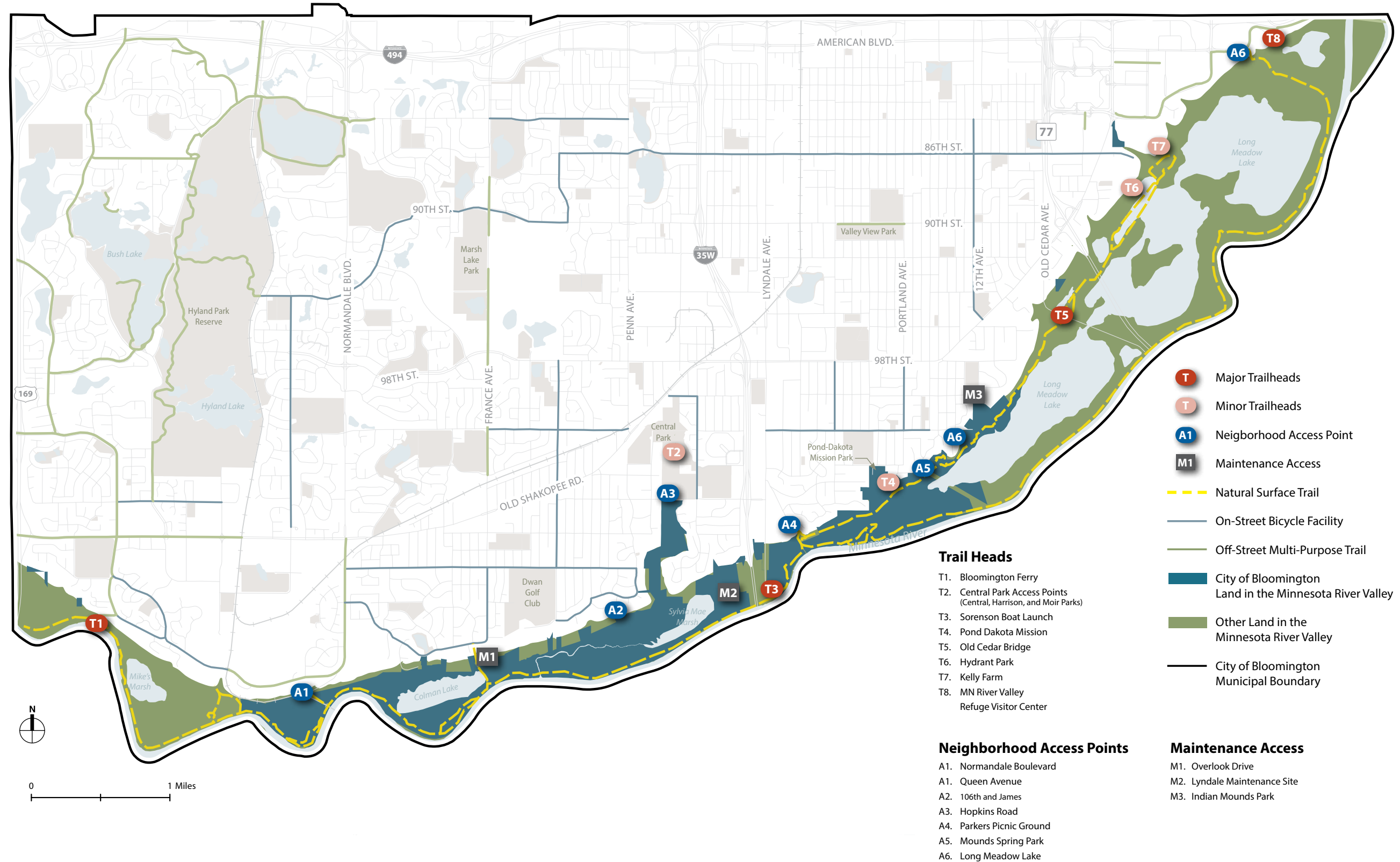
Education is fundamental to increasing the general understanding and appreciation of the River Valley's ecosystem. Educational opportunities can help communicate that resource management does not always appear neat and orderly. This section identifies three intentions for an education strategy in the River Valley. First, awareness needs to be expanded to create a general appreciation about the River Valley and its natural and cultural resources. Second, education efforts should focus on creating stewards and influencing behaviors by letting people know how certain actions are beneficial or harmful in the River Valley. Last, programs and events should be intentional about sharing specific information on resource management goals and processes.

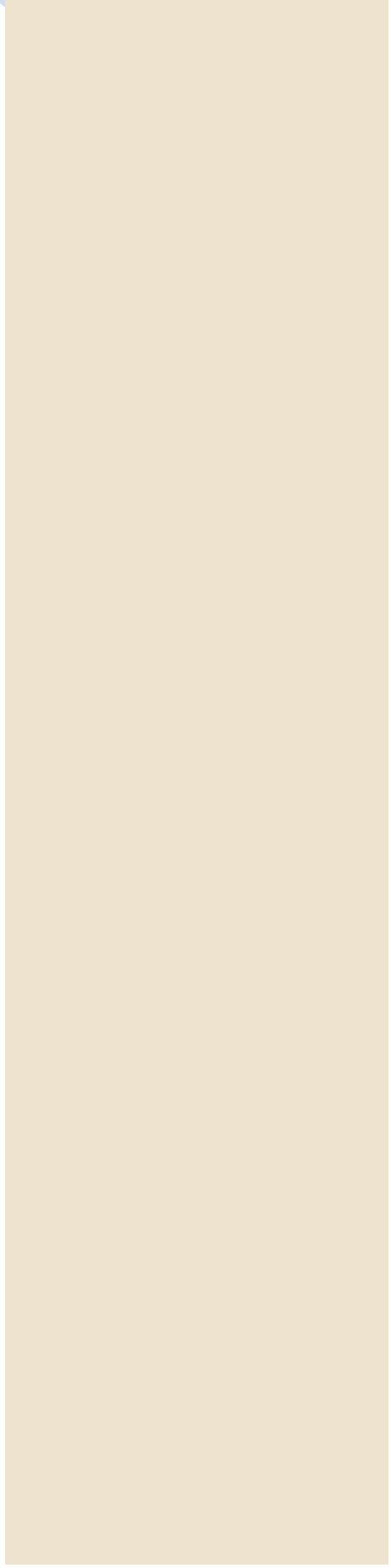
5.1 Expanding Awareness

Increasing awareness and knowledge of the natural and cultural environment can enhance the value people place on the River Valley. As the City's largest open space, many people visit the River Valley to be outside and enjoy nature. Yet, many do not realize that the dense woods provide low quality wildlife habitat, or that the expanse of greenery is largely comprised of two or three species and is a poor food source for wildlife. As described in Section 2, prior to European settlement and the proliferation of farming, the River Valley was an ecologically sound environment. With urbanization, the natural resource integrity of the River Valley has greatly declined. More robust marketing and outreach is needed to educate people about the natural and cultural resources in the River Valley, and what resource management looks like in the River Valley. For instance, the following outlets could be used to provide information about existing conditions and programs in the River Valley:

- Brochures
- Videos
- City of Bloomington Website
- The Bloomington Briefing
- Bloomington Today YouTube/cable TV

Figure 5.1 Existing Trailheads and Trails





**THIS PAGE INTENTIONALLY LEFT
BLANK**

Awareness is also enhanced when people are able to easily access the River Valley to experience and learn about its resources. Clearly marked trailheads with signage invite people to learn about the River Valley. Some well-marked trailheads exist, such as the major trailheads shown in figure 5.1, but others are poorly identified and lack signage or parking. Signs can help mark public trails so that people don't wander unknowingly off-trail. Signs also offer a great method of enhancing educational efforts. In addition to this plan, two other systems plans, a trail systems plan and a signage systems plan, were proposed with the MVSP and will address issues of accessibility, wayfinding, and educational signage.

5.2 Creating Stewards

The more people that are aware of and appreciate the River Valley and its cultural and natural resources, the more likely they are to advocate for its protection and enhancement. A variety of education efforts can focus on creating stewards by identifying actions individuals should take as well as collective group efforts. For instance, visitors can be informed to stay on marked trails so that soil compaction is reduced and the spread of undesirable species is prevented. Landowners with property adjacent to the River Valley can become better educated about proper yard waste disposal and how to care for and restore their oaks, the understory, and the bare soils. People can become better informed about undesirable species, how they're treated and how to prevent their dispersal. For land managers performing work within the River Valley, common practice should include cleaning boots and equipment before entering and after leaving each site, as stated in the Minnesota DNR's 'Come Clean, Leave Clean' operational order. All of these actions can be performed by disconnected individuals, but are much more effective when stewards advocate for their collective implementation by a larger group with a focus on creating additional stewards.

While this plan outlines various management strategies, further research about how they could be applied throughout the City might increase support

or even create champions for specific strategies. For instance, grazing is an increasingly popular method for ecological restoration, but is not a widespread practice. Further education among staff is needed to determine if grazing is an appropriate strategy in the City, and if so, where it is most effective. Additionally, the community should be further educated about the role of grazing in maintaining the natural landscape. Grazing is just one example. Various management practices are easier to implement when stewards educate and advocate for their practice.

Citizen science initiatives help attract a wide audience by involving the general public in collecting scientific data. These programs serve the dual purpose of engaging people in a meaningful manner, while also compiling potentially useful information. Examples of citizen science programs include water quality monitoring programs, such as Metropolitan Council - Environmental Services' Citizens Assisted Monitoring Program (CAMP) and Hennepin County's Wetland Health Evaluation Program (WHEP) mentioned on page 3.15. Another example of a citizen science program is a bio-blitz, in which volunteers identify as many species as possible in a given area within 24 hours. These species surveys help track the spread of undesirable species, for instance, while also providing a type of scavenger hunt to help people learn about biodiversity. Since citizen science programs tend to be engaging in a wide array of subject matter, they can be useful in attracting audiences that might not normally participate in environmental education programs.



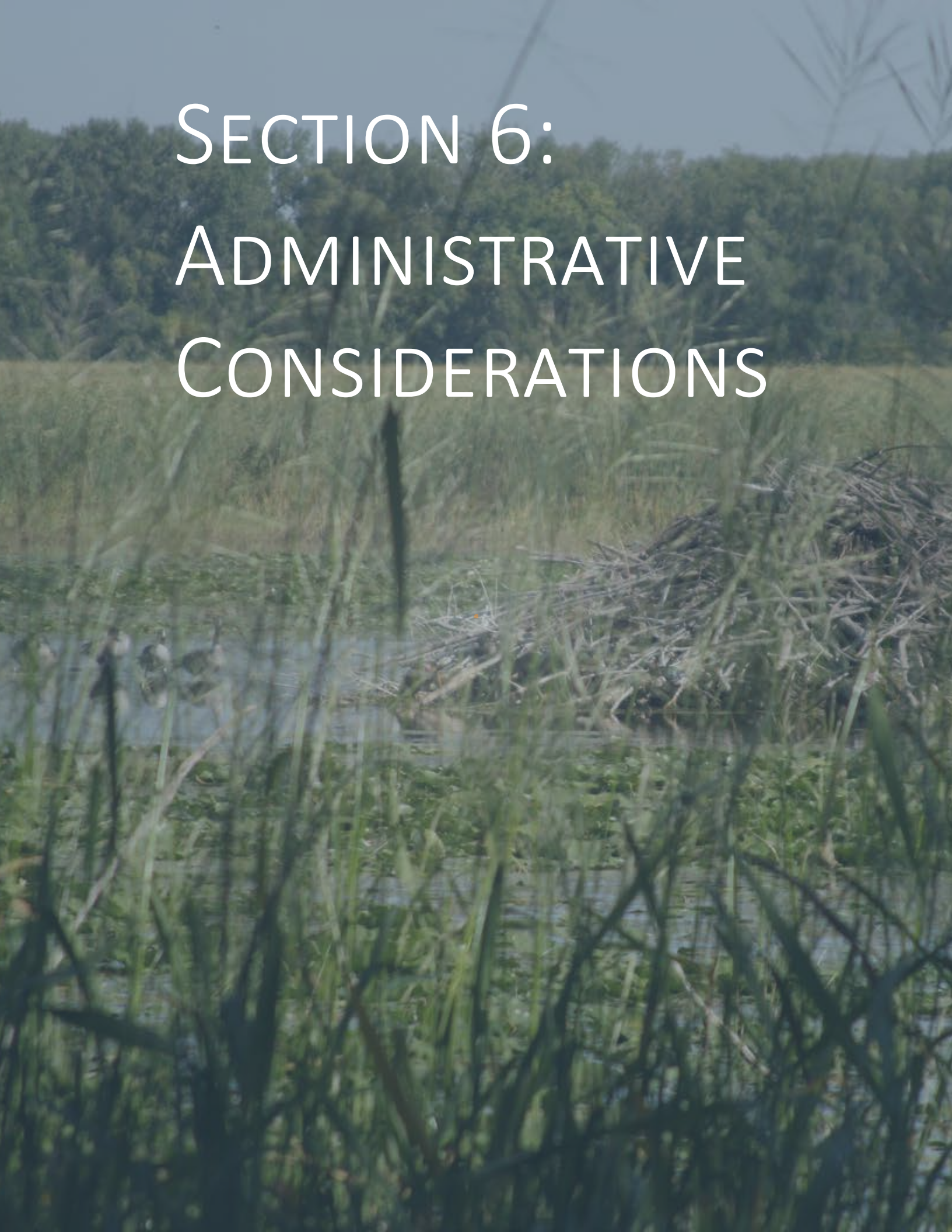
5.3 Sharing Information about Management Goals

Providing opportunities for people to directly interact with the environment can build stewardship and help create a sense of ownership. A variety of creative outreach programs allow people to become better engaged with their natural surroundings. Volunteer days, such as the City's Buckthorn Bust, bring people out to the site and provide hands-on engagement in land management. Other events are more passive, such as tours. Some of the existing programs are provided at the Pond Dakota Mission, the adjacent USFWS National Wildlife Refuge, and by interest groups identified in the following section, and are listed below:

- Bird-Watching & Wildlife Observation
- Photography
- Environmental Education & Interpretation
- Historical and Cultural Education & Interpretation
 - River Rendezvous
 - Winter Fete Celebration
 - Dakota Language Camp
 - Dakota Day Celebration

Many of these could include an educational component about resource management. New programs and events could also be created with a focus on engaging people in the resource management process.

**THIS PAGE INTENTIONALLY LEFT
BLANK**



SECTION 6:
ADMINISTRATIVE
CONSIDERATIONS

6.1 Flora and Fauna Species Protections

Federal Species Protections

Endangered Species Act: Signed into law in 1973, the Endangered Species Act protects plant and animal species at risk of becoming extinct. Species may be listed as “Endangered,” meaning there is a threat of extinction, or “Threatened,” which signifies that a species is likely to become endangered in the near future. Notably, this law also aims to safeguard those habitats in which threatened and endangered species are found. The current threatened and endangered species with potential habitat in the River Valley include:

- Higgins eye (pearlymussel) – Endangered
- Snuffbox mussel – Endangered
- Rusty patched bumble bee – Endangered
- Northern long-eared bat - Threatened

The US Fish and Wildlife Service in conjunction with the National Marine Fisheries Service administers the Endangered Species Act. Further information and current endangered and threatened species lists can be found here: <https://www.fws.gov/endangered/>.

Bald and Golden Eagle Protection Act: This law, passed in 1940, provides for the protection of the bald eagle and the golden eagle by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. “Take” includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.

Migratory Bird Treaty Act: This law carries out the United States’ commitment to four international conventions with Canada, Japan, Mexico, and Russia that protect birds that migrate across international borders. All migratory birds, including bald eagles, are included in the Migratory Bird Treaty Act’s regulations. The Migratory Bird Treaty Act (MBTA) prohibits

the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except as authorized under a valid permit.

Lacey Act: Protections provided by the Lacey Act continue even though the bald eagle has been delisted under the Endangered Species Act. This law, passed in 1900, protects bald eagles by making it a Federal offense to take, possess, transport, sell, import, or export their nests, eggs and parts that are taken in violation of any state, tribal or U.S. law.”

State Species Protections

There are several animal and plant species that have been documented in the River Valley that are included on State protection lists. Species of special concern may or may not be listed as endangered or threatened, but are of concern because they are extremely uncommon in Minnesota or deserve careful monitoring because they have unique or highly specific habitat requirements.

State listed endangered species:

- Blanchard’s Cricket Frog *Acris blanchardi*
- Rock Pocket Book *Arcidens confragosus*
- Yellow Sandshell *Lampsilis teres*

State listed threatened species:

- Blanding’s Turtle *Emydoidea blandingii*
- Mucket *Actinonaias ligamentina*
- Paddlefish *Polyodon spathula*
- Pistolgrip *Tritogonia verrucosa*
- Round Pigtoe *Pleurobema coccineum*

State listed as special concern:

- Bald Eagle *Haliaeetus leucocephalus*
- Black Buffalo *Ictiobus niger*
- Black Sandshell *Ligumia recta*

- Fluted-shell *Lasmigona costata*
- Hickorynut *Obovaria olivaria*
- Skipjack Herring *Alosa chrysochloris*
- Snow Trillium *Trillium nivale*
- Spike *Elliptio dilatata*

State listed species of note:

- Bell's Vireo *Vireo bellii*
- Shovelnose Sturgeon *Scaphirhynchus platyrhynchus*

State Listed Terrestrial Systems:

- Black Ash - (Red maple) Seepage Swamp(s)
- Dry Sand - Gravel Prairie(s)
- Southern Wet Ash Swamp

A list of Hennepin County's rare, endangered, threatened, and special concern species is provided in Appendix I.

Lower Minnesota River Watershed District Standards

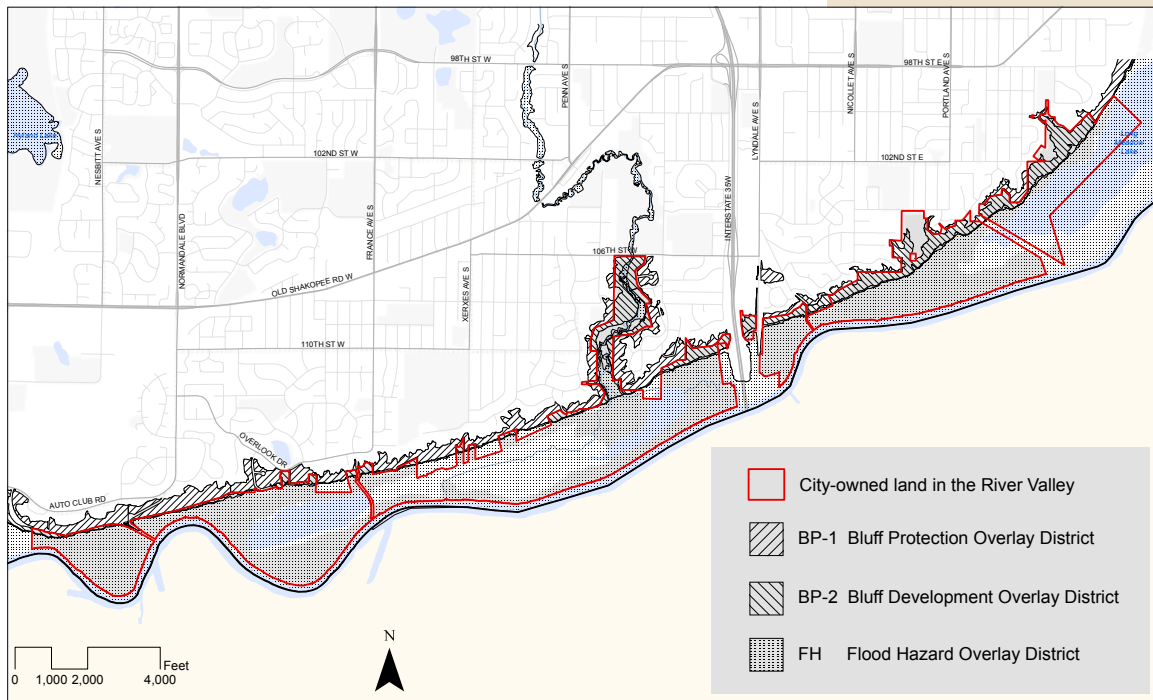
The Lower Minnesota River Watershed District's Watershed Management Plan imposes standards that must be met by the City's land use code. One standard that is especially pertinent to the River Valley is the Bluff Standard. The Bluff Standard prohibits grading and vegetative removal within the bluff impact zone or on the face of the bluff unless stabilization standards are met. The purpose of this standard is to protect the integrity of the slope and prevent erosion, sedimentation, flooding, and other damages to nearby waterbodies and the watershed as a whole.

City Regulations

Bluff Protection Overlay Districts (BP-1) and Bluff Development Overlay Districts (BP-2) apply to all land between the 722-foot elevation and 800-foot elevation in the River Valley and a portion of the Nine Mile Creek areas (Figure 6.1). Any proposed development below the 760-foot contour elevation is prohibited. (BP-1 (City Code Section 19.38.11) and BP-2 (City Code Section 19.38.12))

The **Flood Hazard Overlay District** regulates development in flood hazard areas in order to preserve the natural characteristics and functions of watercourses and floodplains (Figure 6.1). The intentions of this district are to moderate flood and stormwater impacts, improve water quality, reduce soil erosion, protect aquatic and riparian habitat, provide recreational opportunities, provide aesthetic benefits and enhance community and economic development.

Figure 6.1 Overlay Districts in the River Valley



6.2 Cultural Resources Regulations and Protections

Federal and State Protections

The legal basis for Cultural Resource Management (CRM) is deeply rooted in federal and state legislation concerned with natural resource conservation and environmental protection dating back to the early 1900s. Cultural resource laws in general ensure that significant resources are taken into consideration when activities are planned that might damage their scientific or cultural values. Both federal and state laws protect cultural resources. In some cases, these laws might apply on private property as well.

The National Historic Preservation Act (NHPA) of 1966, as amended, is the centerpiece of the national historic preservation program and is an important component of state and local CRM programs in Minnesota. NHPA establishes the National Register of Historic Places and provides for State and Tribal Historic Preservation Officers to implement the national preservation program. Section 106 of NHPA requires that federal agencies consider the effects of their activities on cultural resources.

The State of Minnesota also adopted laws designed to ensure that both natural and cultural resources are considered in government decision-making. These laws include state environmental policy and environmental rights acts. Virtually all environmental legislation currently on the books applies to CRM issues.

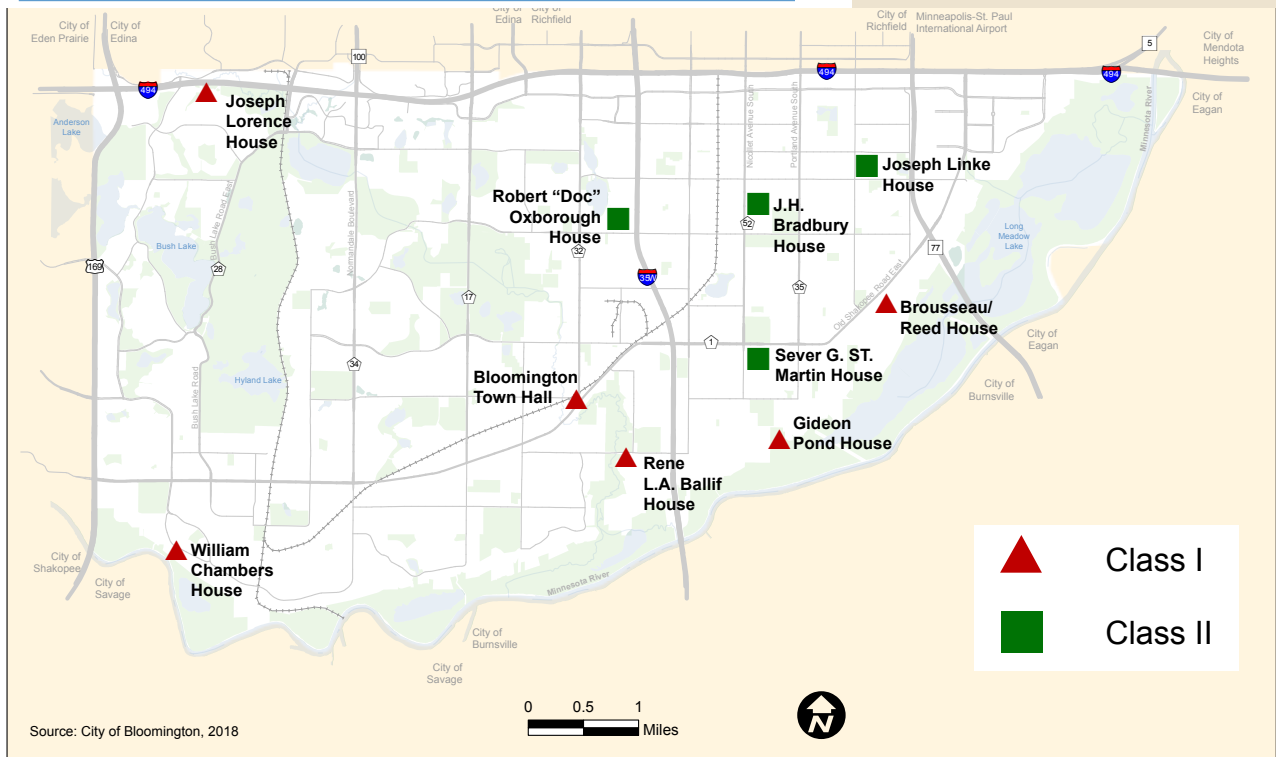
For cultural resources other than cemeteries, the application of a law is determined by three factors:

- Land ownership
- The source of funding being used for the activity
- Any permitting authority that might be involved.

Federal law applies whenever activity takes place on federal land, will use federal funds, or will require a permit issued pursuant to federal authority. State law applies whenever the activity is on non-federal public land or will use non-federal public funds. If human burials are known or suspected to be present, state law

Burial sites are a special category of cultural resources, and are given special consideration under both Federal and State law. The Minnesota Private Cemeteries Act (MS 307.08) protects all human burials in the state from disturbance, regardless of age, ethnic affiliation, or land ownership. Similar protection applies to burials on lands under federal control. Many graves in pioneer cemeteries do not have markers, making identification and protection more difficult.

Figure 6.2 Class I and Class II Sites



applies regardless of ownership.

CRM review and compliance may be necessary for many projects taking place in the River Valley. Federal and State laws require public land forest managers to consider the effects of their projects on cultural resources. When a cultural resource eligible for inclusion on the National Register may be destroyed or damaged by activities on public land, public funds may be used to recover important historical, archaeological, or cultural data that would otherwise be lost.

City Protections

The City protects and preserves historical resources from demolition, movement, and material alteration. Protected sites include the following designations:

- Burial Ground Sites
- Class I Sites
- Class II Sites

Any proposed changes to these sites requires a permit. Further information is found in City Code Section 15, Article II.

**THIS PAGE INTENTIONALLY LEFT
BLANK**

SECTION 7: IMPLEMENTATION



A variety of agencies and interest groups have interest in the River Valley. Partnerships should look to leverage resources and identify shared goals. Additionally, a reexamination of City regulations and protections, their purposes and goals, might enhance land management efforts. With broad interest, support, and clear understanding of what needs to happen first, the City can more readily submit project proposals when funding solicitations occur.

Improved awareness and understanding of natural processes in the River Valley help to garner stewardship and advocacy around protecting our natural environment, but given limited funding, implementation of the strategies discussed in this plan should leverage resources through strategic partnerships. City regulations can also be updated to better serve the natural environment of the River Valley. Last, resources through grants and other funds should be explored and proactively pursued.

7.1 Partners

Partnerships can provide technical and fiscal resources that optimize project success. While this plan focuses on City-owned lands in the River Valley, there are other landowners, government agencies, and groups that have interest in the City's land management efforts. Some partners may have general shared interests, whereas others have particular interest in cultural or ecological (flora & fauna) resources in the River Valley. Sites where partnerships can be leveraged might take priority over those without. The MVSP identifies agencies and organizations that own land and/or have special interest in the River Valley. Those that have an interest related to cultural and ecological resources are listed below:

Cultural

Agencies

- Minnesota State Historic Preservation Office

Organizations

- Bloomington Historical Society

- Pond Dakota Heritage Society
- Geezer Squad

Ecological – Flora & Fauna

Agencies

- City of Bloomington (landowner)
- United States Fish and Wildlife Service (USFWS, landowner)
- Minnesota Department of Transportation (MnDOT, landowner)
- Minnesota Department of Natural Resources (MnDNR)
- Hennepin County
- Three Rivers Park District
- Nine Mile Creek Watershed District
- Lower Minnesota Watershed District

Organizations

- Izaak Walton League of America – Minnesota Valley Chapter
- Friends of the Minnesota Valley
- Park and Trails Council of Minnesota
- Minnesota River Valley Audubon Chapter
- Sierra Club North Star Chapter
- Wild Ones Twin Cities Chapter

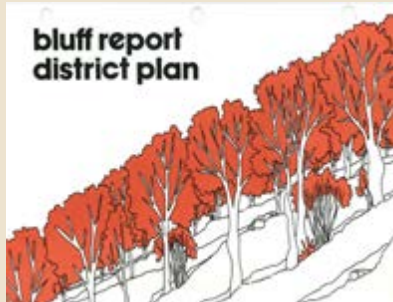
Utility Companies and Agencies

- Xcel Energy
- Metropolitan Council Environmental Services (MCES)
- Centerpoint Energy

Although each of the agencies and organizations have their own agendas, many have goals and priorities that are complementary to one another. Land owners and managers are limited by property boundaries, but coordinated efforts among all stakeholders can lead to more efficient practices to improve the River Valley's environment. There are also state-wide programs and other ecologically-minded organizations that might share technical resources or provide a volunteer base.

7.2 City Regulations

There are a few existing City ordinances that may pose challenges to restoration because they do not adequately recognize the River Valley's mosaic of ecological communities. While the impetus behind these regulations is to protect the natural state of the bluff and to preserve the scenic value of the City and the River Valley, development guidelines and regulations do not consider the dynamics of habitat preservation and restoration. A one size fits all approach is incompatible with enhancement and restoration of the complex habitats along the bluff and in the floodplain. This section identifies regulations and guidelines the City should consider amending if fostering environmental enhancement and habitat restoration is a desired end goal.



The Bluff Report District Plan (1982) focused on protecting the natural character of the bluff area from encroachment by development. Particular emphasis is placed on sensitively integrating development with natural resources. With regard to natural resources, the Bluff Report District Plan treats the bluff area as a single ecological community and doesn't recognize the landscape as a mosaic of habitats. It also focuses too much on quantity rather than quality. The prevention of tree removal is used as an erosion control method, but does not take into account species quality or habitat type. Over the past few decades, much more has been understood about ecological systems and the impacts of development. An update to the Bluff Report District Plan is needed in response to these new findings and strategies identified in this plan.

The Bluff Protection Overlay Districts (BP-1 (City Code Section 19.38.11) and BP-2 (City Code Section 19.38.12)) were implemented following the adoption of the Bluff Report District Plan in 1982. The BP Overlay Districts limit vegetation clearance, enforce erosion control measures, and reduce the visual impacts of development on the River Valley's character. A map of the Overlay Districts in the River Valley is provided in Figure 6.1 on page 6.4. The BP Overlay Districts are currently designed to protect land between the 722-foot elevation and 800-foot elevation in the River Valley and a portion of the Nine Mile Creek areas, and to prohibit development below the 760-foot contour elevation. The Lower Minnesota River Watershed District (LMRWD) is currently updating its bluff standards to include bluff areas over 18% in slope plus a 20 foot buffer from the top of the slope. After adoption, the City will make changes to its Code to reflect the new LMRWD bluff standards.

With the proposed LMRWD bluff standards, review of the BP Overlay Districts is needed in light of the management goals, objectives, and strategies proposed in Section 4. The BP Districts can be refined to better align City Code with the proposed tree thinning management strategies. Additionally, the BP Overlay Districts treat the area as a homogenous zone, with one set of tree species and density recommendations for the whole area. A more comprehensive approach would entail consideration of the species and tree densities found within each of the unique ecological communities. These changes should be reviewed when revising the BP Overlay Districts.

Prohibited Trees identified in City Code Section 18.03 are those recognized as a nuisance or hazardous

within the City. However, some prohibited trees serve important ecological functions. If banned throughout the City, these trees are less likely to regenerate in the River Valley. Flexibility in the Code may be needed to permit species that have ecological value to be planted in and around the River Valley area.

7.2 Funding Sources

To be effective, resource management requires a commitment of ongoing fiscal resources from multiple sources.

City

The City does not identify funding dedicated solely to resource management in the River Valley. Instead, funding is allocated to natural resource restoration projects throughout the City through the Capital Improvement Plan (CIP), and any newly proposed projects in the River Valley might take funding away from resource restoration elsewhere in the City. The City's 2018 – 2028 CIP allocates funding to natural resources restoration projects throughout the City as follows:

- 2019 - \$65,000
- 2021 - \$70,000
- 2024 - \$75,000
- 2025 - \$65,000
- 2026 - \$65,000
- 2027 - \$65,000

The City has recently focused on resource management in the River Valley, but the Council will need to take formal action each year to approve project funding. To fully implement the proposed strategies described in Section 4, the City will need to explore opportunities to obtain outside resources to augment City funding.

State

Minnesota is fortunate to have funding sources that are dedicated to enhancing environmental resources.

The primary funding sources through the State are the Environment and Natural Resources Trust Fund and the Legacy Funds, which include an Arts & Cultural Heritage Fund, a Clean Water Fund, an Outdoor Heritage Fund, and a Parks & Trails Fund. More information about these funds, including past projects and the proposal process, can be found at the Minnesota's Legacy website:

<http://www.legacy.leg.mn/>

Additional grants through the State and elsewhere are listed on the DNR's website:

<http://www.dnr.state.mn.us/grants/index.html>

Proactive pursuit of funding from these sources is needed to maintain and expand restoration efforts. Review of regulations shows that the City is committed to improving the environment in the River Valley. Grant applications are made more competitive through strategic partnerships and shared resources. By identifying and prioritizing projects, this plan helps to facilitate the submission of proposals when funding solicitations occur.

**THIS PAGE INTENTIONALLY LEFT
BLANK**

SECTION 8: APPENDICES

The image shows a natural landscape with a body of water in the foreground and middle ground. The water is dark blue and contains several lily pads. In the foreground, there are tall, green reeds. The background features a line of trees, some of which are bare and some have green leaves. The sky is a clear, light blue. The text 'SECTION 8: APPENDICES' is overlaid in white, sans-serif font in the upper left quadrant.

Appendix A: Habitat Assessment

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20A_Habitat%20Assessment_07.26.18.pdf

Appendix B: Management Strategies

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20B_Management%20Strategies_07.06.18.pdf

Appendix C: Undesirable Species Management Protocols

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20C_Undesirable%20Species%20Management%20Protocols_07.06.2018.pdf

Appendix D: Recommended Species

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20D_Recommended%20Species_07.06.18.pdf

Appendix E: Flora Species List

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20E_Flora%20Species%20List_07.06.18.pdf

Appendix F: Fauna Species List

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20F_Fauna%20Species%20List_07.06.18.pdf

Appendix G: MLCCS Dichotomous Key

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20G_MLCCS%20Dichotomous%20Key_07.06.18.pdf

Appendix H: Known Cultural Resources

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20H_Known%20Cultural%20Resources_07.06.18.pdf

Appendix I: Hennepin County Rare & Protected Species

https://www.bloomingtonmn.gov/sites/default/files/media/Appendix%20I_Hennepin%20County%20Rare%20%26%20Protected%20Species_07.06.18.pdf