Minnesota River Valley

Natural and Cultural Systems Plan

CITY OF BLOOMINGTON MINNESOTA

June 18, 2018

Credits

- **Sustainability Commission & Volunteers**

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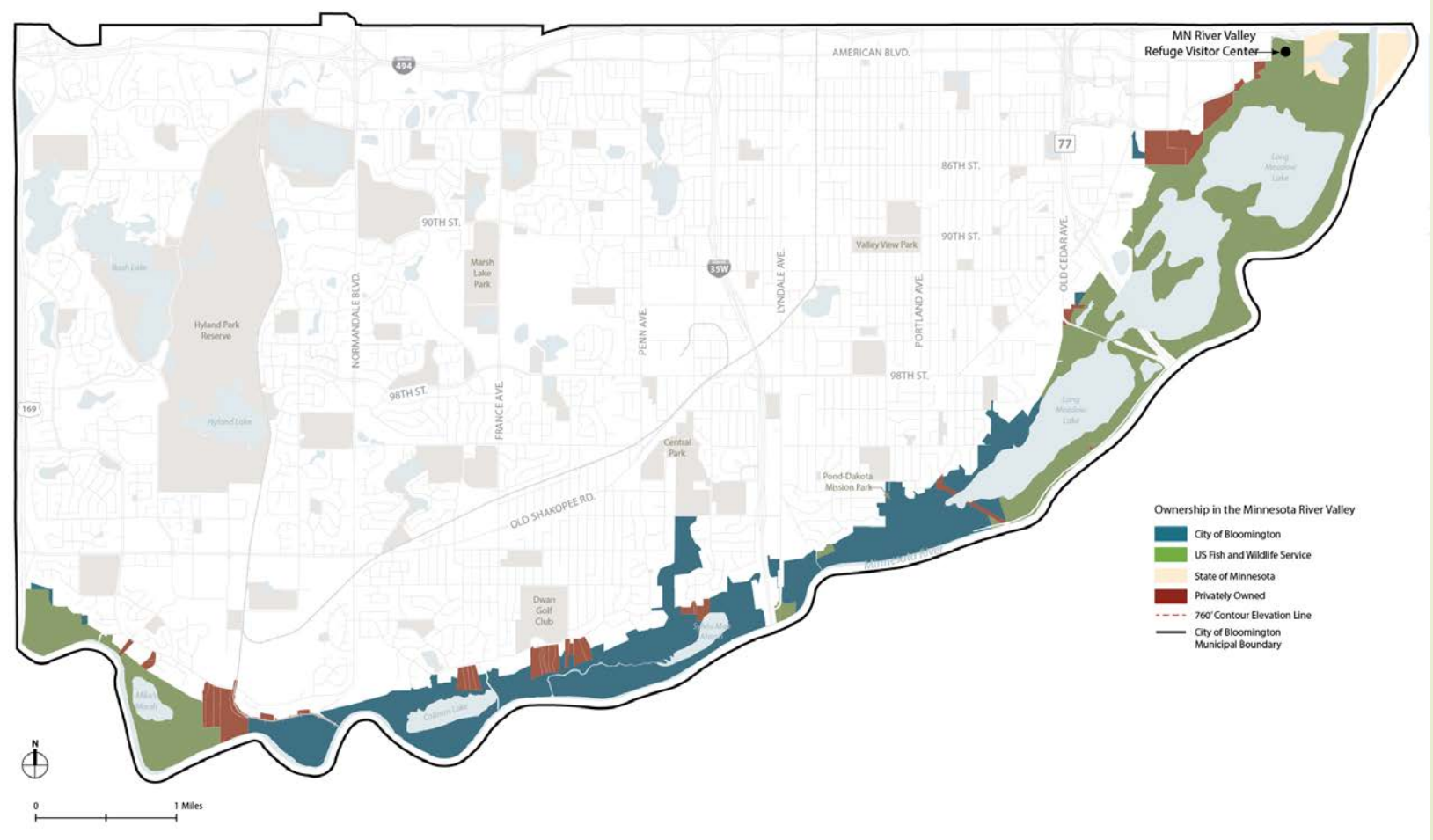
Laura Perreault

Discussion

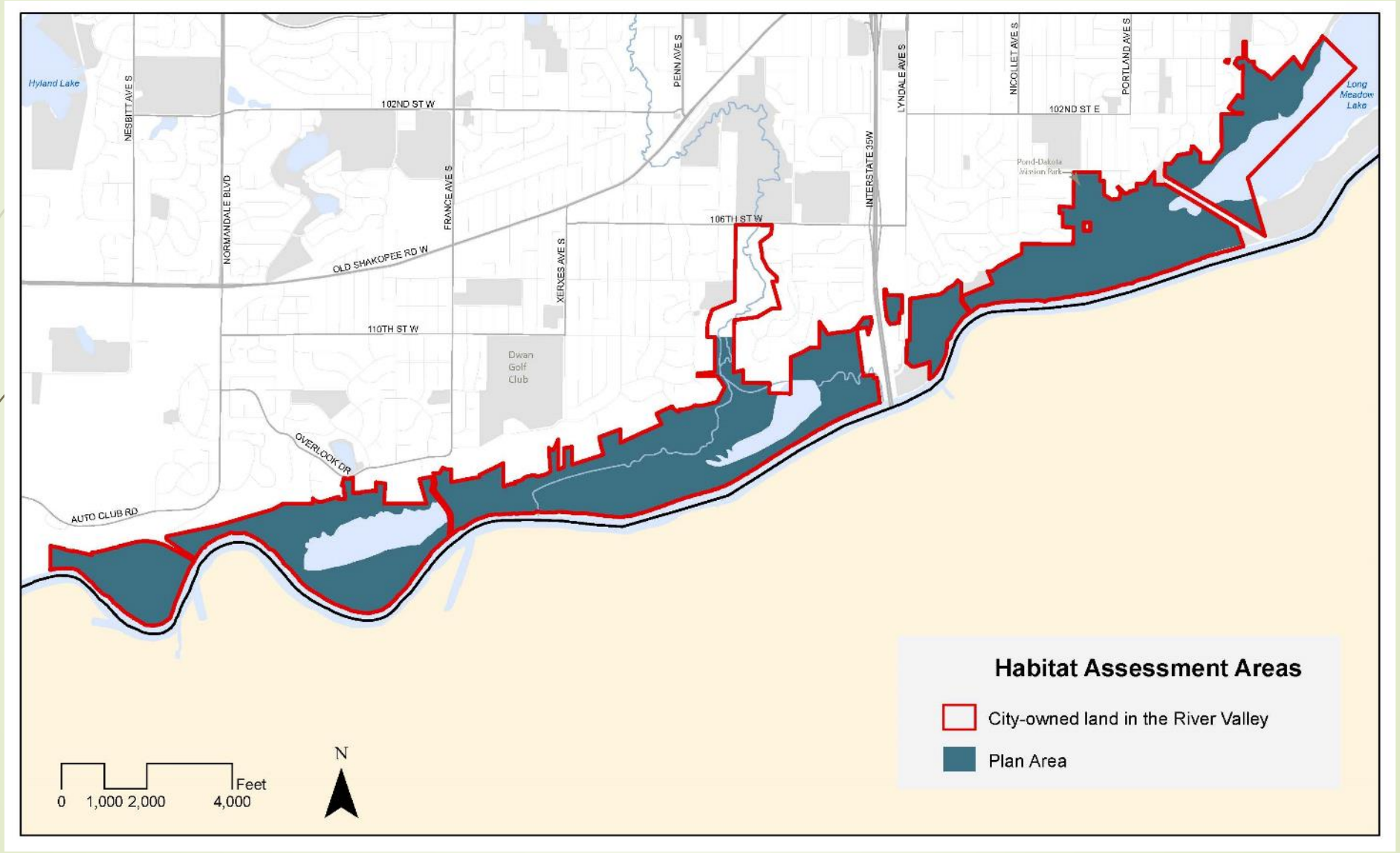
1. What is your current role in the River Valley?
2. What are best practices & how can we proactively manage areas as a whole?

Purpose

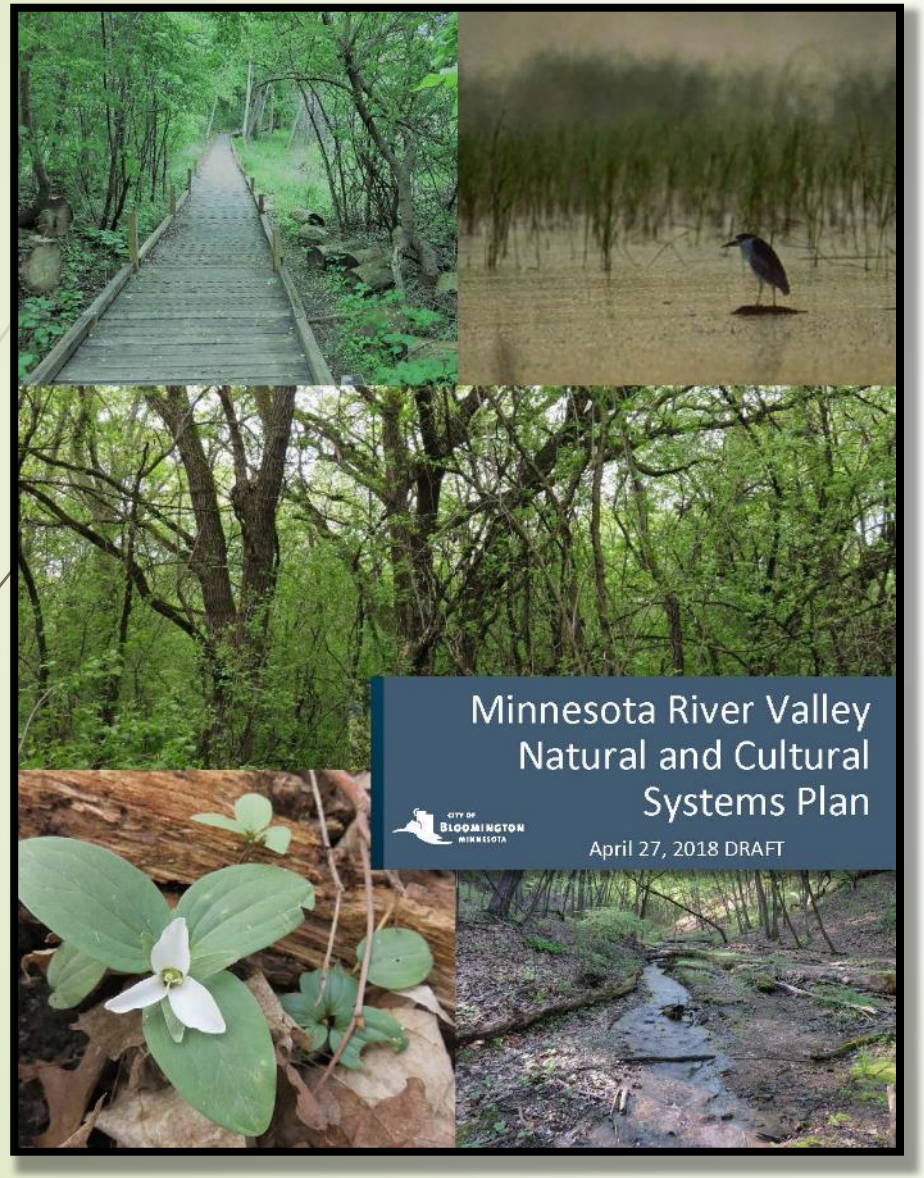
To identify city-owned areas in the River Valley that are of highest priority for resource enhancement, and to recommend management strategies and priorities



Plan Area


Hyland Lake
NESBITT AVE S
102ND ST W
NORMANDALE BLVD
FRANCE AVE S
PENN AVE S
XERXES AVE S
OLD SHAKOPEE RD W
110TH ST W
106TH ST W
INTERSTATE 35W
LYNDALE AVE S
NICOLLET AVE S
102ND ST E
PORTLAND AVE S
Long Meadow Lake
Pond-Dakota Mission Park
Dwan Golf Club
OVERLOOK DR
AUTO CLUB RD
Habitat Assessment Areas
City-owned land in the River Valley
Plan Area
0 1,000 2,000 4,000 Feet
N

Natural & Cultural Systems Plan



Cultural Resources

- Known & Unknown
- Tangible & Intangible

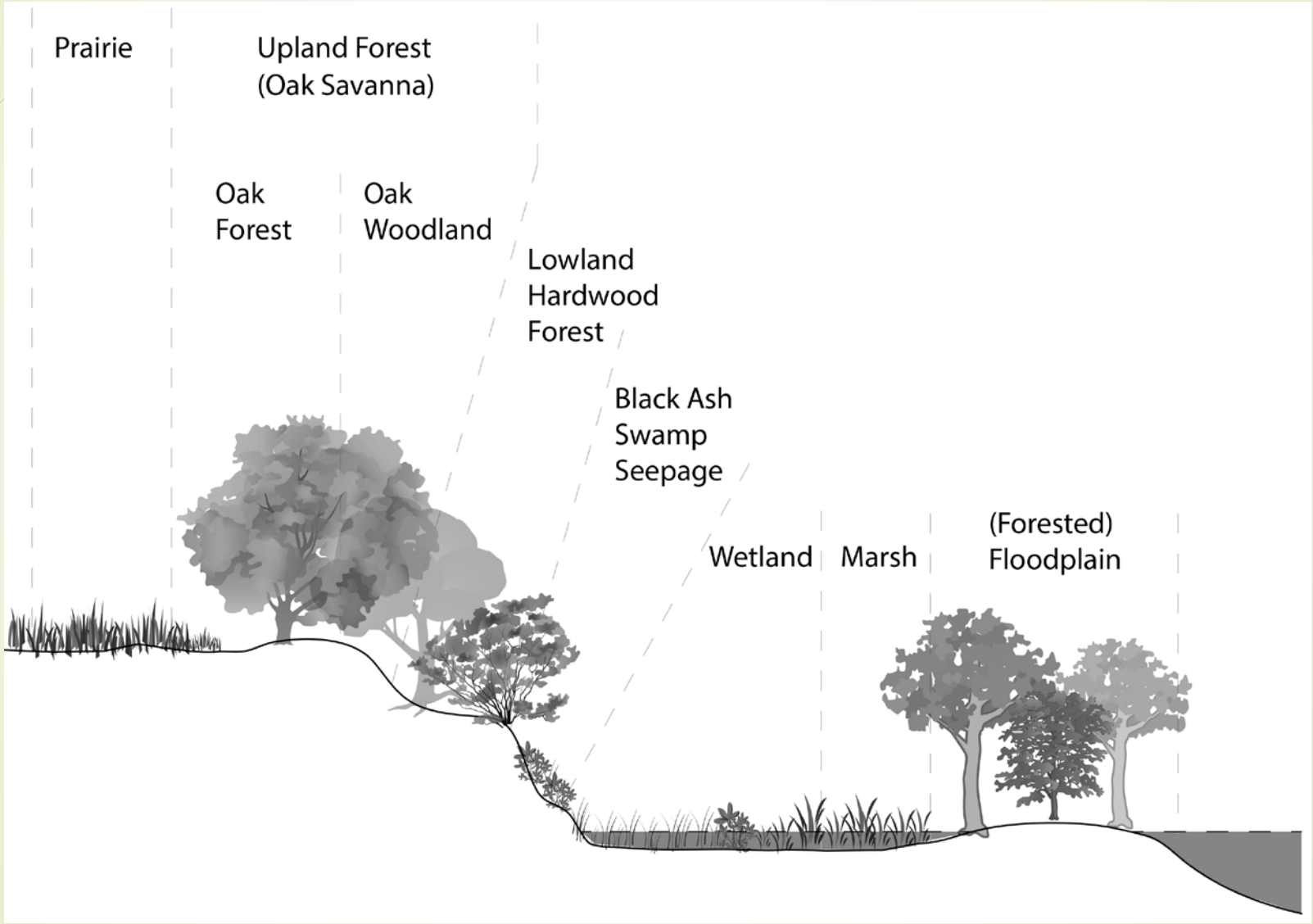
Natural Resources

- Water resources
- Fauna
- **Flora**

Past Surveys

- **1853** - Public Land Survey
- **1998** to Present – Minnesota Land Cover Classification System (MLCCS)
- **2007** – *Natural Resources Inventory of the City of Bloomington* (NRI) by Hennepin County
- **2017** – Verification of NRI by Great River Greening (GRG)

Surveyed Natural Areas



Resource Threats

- Climate Change
- Flooding
- Excessive Dead, Fallen Wood
- Overgrown plant populations, bare soils, and erosion
- Undesirable Species
- Dumping
- Human Disturbance

Desired Conditions

Current Projects

Pond Dakota Mission

- Prairie & Oak Savanna restoration
- Tree thinning west of PDM
- Volunteer events
- Goat grazing

Aerial Photos

Colman Lake

1937

Aerial Photos

Colman Lake

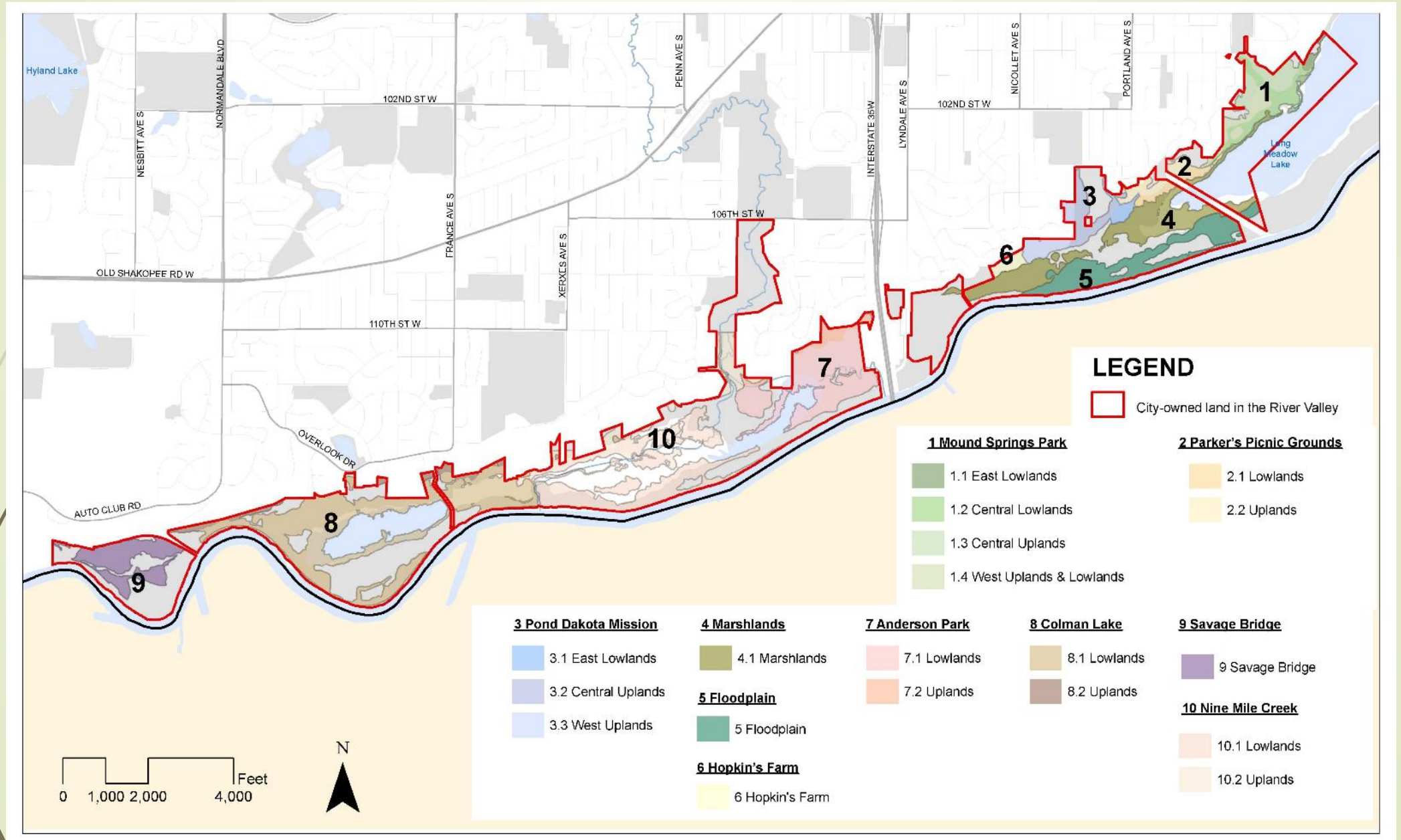
1972

Aerial Photos

Colman Lake

2015

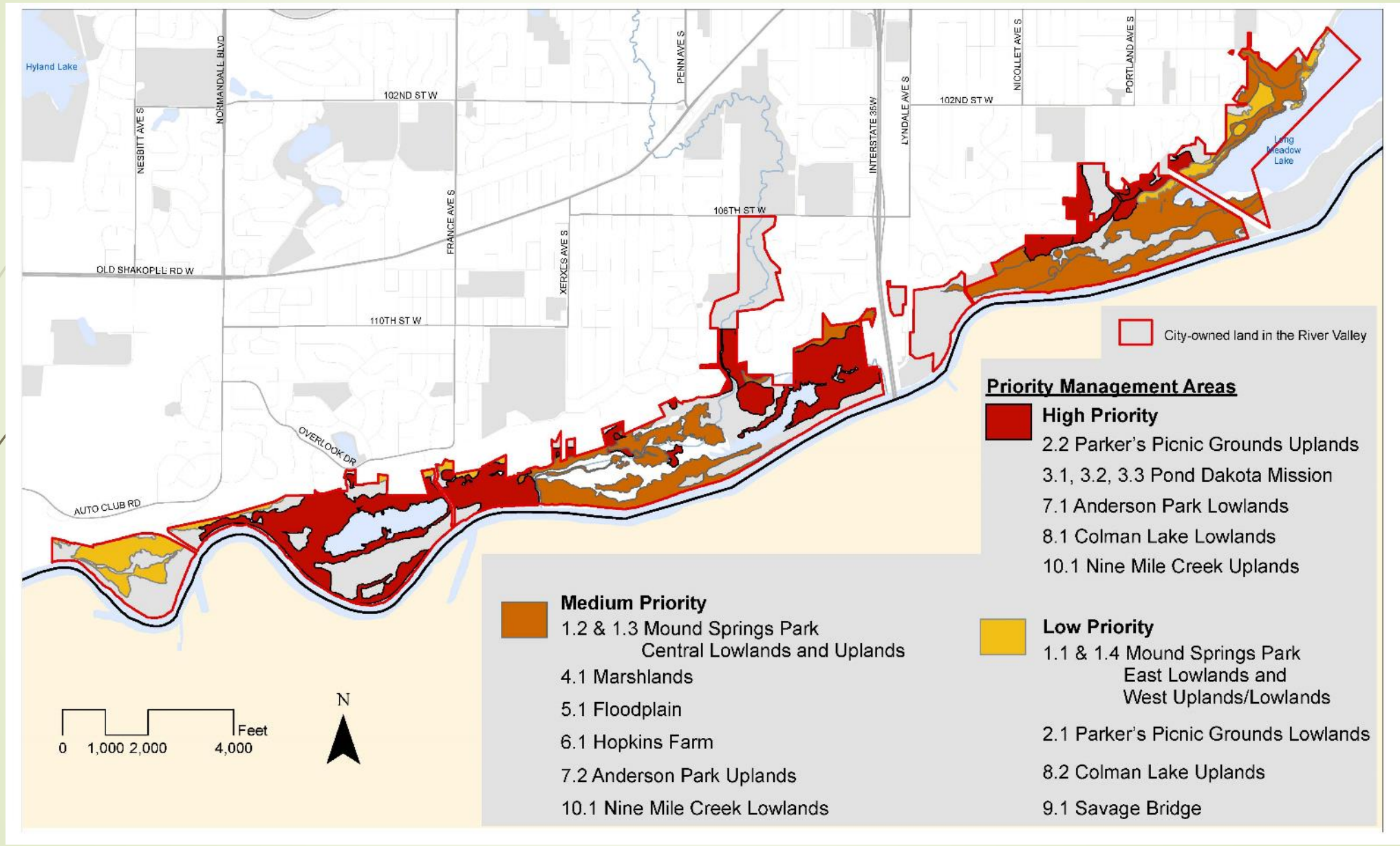
Management Areas



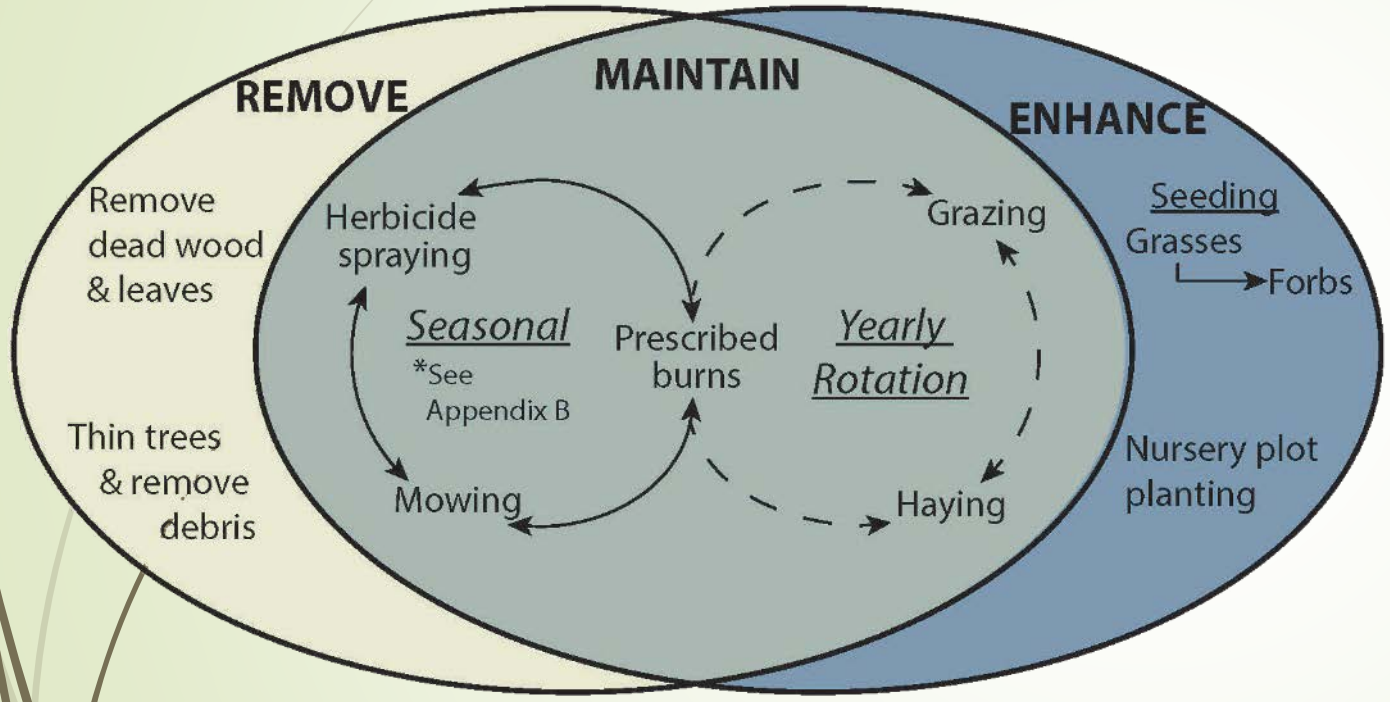
Priority Areas - Criteria

1. Improvement and/or
   Expansion of Existing Efforts
2. Quality of Vegetative Community
3. Visibility and Public Perception
4. Technical Viability of Initial Management
5. Technical Viability of Long-term Management
6. Presence of Biological Resources of Special Significance

Priority Areas



Management Strategies



1. **Remove Undesired Plants & Material**
   - Thin Trees
   - Mow
   - Herbicide Spray
2. **Continued Maintenance**
   - Mow
   - Herbicide Spray
   - Prescribed Burn
   - Haying
   - Grazing
3. **Site Enhancement**
   - Seed native grasses & forbs
   - Nursery plot planting
4. **Monitoring**

Plan Resources – Management Strategies

Tree Thinning

Cost: $4,500+ / acre (roughly)

Tree thinning is a management strategy aimed at achieving the appropriate number of trees and density of tree canopy that will allow enough sunlight to reach and sustain desirable ground layer of vegetation. Typically, the desired outcome is to achieve 80-100% ground cover by desirable species. Tree thinning entails removing trees by either cutting or gurdling, and removing the woody debris. Thinning can be highly effective, but is also one of the more costly management strategies. Cost can vary significantly depending on steepness of terrain, access to a site, and method or woody debris removal (burning, or hauling off-site, or stacking in piles on-site).

Equipment

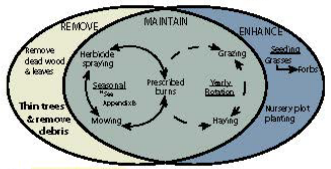
Chainsaw

Feller-buncher
(source: John Deere)

Wood Chipper
(source: J.P. Carlton/Stumpcutters)

When

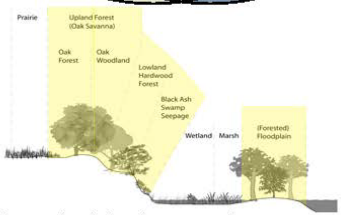
Tree thinning is typically the first step to restoring a site. It can be conducted in any season, but most often occurs in the winter. Thinning should occur over a several year period.



Where

In the River Valley, tree thinning is needed almost everywhere. However, it can be most effective in areas where desirable oaks and other species are overgrown by weedy trees. Thinning should occur in patches around the desirable species.

Tree removal may also be desirable to enhance visitor experience and open scenic views of the valley. Selective thinning can strategically open up patches of sunlight to encourage ground layer vegetation, while maintaining enough shade to keep trail users cool.



Notes:

The land type, restoration objectives, and tree quality should be considered when determining the appropriate number, density, and type of trees desired. One tool for determining tree quality is the Species Quality Index (SQI) provided in Appendix C.

All cut wood should be removed, stacked, or burned on site. Burning the cut woody vegetation will help reduce nitrogen build up in the soil. Removal is significantly more resource intensive, requiring trucks and potentially multiple trips to haul the woody material off-site. However, removing cut material is most effective at reducing undesirable nutrients on site.

Tree thinning should occur strategically to facilitate short and long-term management. Thinning can create corridors for machinery to carry out tasks such as mowing, removing dead, fallen wood, and selective cutting. Terrain aspect also needs to be considered when selectively cutting trees to allow sunlight to reach the ground.

Nursery Plot Planting

Cost: Varies
Dependent on volunteer time or staff management

Nursery plots can be established for species that were once common, but are now rare. Species such anemones are expensive, hard to find, and difficult to grow by seed. Stable populations of native wildflowers can serve as transplants for plug planting in other areas of the valley. Native Americans likely practiced this strategy by spreading the rootstock of unique forest wildflowers, which increased their resilience as a viable population in some of the river valley areas today. With appropriate care and management, this practice can be continued.

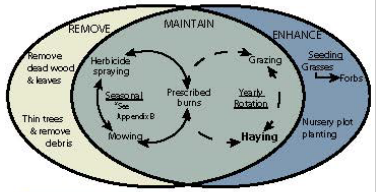
Equipment

Signage at the National Wildlife Refuge protects vegetation by informing visitors not to harvest plants on site.

Fencing provides specific area designations for nursery plots.

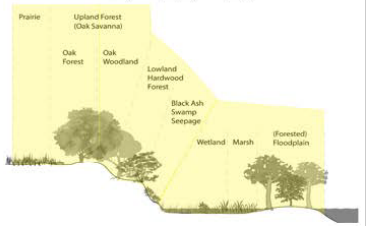
When

Plants are best transplanted when they are thriving and are under the least amount of stress. In general, early morning hours or late afternoon hours are suitable due to limited stress from sun and heat.



Where

Before this strategy is applied, suitable transplant sites should be identified. The most effective strategy might entail transplanting to areas immediately adjacent to existing native wildflowers, thereby expanding outward the current populations.



Haying

Cost: $400-800/ acre

Haying is very effective at facilitating diverse native plant communities because it prevents afforestation and restricts nitrogen inputs. The lower nitrogen levels in soils allow greater potential for plant biodiversity. Compared to prescribed burning and grazing, haying provides the most effective means to remove undesired nutrients. Haying is often more technically feasible than grazing since no fencing and water requirements are needed.

The benefits of haying include:

- Reduces the amount of undesirable nutrients, specifically nitrogen, that leach into soils
- Prevents the overgrowth of woody species
- Reduces competition for sunlight for desirable species
- Facilitates structural heterogeneity of vegetation
- Increases long-term carbon storage in soils
- Provides forage that may be marketable or used elsewhere

Equipment

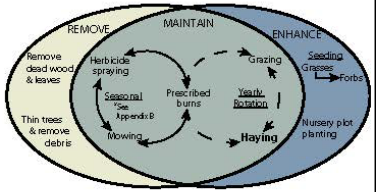
Mini hay baler
(source: Earth Tools, Inc)

Round bale
(source: Earth Tools, Inc)

When

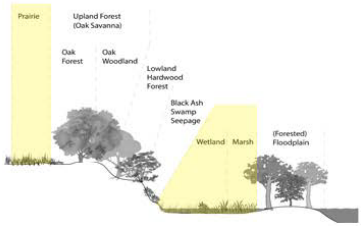
Typically, haying follows mowing. Haying is often a viable option when prescribed burning is not feasible.

Biomass harvest, such as haying, should occur in the summer months when spring wildflowers are dormant.



Where

Haying wetlands for marsh hay was once common, and is known to reinforce high biodiversity of both plants and animals. Additionally, native marsh hay is highly nutritious and can be highly marketable as forage. Even lower quality hay from species such as nettles, ragweed, and cattail can be used for biomass fuels.



Plan Resources – Habitat Assessment

Area 1. Mound Springs Park

Context: Mound Springs Park is the eastern most portion of the Minnesota River Valley that is owned by the City. The site is located south of Indian Mounds Elementary School. The existing bluff trail traverses this area and a boardwalk crosses unique calcareous wetlands.

Site Size: 56.65 acres (25.63 acres lowlands, 31.02 acres uplands)

Site Access: The site is best accessed at 102nd Street East & 10th Avenue South. The pavement leads down to a derelict parking lot. For the uplands, there is also access from 11th & 13th Avenues south of the school.

Machine Accessibility: The boardwalk and narrow trails limit management to mostly hand work. The central lowlands are level enough for tree clearing by machine. The uplands are steep, but a skid steer could be used. In the western portion, machinery can drive down to the lowlands and work around the edges of the uplands.

Site 1.2 Mound Springs Park - Central Lowlands

Survey Dates: 8/19/2007 & 5/25/2017

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
29F	**Lowland hardwood forest**	**D**	**F**
39B	**Floodplain Forest**	**D**	**F**
39C	**Floodplain Forest**	**D**	**F**

* **Bold** rows show areas of **significant** change

**Flora species list for this area is found in Appendix F

Current State:


Bare soils above 29F


Stream too spread out


Looking upstream from 39B

Oak Woodland

Although the 2007 inventory lists this area as a lowland forest, this report proposes a reclassification of 29F as part of the uplands due to the excessively drained and typical upland soil type found here. The largest trees are sugar maple, red oak and basswood with some displaying greater than 32" dbh. The forest vegetation along the spring stream includes sugar maple, wild leek, Dutchman's breeches, nodding trillium, early meadow rue, Virginia waterleaf, snow trillium, rue anemone, wood anemone, yellow trout lily, and hepatica. Many of these species are ephemerals, and their presence might represent a natural succession of this forest type (Grime 2001). Despite the unique forest vegetation, the overall ground cover is sparse.

Floodplain Forest

Further downstream at the transition of 29F and 39B, the vegetation changes according to topography and hydrology. Cottonwood trees and silver maples replace the sugar maple and oak from uphill. Open growth cottonwood and oak occur along a sandy plain where a bridge once crossed the stream. The older trees are subsumed by dense, young, woody vegetation such as boxelder, hackberry, green ash, red elm, and cottonwood. There are a few prairie crabapple and American plum trees, which cling to small gaps in the canopy along the stream and trails. The main shrub layer is buckthorn, at times so dense as to make walking difficult. The rich soils facilitate the domination of shade tolerant, nitrophilic species such as garlic mustard and wood nettle. There is also excessive dead, fallen wood.

Priority Management Recommendations

1. **Restore ravine slopes & spring streams**
   - Revegetate shoreland & slopes
   - Reconnect upstream channels

   Notes: Earthwork is needed to prevent the stream from spreading over a wide area. A designed pool and cascade single-channel stream would greatly improve stream flow and water quality.
2. **Maintain and enhance rue anemone**
   - Remove excessive dead, fallen wood and leaf litter
3. **Restore a ground layer vegetation**
   - Cut & stump treat buckthorn
4. **Maintain & expand unique forest wildflowers**
   - Remove excessive dead wood & leaf litter

1. **Restore cottonwood/oak grove**
   - Thin dense trees by machine (young cottonwood, green ash, boxelder, hackberry)
   - Seed moist mesic grass mix (including shade tolerant species)
2. **Maintain by managing Invasive species**
   - Mow
   - Prescribed burn
   - Haying and/or grazing

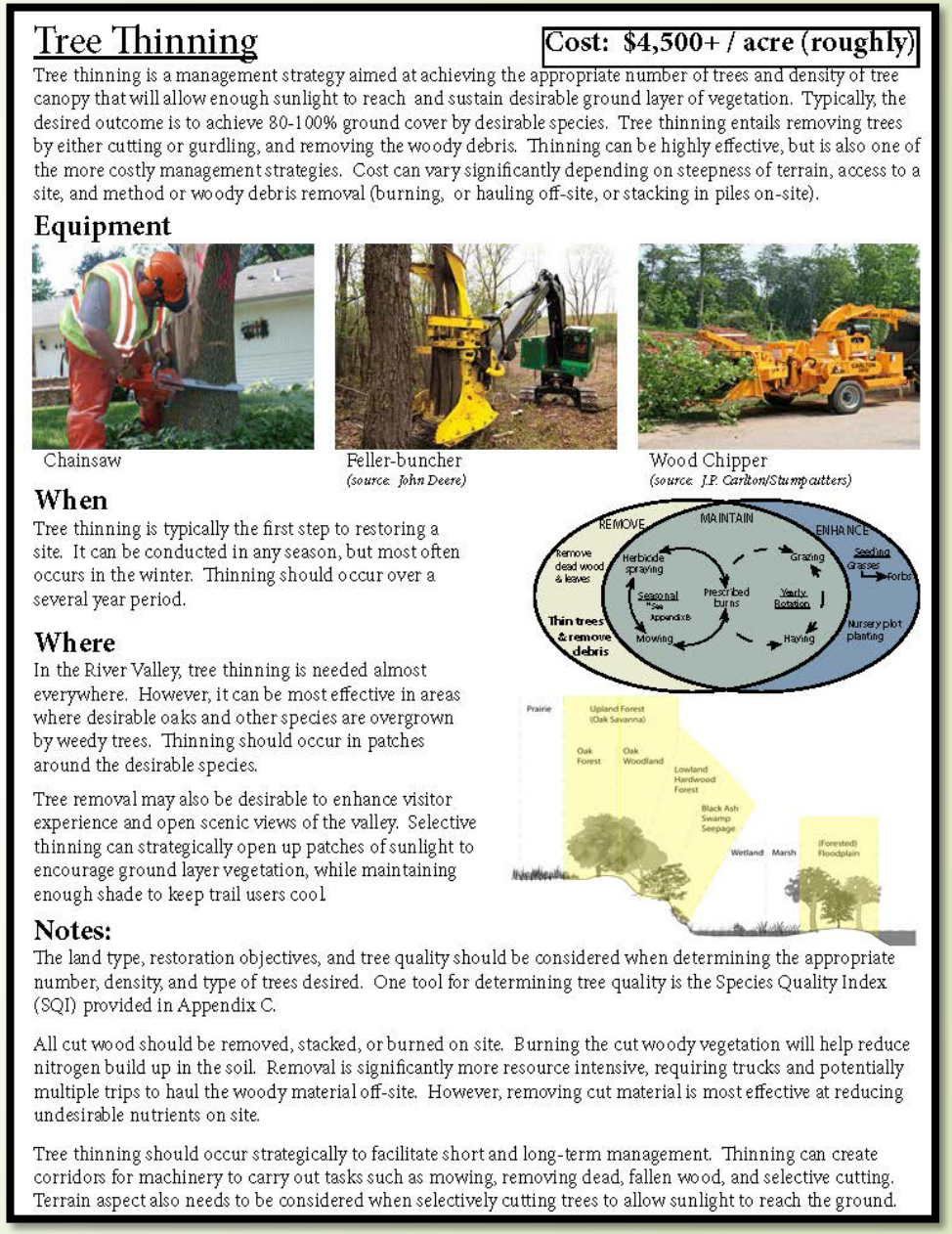
Potential Model Site: This site's afforested lowlands could be converted to a meadow along a stream and would provide a unique restoration model to guide work in other lowland areas.

Appendices

- **Habitat Assessment**
- **Management Strategies**
  - Species Quality Index
  - Management Protocols for invasive species
  - Recommended Species

Existing Conditions

- Flora Species List
- Known Cultural Resources



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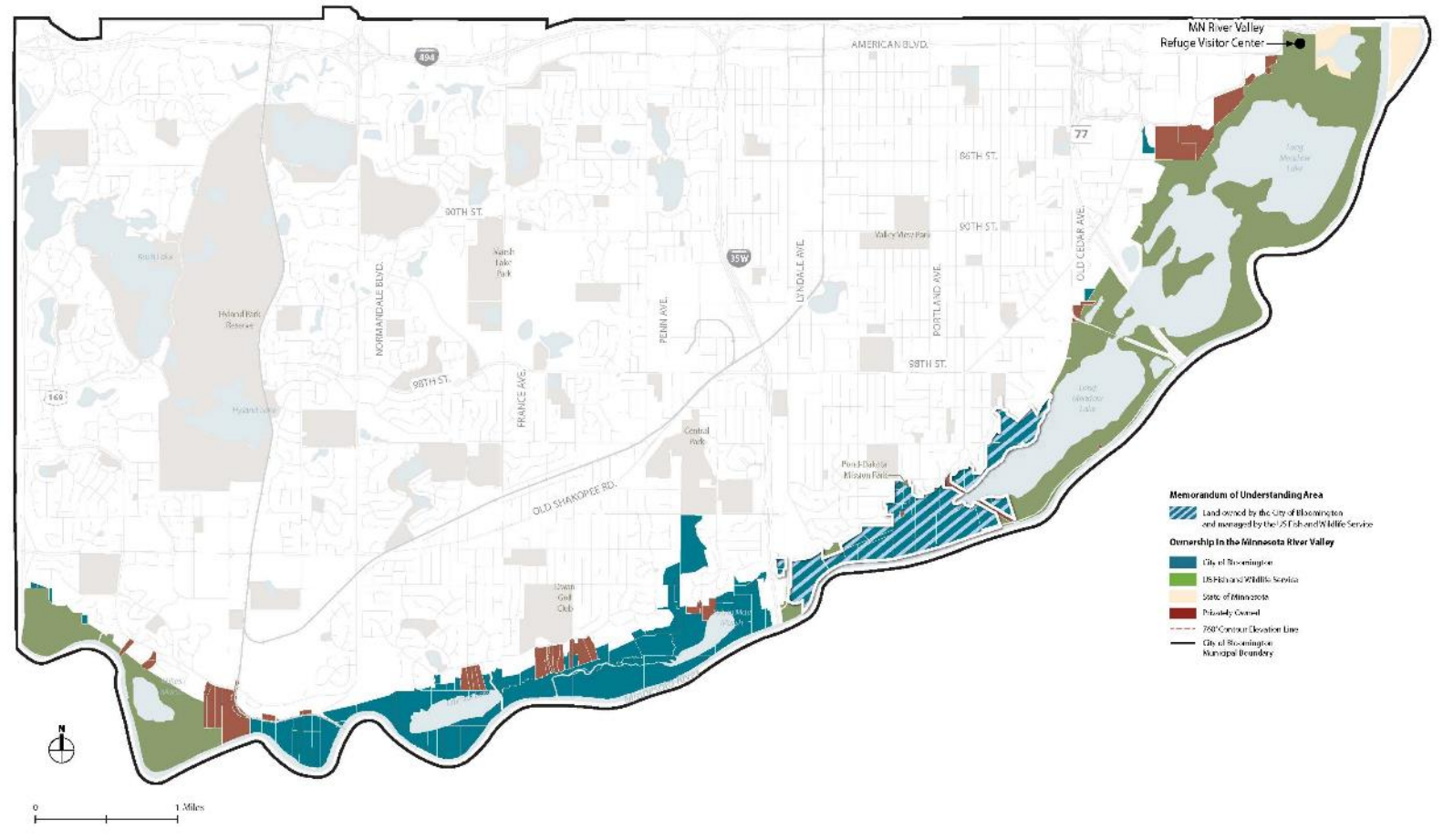
Education

1. Expanding Awareness
2. Sharing Information and Management Goals
3. Creating Stewards

Implementation & Partnerships



Leveraging resources

- Grant Opportunities
- Volunteers
- Events
- Best Practices

Discussion

1. What is your current role in the River Valley?
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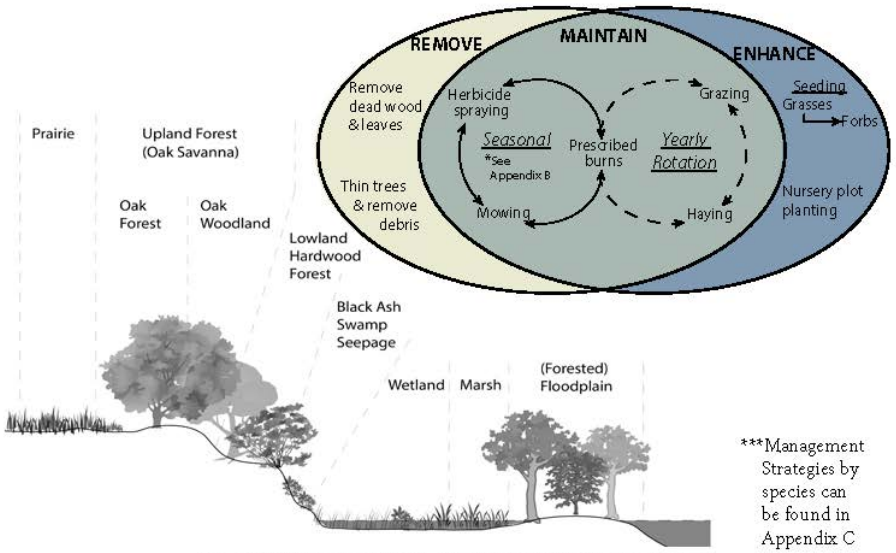
Extra Slides

Management Goals

- Maintain and Enhance Existing Accomplishments
- Foster the Growth of Desirable, Native Species
- Establish Continuous Ground-Level Vegetation
- Reintroduce Natural Disturbances
- Strengthen Potential for Biodiversity
- Provide Educational Opportunities

Management Strategies by Habitat

Management Strategies
A General Framework



***Management Strategies by species can be found in Appendix C

Typical Management Sequences by Habitat

Savanna, Forested Floodplain

1. Pre-treatment survey, establish photo points
2. Remove excess dead, fallen wood
3. Thin trees
4. Remove undesirable shrubs by cutting and treating stumps
5. Seed native grasses and forbs
6. Mow site continuously, especially during the first 2 years of site enhancement
7. Establish desirable species by reducing excessive nutrients and not allowing undesirable vegetation to shade out desirable vegetation
8. Utilize a combination of haying, grazing, and prescribed burning

Wetland, Marsh

1. Pre-treatment survey, establish photo points
2. Forestry mow and perform prescribed burns to manage woody encroachment
3. Hay bale and prescribed burn to reduce nutrient undesirable inputs

Prairie

1. Perform strategies similar to Savanna, Floodplain Forest habitat
2. Focus on cutting and removing woody species along the edges to protect existing prairies with smaller, remnant plant communities

Black Ash Swamp Seepage and Lowland Hardwood Forest

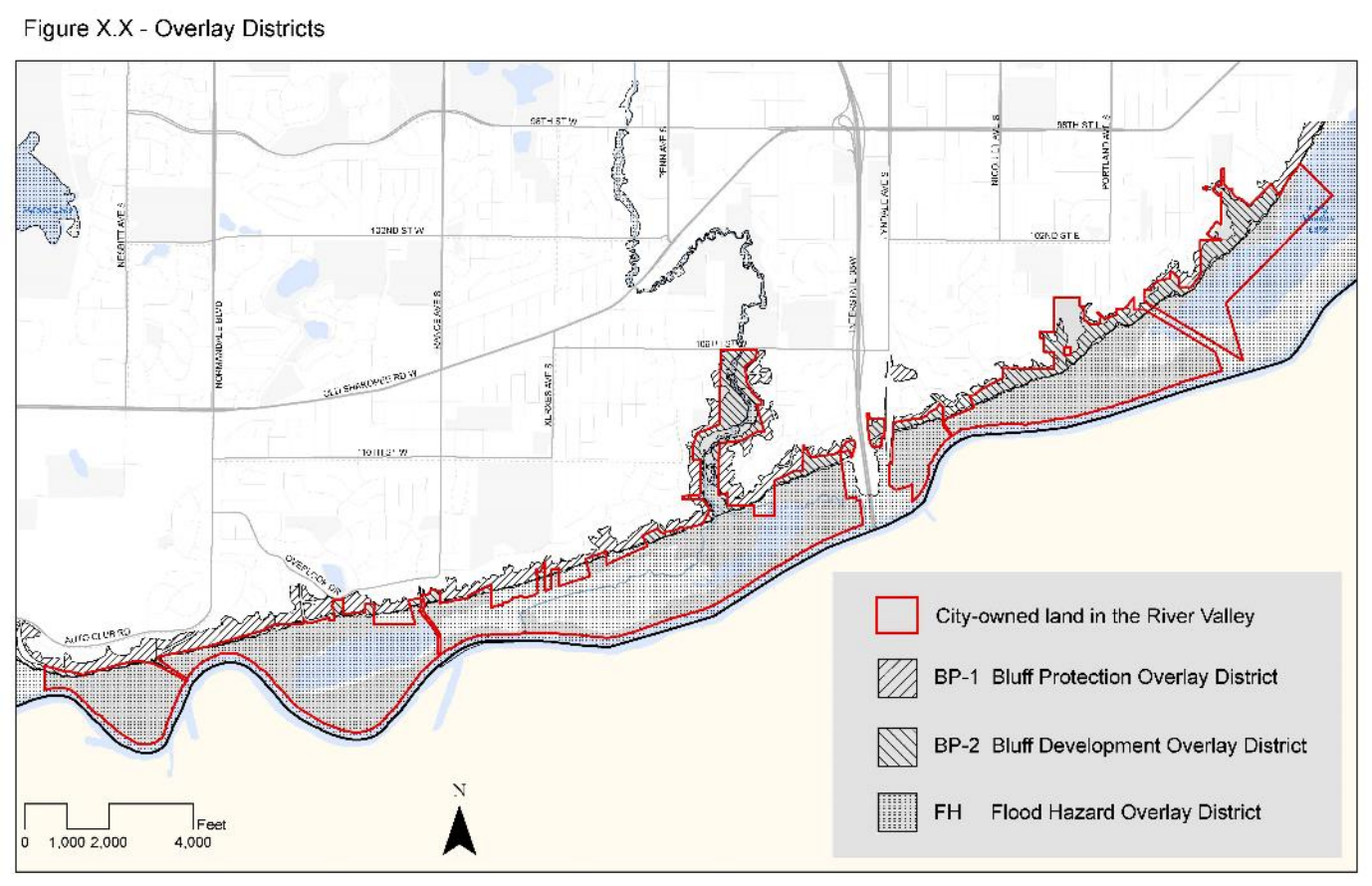
1. Pre-treatment survey, establish photo points
2. Thin trees
3. Seed bare soils on steep slopes and along stream banks where possible
4. Establish desirable species by reducing excessive nutrients and not allowing undesirable vegetation to shade out desirable vegetation
5. Cut and remove woody species along the edges

Management Costs Table

Activity	Cost	Notes
Mechanical		
Tree thinning	$45,000*+	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* / occurence	
Forestry mowing	$650 - $850 / acre* / occurence	Cost dependent on amount of material needing to be mowed
Spot mowing		
Haying		
Hand pulling/ digging		
Forb Seeding	$1,000-$3,000 / acre / occurence	Cost dependent on mix and species
Graminoid Seeding	$600 -$1,000 / acre / occurence	

Activity	Cost	Notes
Chemical		
Cut, treat, and stack woody undesirable species	$1,000 -$2,500 / acre / occurence	Cost dependant on size of infestation, equipment accessibility, and terrain
Non-woody undesirable species management (mow & spray)	$250 - $750 / acre / occurence	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, complexitity of burn units, and access
Grazing	$1,200 - $1,800 / acre	
Biological Control Agents		

Regulatory Considerations



Federal & State Species Protections

- Endangered & Threatened Species lists
- National Historic Preservation Act

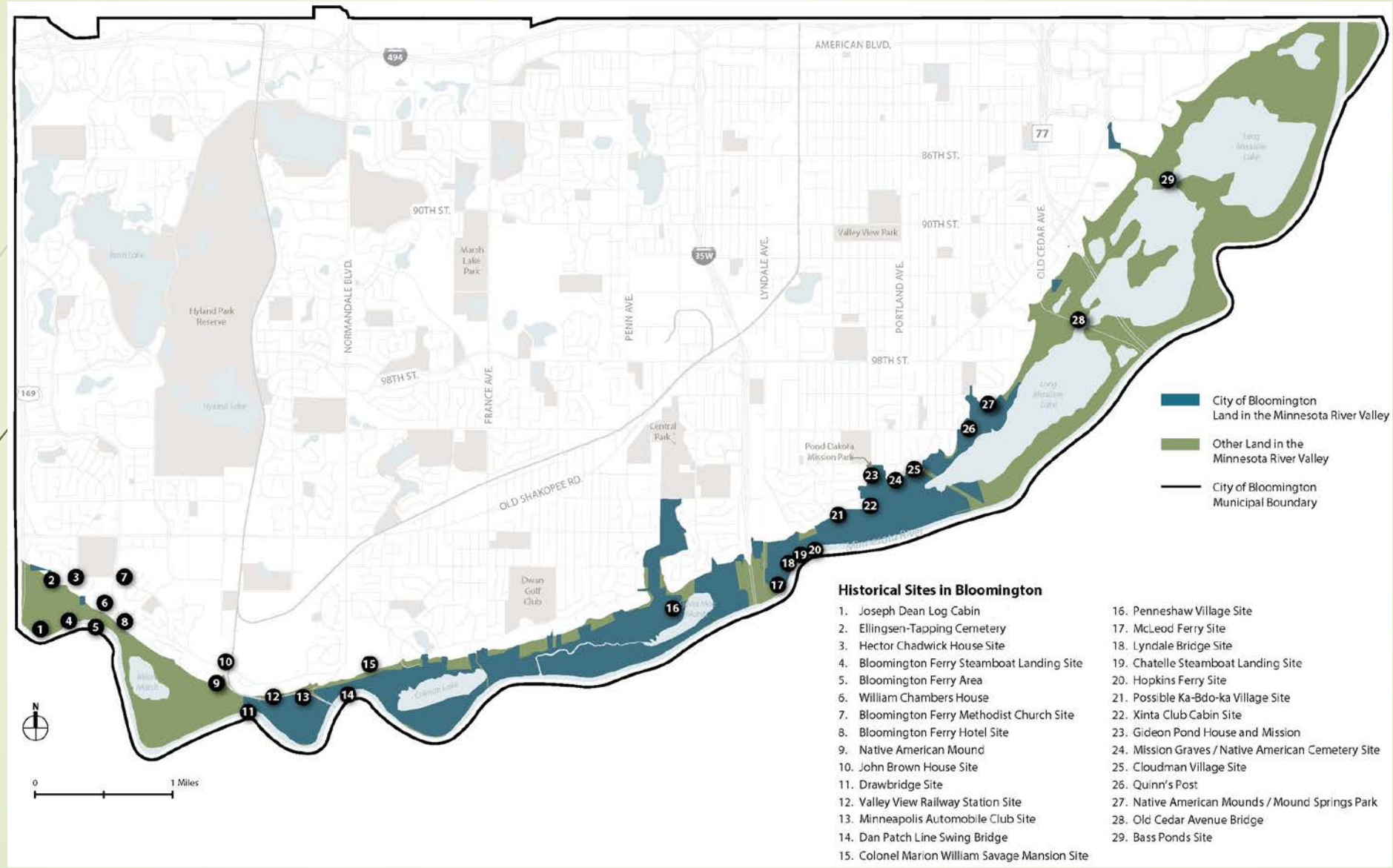
City Regulations

- Bluff Protection Overlay Districts
- Flood Hazard Overlay District
- Designated Burial Grounds, Class I, and Class II Historic Sites

Historic Perspective

Seth Eastman painting (1847) of River Valley

Cultural Resources



Historical Sites in Bloomington

1. Joseph Dean Log Cabin
2. Ellingsen-Tapping Cemetery
3. Hector Chadwick House Site
4. Bloomington Ferry Steamboat Landing Site
5. Bloomington Ferry Area
6. William Chambers House
7. Bloomington Ferry Methodist Church Site
8. Bloomington Ferry Hotel Site
9. Native American Mound
10. John Brown House Site
11. Drawbridge Site
12. Valley View Railway Station Site
13. Minneapolis Automobile Club Site
14. Dan Patch Line Swing Bridge
15. Colonel Marion William Savage Mansion Site
16. Penneshaw Village Site
17. McLeod Ferry Site
18. Lyndale Bridge Site
19. Chatelle Steamboat Landing Site
20. Hopkins Ferry Site
21. Possible Ka-Bdo-ka Village Site
22. Xinta Club Cabin Site
23. Gideon Pond House and Mission
24. Mission Graves / Native American Cemetery Site
25. Cloudman Village Site
26. Quinn's Post
27. Native American Mounds / Mound Springs Park
28. Old Cedar Avenue Bridge
29. Bass Ponds Site