

# APPENDIX A: HABITAT ASSESSMENT



## Appendix A: Habitat Assessment

In May and June of 2017, Great River Greening (GRG) conducted a habitat assessment in ten (10) delineated management areas (figure 4.3) of the River Valley. Some of the management areas are further divided by uplands and lowlands or east and west to account for differing management strategies. The nineteen (19) subareas are further identified by land cover type with a corresponding number and letter that were assigned with a survey conducted for Hennepin County's 2007 Natural Resource Inventory (NRI). Ecological community descriptions are provided for each of the subareas as defined in the Minnesota Land Cover Classification System.

Each of these sites was assigned a quality ranking in the 2007 NRI. These quality rankings are compared to GRG's rankings in the following tables. Overall, habitats that have not received any form of restoration or enhancement activities have continued to degrade. The quality rankings are compared by grades A to F.

- A – Highest quality natural community, no disturbances and natural processes intact. Site must be visited entirely or partially to accurately assess its natural quality at this level (field check level = 3 or 4).
- B – Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of exotics. Site must be visited entirely or partially to accurately assess its natural quality at this level (field check level = 3 or 4).
- C – Moderate condition natural community with obvious past disturbance but is still clearly recognizable as a native community. Not dominated by weedy species in any layer. Minimally, the site must be visited from the edge to accurately assess its natural quality at this level (field check level = 2, 3 or 4).
- D – Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered. Herbaceous communities may be assessed with this ranking from a distance (field check level = 1)

if large masses of invasive species are present and the entire community is visible.

- F - Semi-natural plant community with either some native species present, or no native species present in an altered plant community. Many areas with this ranking are unmapped in the following assessments because they are not identified as natural communities, and are not priority management areas.

While some sites received a lower grade in 2017 compared to 2007, nearly all continue to have the same ecological community description. These community descriptions represent existing conditions and are described in Current Conditions (Section 3.2). However, the existing community descriptions are not always the targeted communities for restoration.

Each assessment also includes a suggested list of management strategies. The strategies suggested in each assessment are based on the goals, objectives, and strategies identified in Section 4. These strategies are not a complete catalogue of all activities that should occur. The strategies should be evaluated for use according to the identified priority sites (Section 4.4), the costs listed in Table 4.1, and the appropriate application of each strategy (Appendix B). Additionally, the protocols for managing particular invasive species are outlined in Appendix D. These protocols should be applied in conjunction with the strategies outlined in each area assessment. Each site's objectives and strategies are broad so that adjustments can be made in response to changes in land cover and species configuration. However, the assessments serve as a basis for initial management decisions.

The extent to which management strategies should be applied are defined by the management objectives. These objectives are outlined in Section 4.2 as a range of monitoring – maintenance – enhancement – restoration, and are provided for each management strategy in the site assessments. The restoration targets allow for a variety of land types and communities, and are ultimately based on the recommendation of the land manager once work is scheduled to begin.







## 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 1.1 Mound Springs Park - East Lowlands

The eastern lowlands in Mound Springs park feature some unique plants, and a boardwalk through the wetland areas. However, this site is difficult to access and resource management could be cumbersome and require mostly hand work.



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

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>29D</b>	<b>Floodplain forest silver maple subtype</b>	<b>D</b>	<b>B to F</b> depending on sunlight and nutrients
<b>29E</b>	<b>Mixed emergent marsh</b>	<b>D</b>	
<b>29I</b>	<b>Black ash swamp seepage subtype</b>	<b>D</b>	

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Photo 1: Standing in 29E - 29I looking towards 29D at the far end of the boardwalk.



Photo 2: Understory dominated by buckthorn and box elder. Sunlight at soil is insufficient for graminoid and herbaceous regeneration.



Photo 3: Opening with sunlight permits continuous vegetation, mainly beggars tick, prairie sedge, rice cut grass, and Michigan lily.

**Forested Floodplain, Marsh/Meadow & Wetland**

The central portion of 29I and 29E have been opened due to construction of a board walk through the seep (Photo 1). The dappled sunlight is sufficient for continuous vegetation cover, primarily by rice cutgrass, prairie sedge, lake sedge, beggar's ticks, and reed canary grass (Photo 3). Additionally, later successional species, such as Michigan Lily, are apparent in this area. Where trees weren't cut, there is dense shade and little ground layer vegetation. (Photo 2).

The west sections of 29I and east sections of 29E receive runoff from the Martin Luther Campus development located above the bluff. The nutrient rich discharge has created a disturbed patch of sand and gravel with high populations of burdock in sunny patches. These sections have also experienced rapid overgrowth of box elder and buckthorn, with shade intensities high enough to eliminate ground layer vegetation, or become infested with wood nettle. There is also excessive dead, fallen wood, mainly from black willow.

**Notes**

Many pussy and Bebb's willows exist in an old-growth stage, but young stands are rare. Both common and glossy buckthorn are present along the fringes that were not cleared, and dense stands occur in the west section of 29I and all of 29E.

**Priority Management Recommendations****At all sites****1. Enhance for a continuous ground layer vegetation**

- Thin trees
- Remove excessive dead, fallen wood

**2. Maintain by Managing Invasive Species**

(Appendix D)

- Cut & stump treat
- Prescribed burn
  - buckthorn
  - burdock
  - wood nettle
  - reed canary grass

**3. Restore beaver populations**

- Cut old stems of willows and allow sprouts to grow

\*After thinning trees, existing seed banks should allow for a rapid response of early successional species such as smartweed and rice cut grass.



## Site 1.2 Mound Springs Park - Central Lowlands



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

\* **Bold**  
rows show  
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significant  
change

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>29F</b>	<b>Lowland hardwood forest</b>	<b>D</b>	<b>F</b>
<b>39B</b>	<b>Floodplain Forest</b>	<b>D</b>	<b>F</b>
<b>39C</b>	<b>Floodplain Forest</b>	<b>D</b>	<b>F</b>

\*\*Flora species list for this area is found in Appendix E

**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. 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****4. 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.

**3. Maintain and enhance rue anemone**

- Remove excessive dead, fallen wood and leaf litter

**4. 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)

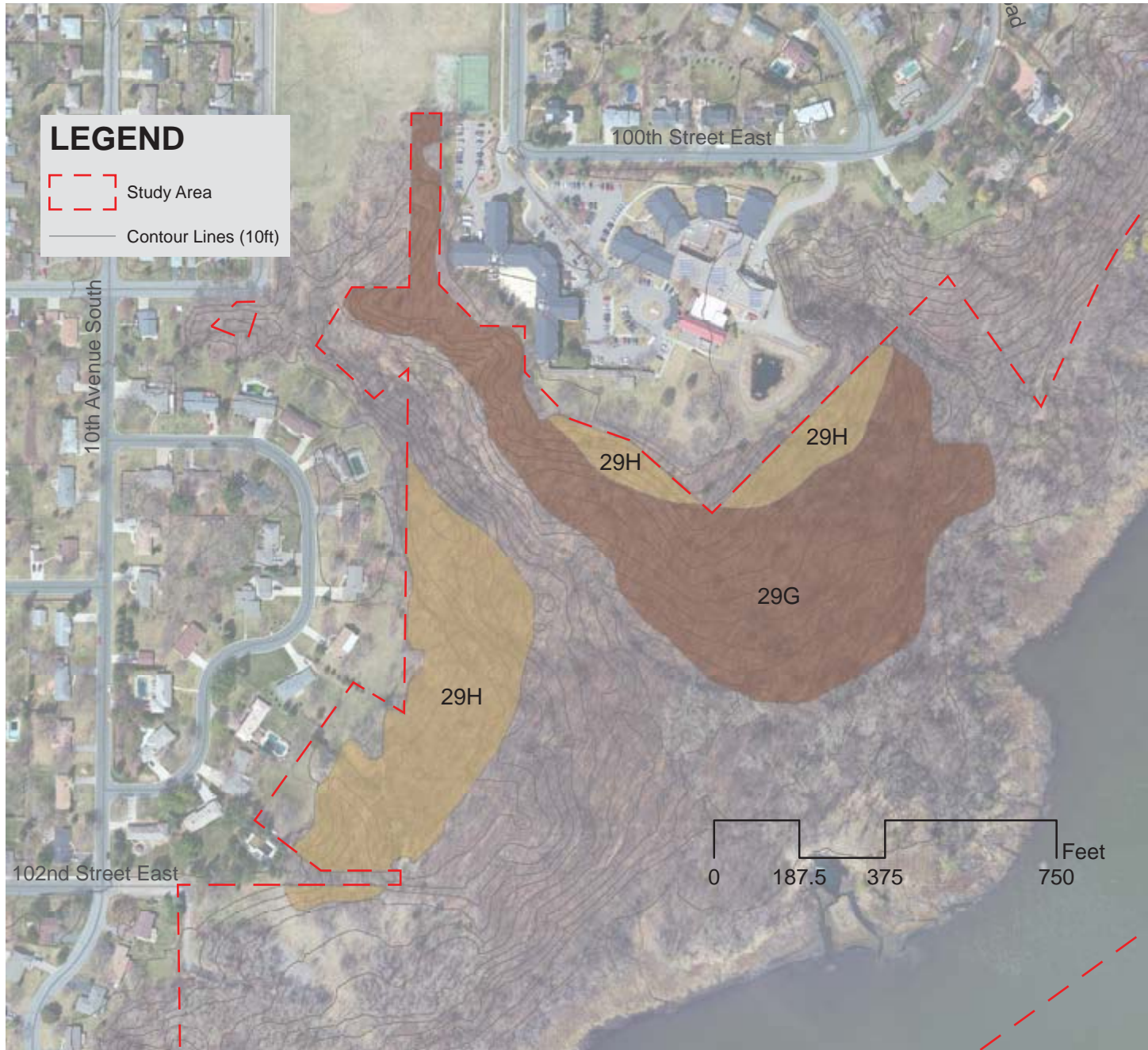
**2. Maintain by managing Invasive species**

- 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.



## Site 1.3 Mound Springs Park - Central Uplands



Survey Dates:  
8/2/2007 &  
5/15/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>29G</b>	<b>Oak forest mesic subtype</b>	<b>D</b>	<b>F</b>
<b>29H</b>	<b>Oak woodland-brushland</b>	<b>D</b>	<b>C-</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Fallen Bur Oak limb



Looking downstream from 29H



Bare soils around stream

A small population of old, open growth sugar maples in both 29G and 29H is one of few sugar maple/oak groves in the City. A maple/oak grove is preferable to maples alone, in terms of biodiversity, ecosystem function, and biological services. In other areas of 29G, younger sugar maples have rapidly expanded, creating deep shade with little to no ground layer vegetation and eroding soils. In these areas, an undesirable phenomenon called maplization is occurring, which is the continuing regeneration of maples and the expansion of their ground cover.

Large, open growth bur oak and red oak show symptoms of stress due to competition for sunlight and high humidity. There is no evident oak regeneration. Some oaks have died and fallen, contributing to the large amounts of dead, fallen wood in the area.

Other tree species include basswood, which is found regenerating. Younger, straight trunk trees such as hackberry, green ash, red elm and ironwood are also present. These species grow very fast and compete for sunlight with some of the oldest oaks and maples.

Several Native American mounds on the west side of 29H are surrounded by overgrowth of undesirable vegetation. Due to existing bare soils and the threat of weak trees tipping over, the structural integrity of the mounds is at risk.

The shrub layer is dominated by buckthorn, with some honeysuckle and chokecherry. Occasional remnants of the savanna state, such as American plum and prairie crab apple, persist along open streams and trail edges and are usually in a highly degraded state.

Ground layer vegetation is primarily native, but sparse. In places, greater than 80% of the ground layer is bare. The most intact ground layer is in 29H, where Dutchman's breeches and Virginia waterleaf provide groundcover in early spring. Yet, as these ephemerals senesce, the soils become increasingly bare from late spring through fall.

Rue anemone exists just east and downstream of the confluence of the two stream channels in 29G and 29F of the Central Lowlands. There are several hundred plants growing in a dense patch of buckthorn with bare and eroding soils. Rue anemone are associated more often with savanna than forest, and dense swaths once covered pastured groves every spring. The population here is one of the last in the River Valley.

**Management Objectives & Strategies:****1. Restore Oak/Maple groves**

- Mow around open growth maples and oaks

**2. Protect Native American mounds**

- Thin surrounding dense stands of buckthorn, honeysuckle, red elm, and green ash trees

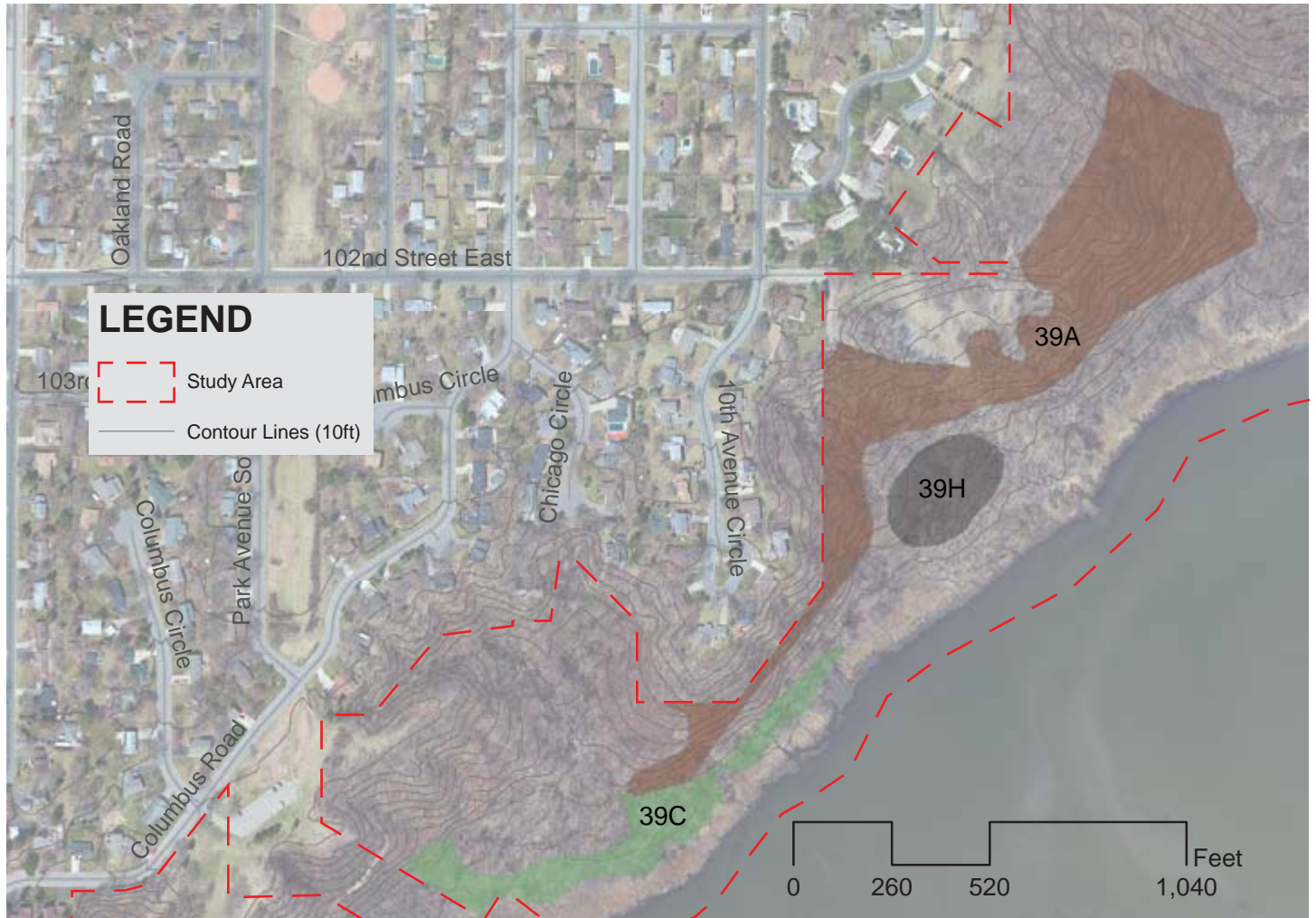
**3. Maintain & expand unique forest wildflowers**

- Remove dead wood & leaf litter
- Prescribed burns

**4. Enhance Rue anemone population**

- Thin 70% of low quality trees
- Cut & stump treat buckthorn in the winter (when anemone is dormant)
- Seed graminoid mix (cool, mid, and warm season species)
- Mow/graze in summer (after anemone go dormant)
- A thriving rue anemone population could provide a transplantable nursery rootstock to repopulate other locations.

## Site 1.4 Mound Springs Park - West Uplands & Lowlands



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8/19/2007 &  
5/25/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>39A</b>	<b>Oak forest mesic subtype</b>	<b>C</b>	<b>F</b>
<b>39C</b>	<b>Floodplain forest</b>	<b>C</b>	<b>F</b>
39H	Black ash swamp seepage subtype	B/C	C

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Seep stream flowing from private residential property



The vegetation in 39C is almost entirely dominated by wood nettle and garlic mustard.



Higher quality vegetation in the SW corner of 39H include Skunk cabbage, beggar's ticks and smartweed.

**Oak Forest**

There is extensive low quality vegetation in this area. The non-native and invasive species include siberian elm, buckthorn, honeysuckle, garlic mustard, wood nettles, and burdock. Additionally, there are undesirable concentrations of small, spindly trees such as young elm, hackberry, and ash.

A small seep-stream, emanating from adjacent private property, flows through east 39A into 39H and 39C. Copious amounts of lawn debris placed in the ravine is decomposing and releasing nitrogen to the area, which has promoted tall, dense stands of invasive species.

West of the small seep stream in 39A, are bur oaks and red cedars that show significant stress due to sunlight competition from red oak, basswood, red elm, and green ash. The ground layer is mostly bare, and there are many bur oak roots that show 2 feet of exposure.

**Forested Floodplain & Wetland**

The 2006 survey indicates a much higher diversity for the wetland area, and many of the species are absent in 2017. Potential causes of this include dense stands of buckthorn that are now taller and creating more shade, the emergence of garlic mustard, and increased shade from all species of trees. The community is dominated by silver maple, black ash, and small red elm, hackberry, and green ash. The ground layer is dominated by wood nettles and garlic mustard. Impatiens and clear weed are ubiquitous throughout. Quality vegetation occurs in the southwest section of 39H adjacent to the lakeshore because it escapes the high levels of nutrients and weedy species associated with the seep stream.

Monotypic, even-age stands of silver maple and cottonwood dominate floodplain ecosystem dynamics. There are large cottonwoods that run parallel to the lakeshore. Numerous small, straight trunk green ash, red elm, and hackberry are present. Wood nettles, garlic mustard, impatiens and clear weed are ubiquitous throughout the ground layer.

**Management Objectives & Strategies****1. Restore to a shortgrass savanna with permanent ground layer vegetation**

- Thin trees 50% (mostly by hand, skid steer usable near parking lot)
- Maintain by grazing and/or prescribed burns

**1. Restore a more diverse, permanent ground layer vegetation**

- Thin trees (by hand)
- Mow continuously

**2. Restore beaver populations**

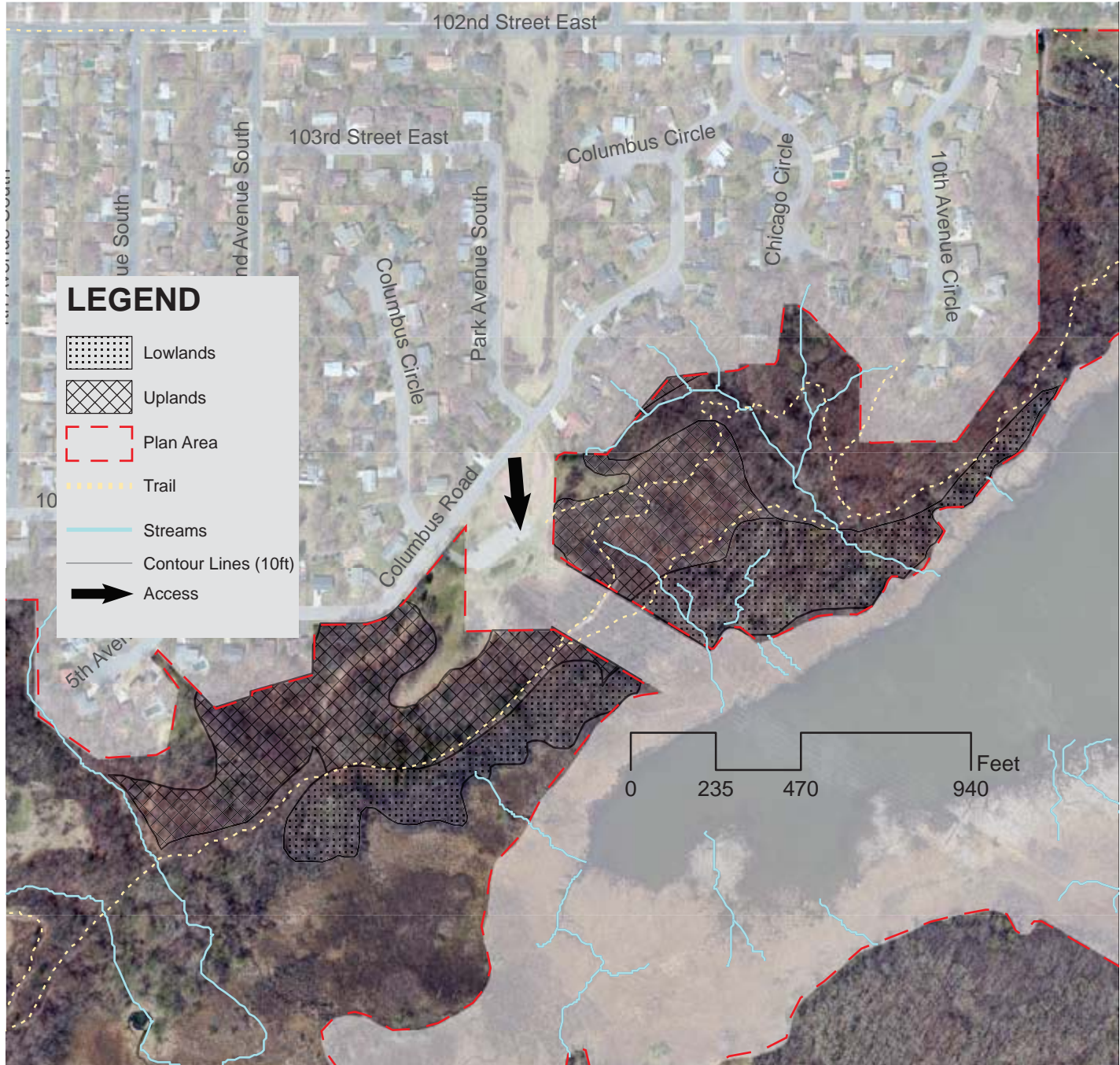
- Cut old stems of willows and allow resprouts to grow





## Area 2. Parker's Picnic Grounds

**Context:** Parker's Picnic Grounds is a gateway to the Bloomington Minnesota River Valley. Large, open growth oaks greet visitors at the trailhead. Native wildflowers occur in patches of sunlight. There is also a stream that forks and flows from two artesian springs. One hiking trail heads upstream while the other cuts through the floodplain.



**Site Size:** 21.33 acres (8.22 acres lowlands, 13.11 acres uplands)

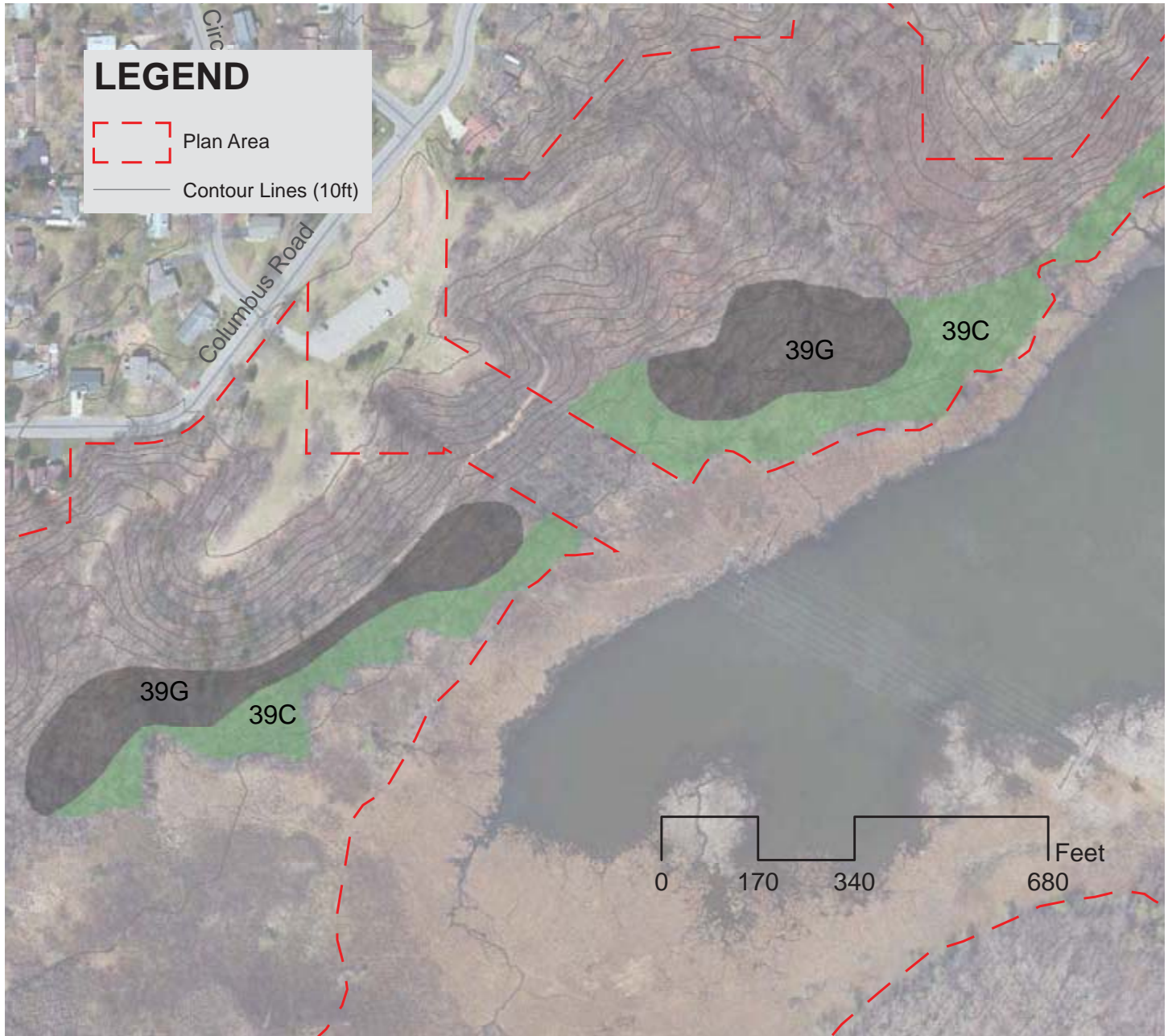
**Site Access:** There is a parking lot off of Columbus Road. Hiking trails lead to most portions of this site.

**Machine Accessibility:** Most work should be conducted by hand. Some machinery can be operated in the uplands along the mowed section off of Columbus Road. Work in the lowlands will need to be conducted by hand.



## Site 2.1 Parker's Picnic Grounds - Lowlands

Restoration along the stream is an attractive project. Done correctly, restoration could increase water quality flowing into Long Meadow Lake while making the stream a much more attractive attribute for valley visitors.



Survey Dates:

8/2/2006 &

5/15/2017

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

Ecological Community Description

Quality  
Ranking

Quality  
Ranking

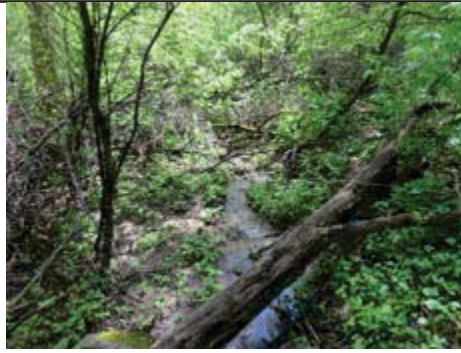
<b>39C</b>	<b>Floodplain forest</b>	<b>C</b>	<b>D</b>
<b>39G</b>	<b>Black ash swamp seepage subtype</b>	<b>B/C</b>	<b>D</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Dense stands of garlic mustard



Spring stream



Seeps at the bluffland base

**Floodplain Forest**

West of the utility right-of-way is a continuation of the Mound Springs Park Lowlands with stands of silver maple and cottonwood trees. There are occasional large cottonwoods and silver maples that exhibit open growth form structure. Small green ash, red elm, and hackberry exist throughout. The ground layer is dominated by wood nettles, garlic mustard, impatiens, and clear weed.

**Wetland**

The dominant woody vegetation in the seeps is black ash, pussy willow, and Bebb's willow. Black ash trees are scattered, and are not the primary factor of shade. Bebb's willows, pussy willows, buckthorn, red elm and hackberry provide the greatest amount of shade. Glossy buckthorn is becoming more evident. Ubiquitous plants include smartweed, beggar's ticks, and impatiens. Unique plants include marsh marigold, spring cress, tufted loosestrife and skunk cabbage. Several indicator species, such as Michigan lily, tussock sedge, and sensitive fern, were recorded in 2006 but were not found in the 2017 inventory,

Along the spring stream, black ash are present, but the willows are replaced by dense stands of buckthorn interspersed with red elm, hackberry, and green ash. Several ash show symptoms of emerald ash borer. Stream bank erosion is apparent due to lack of graminoid vegetation. Wood nettle and garlic mustard are dominant, possibly due to lawn waste nutrient inputs. There is also excessive dead, fallen wood along the stream. This area has experienced a decline in plant diversity since 2006.

**Priority Management Recommendations****3. Enhance to a more open floodplain, with pockets of sun and shade**

- Thin trees
- Mow (several times per season)
- Prescribed burns
- Grazing

**Note:** Combinations of the above strategies will need to be tested throughout the year to determine the best restoration method.

**1. Restore stream & seep areas**

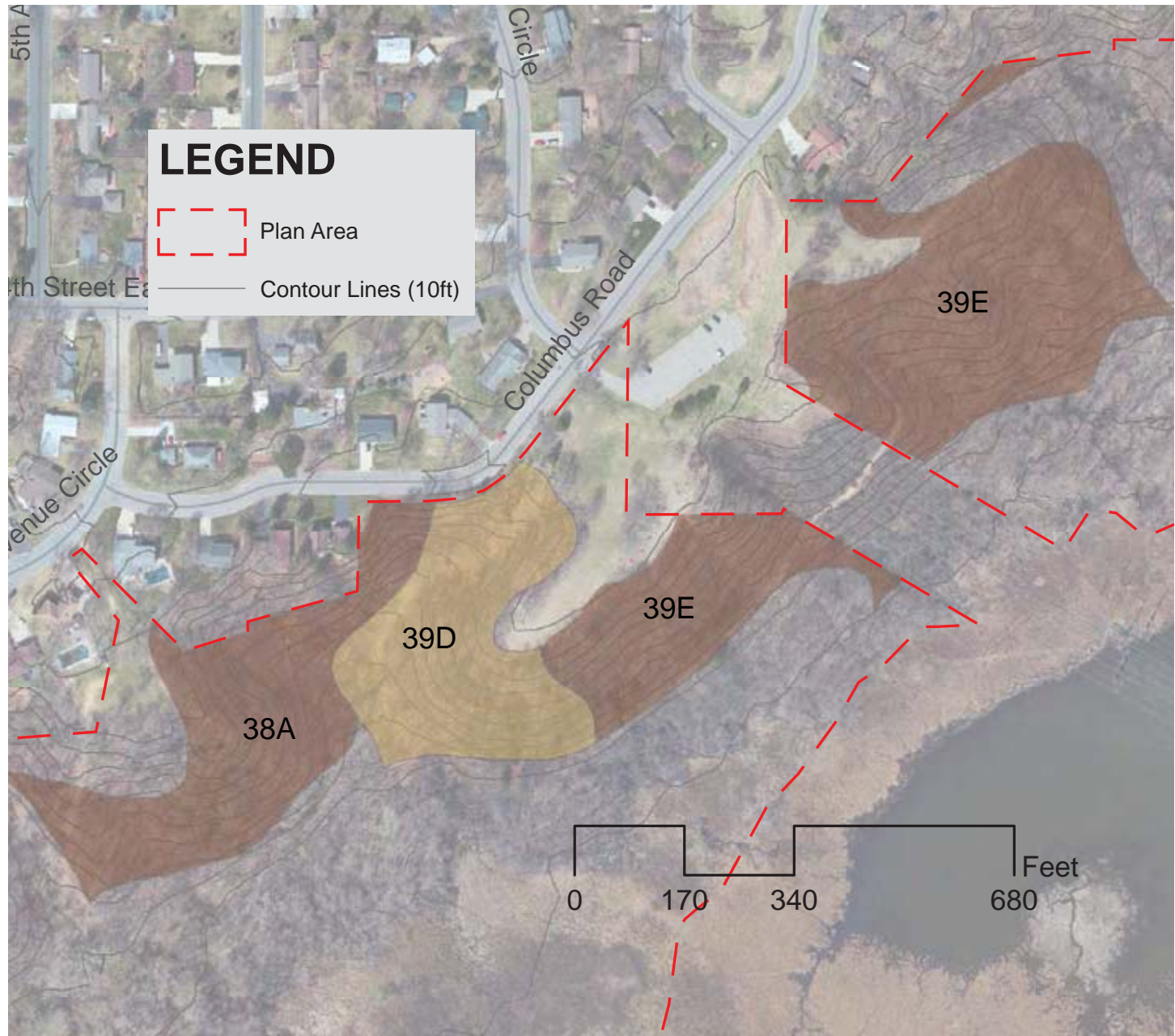
- Cut & stump treat undesired species
- Burn cut wood
- Seed & plug stream banks with grasses

**2. Restore beaver populations**

- Cut old stems of willows and allow resprouts to grow

## Site 2.2 Parker's Picnic Grounds - Uplands

The potential to create great viewsheds, restore areas with open growth oak, and the potential to partner with Xcel makes Parker's Picnic Grounds a good site to conduct restoration. There is ample opportunity for community engagement at Parkers Picnic Grounds, and work could proceed over several years.



Survey Dates:

8/2/2006 &  
5/15/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
38A	Oak forest mesic subtype	<b>D</b>	<b>D-</b>
39E	Oak forest mesic subtype	<b>D</b>	<b>D-</b>
39D	Oak woodland-brushland	<b>D</b>	<b>D-</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Open growth bur oak at the Parker's Picnic Grounds trailhead could be 250-500 years old.



Massive butternut tree. Native Americans boiled the nuts to extract the highly nutritious oil which was used as a tackifier for pemmican. Butternut is nearly extirpated in the Minnesota River Valley,



Bare soils along the Bluff trail.

In 39E east of the right-of-way, there are open growth bur oaks that compete for sunlight with straight trunk red oaks and basswood trees on the slope. Buckthorn densities are low and the understory is mostly open. However, ironwood is becoming too ubiquitous. Good drainage and low nutrients in the upland soils have helped maintain a robust, native ground vegetation. A large colony of Dutchman's breeches covers the slope, wild ginger is common, and waterleaf is prevalent throughout. The far northeast ravine is very steep and shady, with mostly bare soils. This ravine abuts residential property that contributes lawn debris to the ravine.

On the south side of Parker's Picnic Grounds the ground vegetation is sparse due to red oak leaf litter. Buckthorn densities increase in lower elevations. The highest quality ground vegetation is located in the higher elevations.

Waterleaf, columbine, and bloodroot are the most common native plants of virtue.

The Xcel Energy right-of-way is dominated by dense buckthorn. A good display of columbine and tall meadow rue exist in the sunlight of the trail. On the west side of the right-of-way exists bur oak, and intense shade created by cedar and buckthorn prevent ground vegetation. The soils are readily eroding due to the shade and steep slopes. Oaks are not regenerating in any portion of 39E.

There are several coppiced oaks in the southwest corner of 39D. The understory is thick with buckthorn and many soils are bare and eroding. The little ground layer that exists is mostly native and includes columbine, pennsylvania sedge, wild geranium, and bloodroot. The northwest portion of 39D contains an abandoned trailhead with neatly laid rocks and railroad ties.

An occasionally mowed right-of-way divides 39D and 38A. This trail offers access for large machinery, but steep slopes limit accessibility elsewhere. The edge of the mowed trail is weedy and there is an expanding population of Japanese knotweed. Nutrient laden ravines flow from residential properties and facilitate the expanse of nettles, garlic mustard, and burdock. The east facing slope of 38A contains large red oak, basswood, an open understory, and sparse ground layer vegetation. Several bur oak grow on the south aspect of 38A in moderate stands of buckthorn, small hackberry, red elm and green ash. The ground layer is sparse and limited to ubiquitous species, both native and non-native. To the west, there's an old road cut that comes down to East Pond Dakota Stream, where a former brick kiln existed.

**Priority Management Recommendations****1. Restore continuous ground vegetation**

- Thin trees (mostly by hand)
- Seed grasses & forbs

**Note:** Due to steepness, most work needs to occur by hand, which could provide greater opportunity for volunteer engagement.

**2. Enhance viewsheds of the valley**

- Strategically thin trees and shrubs (by hand)





## Area 3. Pond Dakota Mission



**Site Size:** 21.33 acres (8.22 acres lowlands, 13.11 acres uplands)

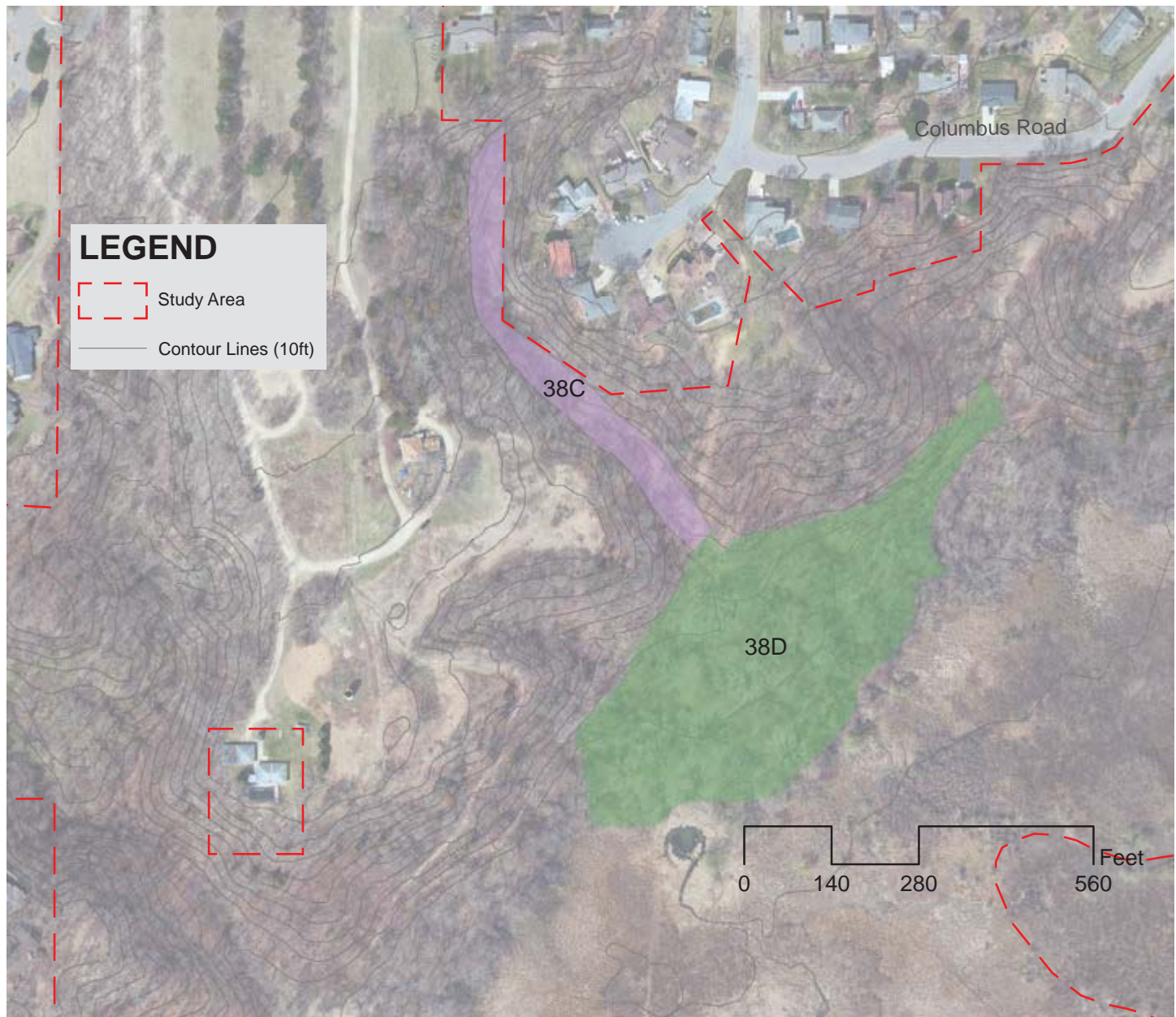
**Site Access:** Most of the site is easily accessed from the Mission located at 301 E 104th Street.

**Machine Accessibility:** In the east lowlands and portions of the central uplands, large machinery is severely limited due to steepness and wet areas. In the west uplands, machinery can enter from Hopkins Road (west of the site).



## Site 3.1 Pond Dakota Mission - East Lowlands

This area features a small spring stream that flows into the floodplain and then into a wet meadow. In the floodplain, the stream flows past remnants of a brick kiln used to build the mission. The soils in the floodplain are filled with river cobblestone, which indicates an ancient Minnesota River shoreland. Restoration and enhancement along these sections offers attractive projects for funding and community engagement, and work could tie into the existing restoration efforts at the Mission.



Survey Dates:

8/2/2006 &  
5/15/2017

\* **Bold**

rows show  
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significant  
change

	Ecological Community Description	2006 Quality Ranking	2017 Quality Ranking
<b>38C</b>	<b>Wet meadow - seasonally flooded</b>	<b>C</b>	<b>C-</b>
<b>38D</b>	<b>Floodplain forest</b>	<b>C</b>	<b>C-</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Stream flowing through delta over cobblestone. Lack of grass cover allows the stream to spread out, without a realized channel.



The stream in 38D shows the desired state. Graminoid vegetation forces the water into a realized channel, which is deeper, less susceptible to rapid temperature change, and has less bank sloughing and erosion.



Open growth cottonwood on the cobblestones of an ancient river shoreland is surrounded by weedy trees, all competing for sunlight.

**Wet Meadow**

Although the 2006 inventory lists 38C as a seasonally flooded wet meadow, this report lists 38C as part of the uplands due to the soil type, which is excessively drained. Bur and red oak (28" dbh) occupy the ravine banks. Faster growing woody species, such as red elm, green ash, and hackberry have created a dense shade that has eliminated most of the native ground layer vegetation. Buckthorn is very dense in the head waters, and shows moderate densities in lower sections of 38C. Some portions of the stream are heavily infested with burdock. Just north of the trail, there is a nice population of fowl meadow blue grass.

The northern portions of the stream are engulfed with low quality weedy vegetation in steep ravines with many mucky seeps, which makes walking difficult. The middle and lower stream sections are open and easy to traverse. Both 38C and 38D show signs of heavy disturbance by humans and livestock associated with the Pond farm.

**Forested Floodplain**

Due to stream deposits and cobblestone, the area is higher in elevation than the surrounding floodplain and the soils are well drained. The brick kiln was in this area and the site shows signs of disturbance. A few open growth cottonwoods occur. The ground layer is sparse, mostly dominated by wood nettle and impatiens

**Priority Management Recommendations****2. Restore ravine slopes & spring streams**

- Thin trees about 200 ft north of the trail along both ravines
- Seed grasses & forbs
- Mow and/or graze to establish health ground layer

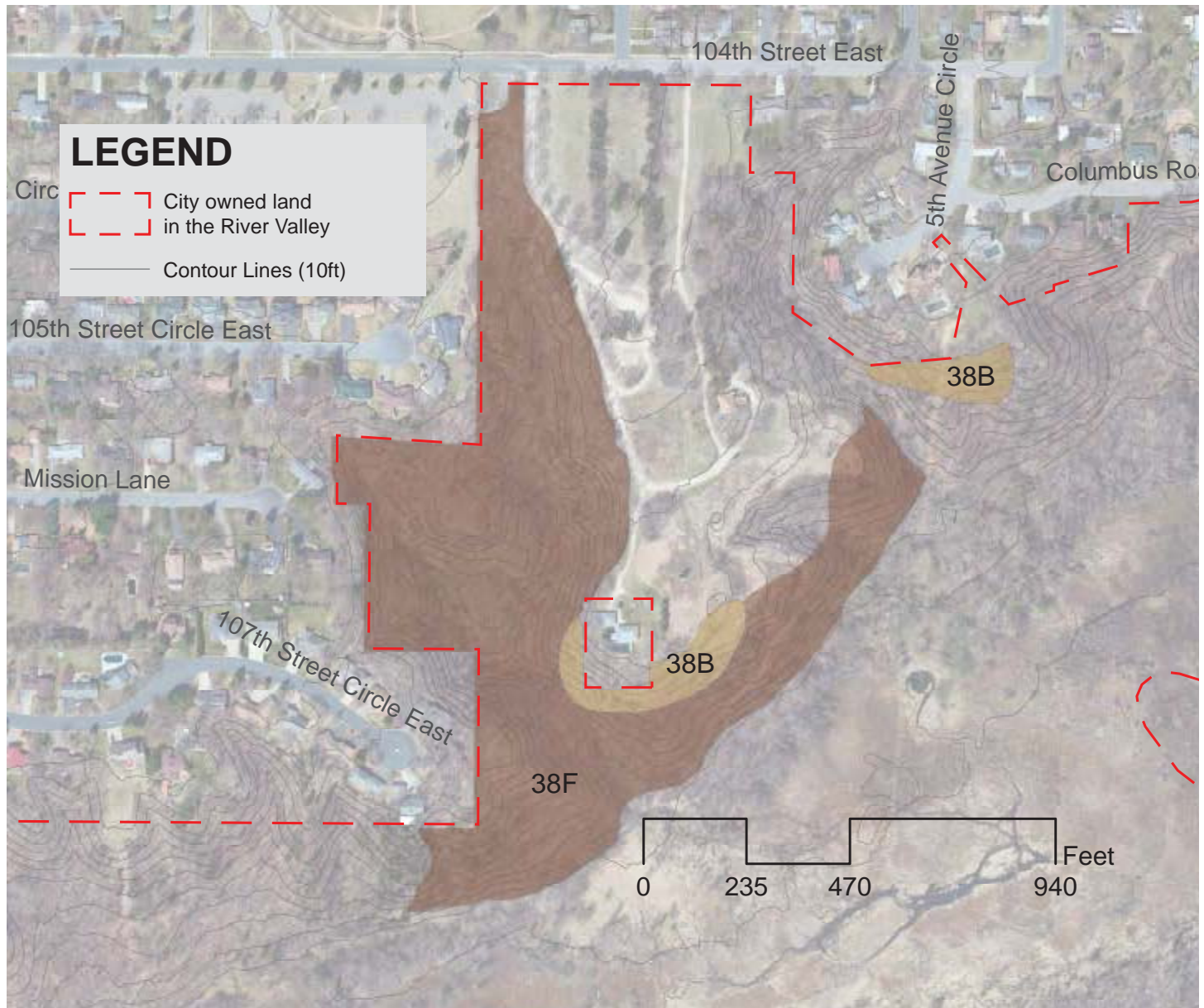
Caution should be taken during the maintenance period, as there is excessive subterranean nitrogen from the historic barnyards associated with Pond Dakota Mission.

**1. Restore cottonwood grove**

- Thin trees
- Remove excessive dead, fallen wood to facilitate mowing
- Seed grasses & forbs
- Mow

## Site 3.2 Pond Dakota Mission - Central Uplands

There are ongoing ecological restoration projects occurring within 38B. Terrain is steep, sometimes making it difficult to walk. 38B also receives subterranean nitrogen additions from the historic barnyards associated with Pond Dakota Mission. 38F is on the west side of the Mission and features a moderate spring stream (figure 65) that was large enough to support a semi-permanent Native American encampment. Both 38B and 38F show signs of heavy disturbance by humans and livestock associated with the farm. Restoration and enhancement along these sections offers attractive projects for funding and community engagement.



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	Ecological Community Description	2006 Quality Ranking	2017 Quality Ranking
<b>38B</b>	<b>Oak woodland-brushland</b>	<b>D</b>	<b>F (C in restored areas)</b>
<b>38F</b>	<b>Oak forest mesic subtype</b>	<b>D</b>	<b>C-</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Photo 65: The west aspect of the stream, once a shortgrass-savanna, is on the right. The east aspect, historically an oak basswood grove with forest vegetation, is on the left.



Photo 66: The east aspect of the stream shows nearly continuous ground cover.



Photo 68: The restored site in 39B. One of the goals at this site is to achieve Bur oak regeneration.

**Oak Woodland**

In the non-restored portions of this site, there are open growth bur oak, red oak, and some basswood, many with greater than 28" dbh. Fast growing species, such as red elm, green ash, and hackberry compete with oaks for sunlight. Ironwood is slightly too ubiquitous. The shrub layer is infested with buckthorn. The ground is bare due to intense shade, and the steep slopes are rapidly eroding. Fast-growing species are fueled by the addition of nitrogen from the historic barnyards associated with the Mission.

The restored portions in 38B have improved drastically compared to what they looked like before restoration. However, the site will quickly revert back to a forested state if sunlight fails to reach grasses and flowers through the trees. Other concerns include the high nutrient levels associated with soils on the site and the stacked wood piles that decompose and add nitrogen to the soils.

**Oak Forest**

The east facing slope along the ravine has good ground vegetation cover. This is one of the healthiest landscapes in the Minnesota River Valley. However, the west facing aspect is bare of ground vegetation. On the terrace above the stream fork, there is one of few large white oak trees (32" dbh) found in the valley. It sits in the center of a Native American encampment site.

The northwest fork of the stream is steep and weedy, possibly due to adjacent residential lawn waste. The northeast fork forms into a broad flat plane. Former cattle trails are evident. Despite a few large basswoods, the dominant trees are small (less than 9" dbh) and include undesired species such as Siberian elm, box elder, hackberry and red elm. The ground layer is mostly garlic mustard. A few bur oak exist along the Mission driveway. The soils are sandy enough here for a potential short grass savanna.

**Priority Management Recommendations****3. Enhance & expand existing restoration area**

- Focus on saving older oaks & creating viewsheds
- Thin trees
- Mow (more than 3 times per season, over several seasons)
- Hay (could be difficult due to terrain)
- Graze (best option given terrain)

Strategic planning is crucial at this site, and depends on nitrogen levels in the soils. Low areas and areas that drain away from former barnyards, outhouses, and septic systems should be avoided for restoration.

**1. Enhance ravine slopes & spring streams**

- Revegetate shoreland & slopes
- Reconnect upstream channels

**4. Restore NE flats to shortgrass savanna**

- Strategically thin trees to facilitate periodic mowing
- Seed variety of grass species (full sun to shade tolerant)
- Shubs, such as plum and hawthorn, can also be planted as long as enough sunlight reaches the ground level

The seeded grass species have a competitive edge against buckthorn and garlic mustard seedlings due to the well drained soils.

## Site 3.3 Pond Dakota Mission - West Uplands

Existing bur oak, well-drained soils, and level terrain make this a high priority location for oak savanna restoration. The site is level enough to allow machinery to operate on frozen soils. Existing open growth bur oak will provide immediate savanna. The cedar glade, in 38E, is of lesser priority due to steep terrain and impenetrable vegetation.



Survey Dates:

8/2/2006 &  
5/15/2017

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

	Ecological Community Description	2006 Quality Ranking	2017 Quality Ranking
<b>38E</b>	<b>Oak woodland-brushland</b>	<b>D/C</b>	<b>D-</b>
<b>38F</b>	<b>Oak forest mesic subtype</b>	<b>D</b>	<b>D-</b>

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Lower elevations in 38F contain richer soils and weedier growth



Mowed utility right-of-way



Giant Bur Reed found along mowed right-of-way

**Oak Woodland**

Red cedar trees dominate the east sections of 38E. Open growth bur oak, red oak, and basswood struggle for sunlight amidst dense stands of buckthorn, prickly ash, red elm, green ash and hackberry. The ground level is mostly bare. Ironwood is slightly too ubiquitous. In some areas, the shrub layer is infested with buckthorn, and in other areas it is open.

When oaks dominate, the soils are protected by persistent leaf litter. When oaks are surrounded by undesirable species, leaf litter decomposes more rapidly and the soils are often bare. Dead, fallen wood is sometimes excessive. A narrow ravine contains a population of bluebells.

**Oak Forest**

An historic Native American encampment dominates the central portion of this site. The encampment has become overgrown in the last 20 to 30 years, but some patches of native grass with hoary puccoon still occur. Red cedar and honeysuckle were the first to encroach here. This site is the only one in the valley with bur oak regeneration, and contains many open growth bur oak (4" – 16" dbh). The encampment is surrounded by mostly dead butternut (10" – 18" dbh). Among the butternut are dense stands of prickly ash, buckthorn, red elm, red cedar, green ash, and hackberry. Siberian elm (10" dbh) are also common in the openings. Much of 38F, especially west of the encampment site, can be traversed by machinery.

**Priority Management Recommendations****5. Maintain historic Native American encampment**

- Thin trees around Bur oak to allow sunlight to reach ground layer vegetation

**6. Restore Oak Savanna**

- Thin trees

The site is level enough to allow machinery to operate on frozen soils. Existing open growth bur oak will provide immediate savanna.

**1. Enhance Cedar Grove**

- Cut down some Red Cedar trees while leaving others standing, allowing for a screen between residential properties and the trail
- Trim lower limbs of Red Cedar trees and mow fire breaks around large Red Cedar trees in preparation for prescribed burns
- Prescribed burn





## Area 4. Marshlands

**Context:** This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrient wetlands correspond to high native plant diversity, and all areas display high levels of native plant diversity.

The map shows an aerial view of the marshlands east of Interstate 35W. A legend identifies several features: City owned land (red dashed outline), Lowlands (stippled pattern), Trail (yellow dotted line), Streams (blue line), and Access (black arrow). A scale bar indicates distances up to 2,800 feet. Labeled streets include Lyndale Avenue South, Nicollet Avenue South, Layman Lane, 102nd Street East, 104th Street East, Park Avenue South, Chicago Circle, Columbus Road, Mission Lane, and Nicollet Circle. An inset map at the bottom left shows the location of Area 4 relative to the surrounding landscape.

**Site Size:** 77.36 acres (all lowlands)

**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site.

**Machine Accessibility:** The site is flat, but contains wet areas. Flotation mowers can be used.

Appendix A: Habitat Assessment 28

## Area 4. Marshlands

**Context:** This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrient wetlands correspond to high native plant diversity, and all areas display high levels of native plant diversity.

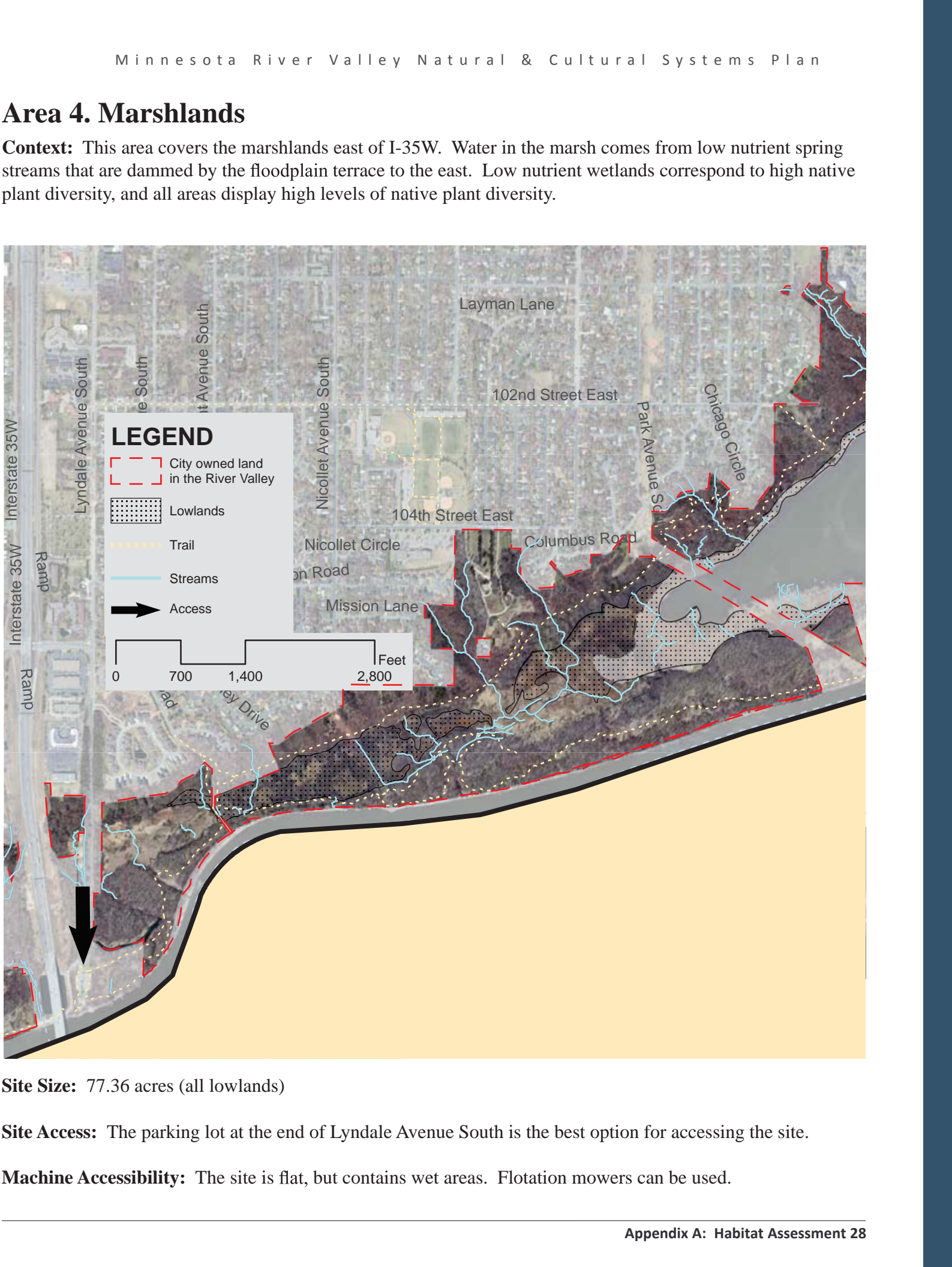
The map displays the marshlands east of Interstate 35W (I-35W). A legend identifies several features: City owned land in the River Valley (indicated by a red dashed border), Lowlands (stippled pattern), Trails (yellow dotted lines), Streams (blue lines), and Access (black arrows). A scale bar shows distances up to 2,800 feet. The map includes labels for various streets such as Lyndale Avenue South, Nicollet Avenue South, Park Avenue South, Chicago Circle, Layman Lane, 102nd Street East, 104th Street East, Columbus Road, Mission Lane, and Nicollet Circle. An inset map at the bottom left shows the location of Area 4 relative to the surrounding landscape.

**Site Size:** 77.36 acres (all lowlands)

**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site.

**Machine Accessibility:** The site is flat, but contains wet areas. Flotation mowers can be used.

Appendix A: Habitat Assessment 28



## Area 4. Marshlands

**Context:** This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrient wetlands correspond to high native plant diversity, and all areas display high levels of native plant diversity.

The map displays the marshlands east of Interstate 35W (I-35W). A legend in the upper left corner identifies the following features: City owned land in the River Valley (indicated by a red dashed line), Lowlands (indicated by a black dotted pattern), Trail (indicated by a yellow dashed line), Streams (indicated by a blue line), and Access (indicated by a black arrow). A scale bar at the bottom left shows distances in feet: 0, 700, 1,400, and 2,800. The map includes labels for various streets: Lyndale Avenue South, 102nd Street East, 104th Street East, Columbus Road, Mission Lane, Nicollet Avenue South, Nicollet Circle, Park Avenue South, Chicago Circle, Layman Lane, and 102nd Street East. A large black arrow points to the access point at the end of Lyndale Avenue South. The marshlands are shown as a large, irregularly shaped area with a black dotted pattern, bordered by city-owned land (red dashed line) and streams (blue lines). The area is situated east of I-35W, which runs vertically along the left side of the map.

**Site Size:** 77.36 acres (all lowlands)

**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site.

**Machine Accessibility:** The site is flat, but contains wet areas. Flotation mowers can be used.

Appendix A: Habitat Assessment 28

## Area 4. Marshlands

**Context:** This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrient wetlands correspond to high native plant diversity, and all areas display high levels of native plant diversity.

The map displays the marshlands east of Interstate 35W. A legend in the upper left corner identifies the following features: City owned land in the River Valley (indicated by a red dashed line), Lowlands (indicated by a black dotted pattern), Trail (indicated by a yellow dashed line), Streams (indicated by a blue line), and Access (indicated by a black arrow). A scale bar at the bottom left shows distances in feet: 0, 700, 1,400, and 2,800. The map includes labels for various streets: Lyndale Avenue South, Nicollet Avenue South, 102nd Street East, 104th Street East, Columbus Road, Mission Lane, Park Avenue South, and Chicago Circle. A large black arrow points to the access point at the end of Lyndale Avenue South. The marshlands are shown as a large, irregularly shaped area with a black dotted pattern, bordered by city-owned land (red dashed line) and streams (blue lines).

**Site Size:** 77.36 acres (all lowlands)

**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site.

**Machine Accessibility:** The site is flat, but contains wet areas. Flotation mowers can be used.

Appendix A: Habitat Assessment 28

## Area 4. Marshlands

**Context:** This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrient wetlands correspond to high native plant diversity, and all areas display high levels of native plant diversity.

The map displays the marshlands east of Interstate 35W. A legend in the upper left corner identifies the following features: City owned land in the River Valley (indicated by a red dashed line), Lowlands (indicated by a black dotted pattern), Trail (indicated by a yellow dashed line), Streams (indicated by a blue line), and Access (indicated by a black arrow). A scale bar at the bottom left shows distances in feet: 0, 700, 1,400, and 2,800. The map includes labels for various streets: Lyndale Avenue South, Nicollet Avenue South, 102nd Street East, 104th Street East, Columbus Road, Mission Lane, Park Avenue South, and Chicago Circle. A large black arrow points to the access point at the end of Lyndale Avenue South. The marshlands are shown as a large, irregularly shaped area with a black dotted pattern, bordered by city-owned land (red dashed line) and streams (blue lines).

**Site Size:** 77.36 acres (all lowlands)

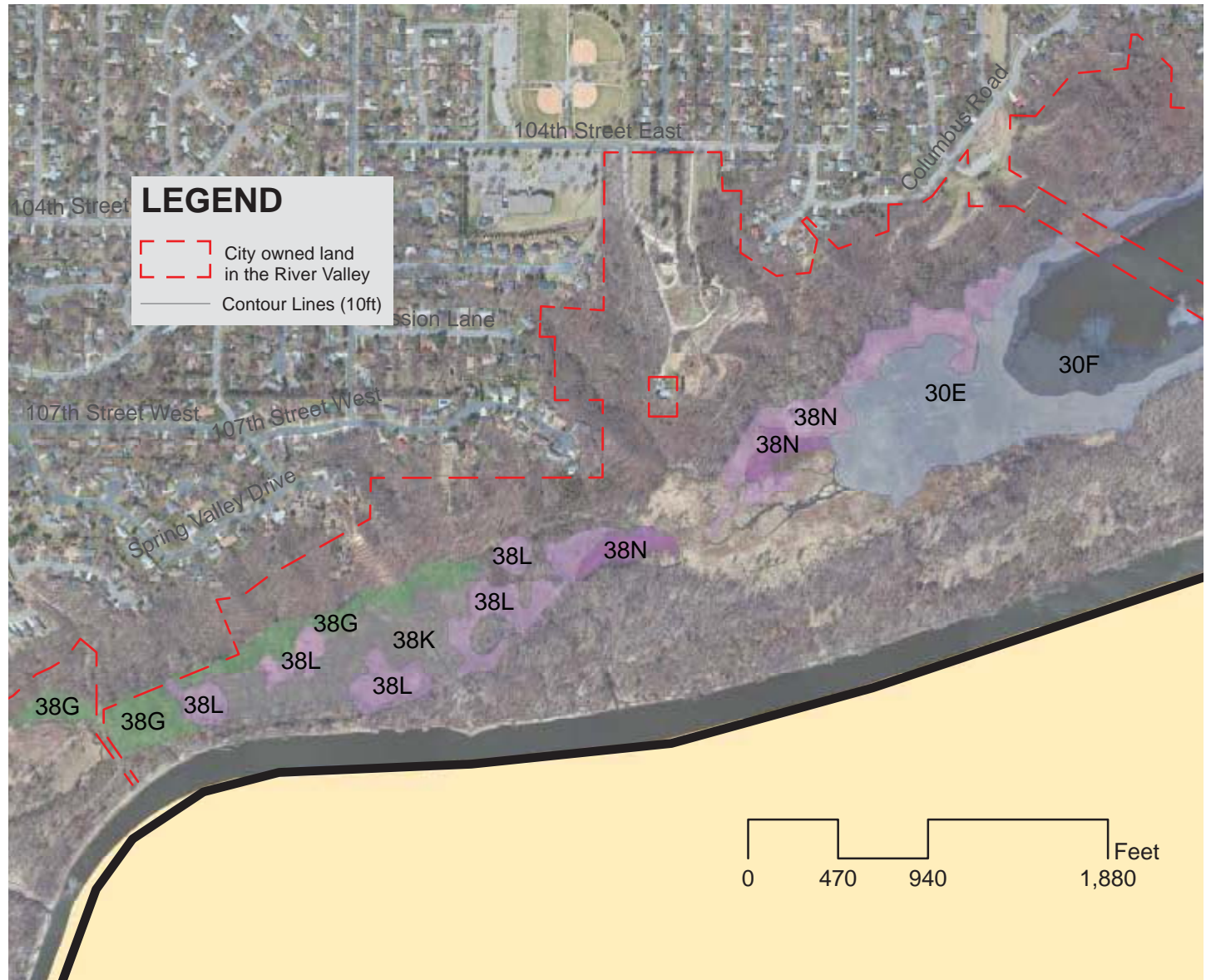
**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site.

**Machine Accessibility:** The site is flat, but contains wet areas. Flotation mowers can be used.

Appendix A: Habitat Assessment 28

## Site 4.1 Marshlands - Lowlands

This area covers the marshlands east of I-35W. Water in the marsh comes from low nutrient spring streams that are dammed by the floodplain terrace to the east. Low nutrients in this area correspond with the highly diverse native plants found here. Due to existing diverse vegetation, it is important that management focus on maintenance and enhancement.



Survey Dates:

7/31/2007 &  
5/15/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
30E	Mixed emergent marsh	C	C/D
30F	NA	NA	C/D
<b>38K</b>	<b>Willow swamp</b>	<b>B</b>	<b>C</b>
<b>38L</b>	<b>Wet meadow - seasonally flooded</b>	<b>B</b>	<b>C</b>
<b>38N</b>	<b>Wet meadow - seasonally flooded</b>	<b>B</b>	<b>C</b>
38G	Floodplain forest	D	D

\*\*Flora species list for this area is found in Appendix E



**Current State:**

This is a preferable condition for a silver maple/cottonwood grove, with enough sunlight to allow continuous ground cover.



Quality rankings in 38L and 38N have been downgraded partly due to continued woody encroachment.



Vegetation found in the right-of-way includes porcupine sedge, giant bur reed, arrowhead, marsh skullcap, and cottonwood

**Marsh/Meadow & Forested Floodplain**

This area displays mostly native, high plant diversity. The best sites are those in recently mowed utility right-of-ways. The lowest plant diversity occurs in afforested areas. Occasional shade allows some species, such as wild golden glow, to thrive.

The 2007 community rankings have been downgraded due to woody plant encroachment and declines in biodiversity. Stormwater nutrients and woody encroachment are the biggest threats to this area.

**Priority Management Recommendations**

**7. Maintain & enhance existing native vegetation in a mostly sunny marsh with scattered groves of trees**

- Option 1: Prescribed burn
- Option 2: Mow & Hay
- Option 3: Facilitate beaver habitat by cutting old stems of willows and allowing resprouts to grow

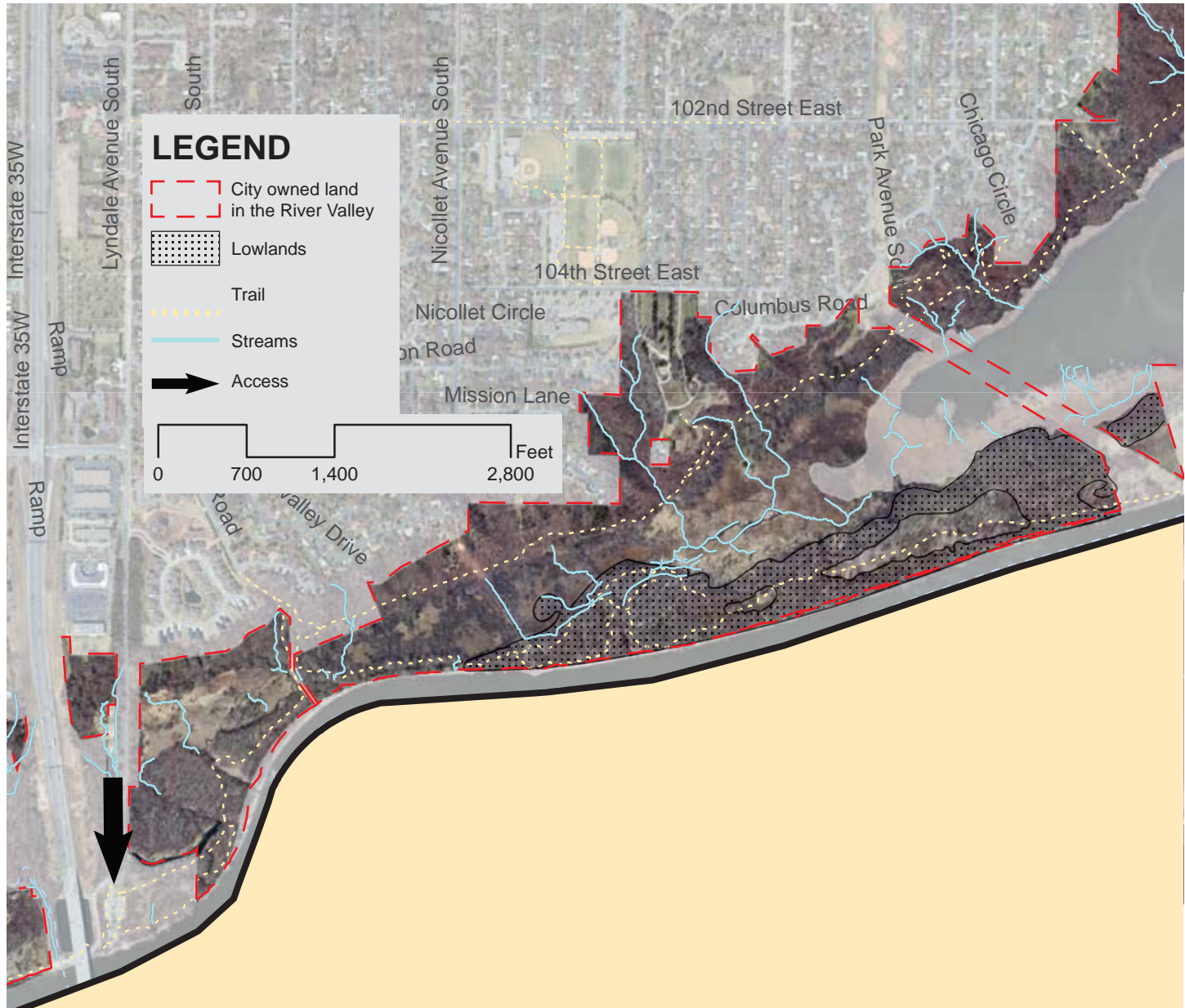
Prescribed burns are needed to fend off woody species and remove nitrogen. However, burning may not be feasible for such a large area in an urban setting. Mowing will set back woody species, but doesn't regulate nitrogen inputs from plant debris. However, mowing will protect against woody encroachment, reduce nutrients, and create a biomass feed stock for energy production. The most efficient method for controlling woody encroachment is by promoting beaver populations.





## Area 5. Floodplain

This area covers the City property between the Xcel Energy right-of-way to the east and I-35W to the west. The current vegetation cover is classified as floodplain forest, but evidence suggests there were fewer trees here historically. During the first half of the 20th century, the site was farmed for hay, small grains, and pasture. Diversity is low and weeds prevail in the sunlight.



**Site Size:** 112.07 acres (all lowlands)

**Site Access:** The parking lot at the end of Lyndale Avenue South is the best option for accessing the site. The hiking trail/road via Old Cedar Avenue offers another option.

**Machine Accessibility:** Machinery can be used for clearing throughout the area. The Lyndale lot offers one point of access. There is possible access via the Old Cedar Ave bridge hiking trail/road depending on weight restrictions, but this access is about 1.7 miles upstream from this area.

## Site 5.1 Floodplain Lowlands

This area covers the City property between the Xcel Energy right-of-way to the east and I-35W to the west. The current vegetation cover is classified as floodplain forest, but evidence suggests there were fewer trees historically. During the first half of the twentieth century the site was farmed for hay, small grains, and pasture. Diversity is low and weeds prevail in the sunlight. The level terrain makes short and long-term tree thinning and invasive species management feasible.



Survey Dates:

7/31/2007 &  
5/30/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
30D	Floodplain forest	D	D
<b>38M</b>	<b>Floodplain forest silver maple subtype</b>	C	D

\*\*Flora species list for this area is found in Appendix E



**Current State:**

The dominate vegetation is cottonwood and silver maple, which are represented by three age classes. The first age class consists of a few open growth form trees (50"+ dbh).



The second age class is represented by straight trunk trees of 25" dbh.



A sunny patch, dominated by scouring rush, horse tail, Canada thistle, burning nettles and riverbank grape.

**Forested Floodplain**

Cottonwood and silver maple trees dominate the ecosystem dynamics. Three different age classes are apparent. The first age class consists of a few large, open growth trees (50"+ dbh) typically in a savanna configuration of fewer than 12 trees per acre. The second age class is represented by straight trunk trees (25" dbh), likely marking the cessation of farming circa 1965 to 1975. The final age class is marked by an increase in pole trunk trees (9" to 12" dbh). Red

elm and green ash fill in between the larger trees. One black walnut was noted in 30D.

The ground layer vegetation is sparse and consists of a few ubiquitous species such as wood nettle, burning nettle, white snakeroot, and white cut grass. Sunny patches exhibit dense stands of horsetail, canada thistle, nettles and riverbank grape.

**Priority Management Recommendations****1. Enhance forested floodplain**

- Assess & manage invasive species
  - especially buckthorn
- Thin trees
- Monitor ash trees for Emerald Ash Borer

In the event that ash trees start to die off, consider needs for removing. This would entail thinning dead and dying ash, as well as removing other undesirable species such as Box Elder.





## Area 6. Hopkin's Farm

The Hopkin's Farm area covers the uplands west of the CenterPoint right-of-way and east of a former service entrance off of Hopkins Road. The name refers to the Hopkins family farm that existed until 1962. The abandoned land became wooded, and the current condition is highly afforested. A remnant, diverse, shortgrass prairie was present along the right-of-way until 2014, when the slope was redone and planted with a common prairie seed mix. There are 3 sub-valleys running north to south in this area. An artesian well located in the southeast corner of this area. The well once supplied water to the Hopkins farm, but now flows freely into the lowlands.



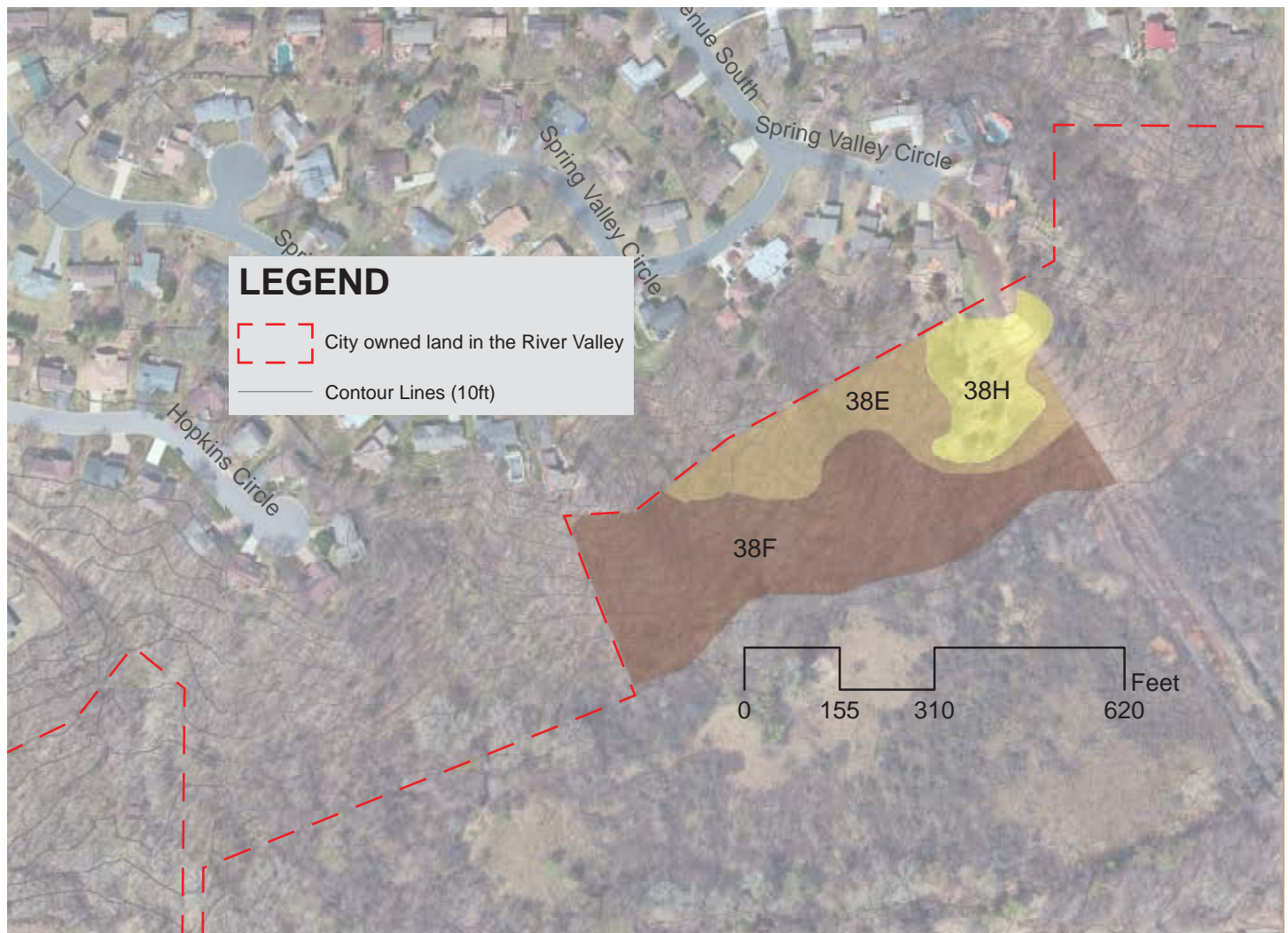
**Site Size:** 18.55 acres (all uplands)

**Site Access:** The site is best accessed at the end of Hopkins Road.

**Machine Accessibility:** Large machinery can enter from Hopkins Rd access. Machinery can operate within the sub-valleys, and tree thinning can occur in some wide and somewhat level terrain.

## Site 6.1 Hopkin's Farm

The Hopkin's Farm area covers the uplands west of the CenterPoint right-of-way and east of a former service entrance off of Hopkins Road. The name refers to the Hopkins family farm that existed until 1962. The abandoned land became wooded, and the current condition is highly afforested. A remnant, diverse, shortgrass prairie was present along the right-of-way until 2014, when the slope was redone and planted with a common prairie seed mix. There are 3 sub-valleys running north to south in this area. Machinery can operate within the sub-valleys. There is also an artesian well located in the southeast corner of this area. The well once supplied water to the Hopkins farm, but now flows freely into 38G. The feasibility of machine operation in conjunction with community engagement events, such as replanting the short grass savanna, offers an excellent restoration opportunity.



Survey Dates:  
8/2/2006 &  
5/15/2017

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

	Ecological Community Description	2006 Quality Ranking	2017 Quality Ranking
38E	Oak woodland-brushland	D/C	F
38F	Oak forest mesic subtype	D	F
38H	Dry prairie sand gravel	D	F

\*\*Flora species list for this area is found in Appendix E



**Current State:**

Photo 83: A variety of pole trunk, low quality tree species dominate system dynamics. Note the death of an open growth oak and the absence of a ground layer of vegetation in the background.



Photo 86: High nutrient soils in the lower elevations promote weedier growth.



Photo 84: Bur oak with multiple stumps indicating sunlight competition, and sloughed lower limbs.

The once diverse, open landscape has been replaced with occluded, overgrown vegetation. Open growth bur oak (22 – 24” dbh) and red oak (24” dbh) are stressed due to sunlight competition from hackberry, red elm and green ash. Hackberry is particularly aggressive in this area. In the higher elevations, the shaded, well-drained soils are

sparsely vegetated with mostly native species, such as nodding fescue. In lower elevations with richer soils, there are dense stands of buckthorn, motherwort, dames rocket, and garlic mustard. No oak regeneration occurs.

Additionally, several feet south of the trail is an artesian well. Rushing water can be heard from the trail, but a dense shrub

and weed screen prevents visual contact. With thinned vegetation, this area could provide a visually attractive and interesting place for respite along the Bluff Trail. There are several open growth oaks and huge open growth cottonwood nearby.

**Priority Management Recommendations****Oak Woodland & Oak Forest****1. Maintain & enhance open growth oaks by achieving oak regeneration**

- Thin trees
  - Thin weedy and lower quality trees
  - Allow fewer than 12 mature trees/acre
  - Thin aggressively on south side of open growth oaks
  - Maintain partial tree screen of residential properties
- Plant shrub layer of aspen, hazel, hawthorn, apple, and plum trees

**Prairie****1. Restore Sand Gravel Prairie**

- Seed diverse forb & grass mix
- Prescribed burn
- Graze

**2. Enhance Artesian well & spring stream as a resting place along the trail**

- Clear dense shrubs and weeds to allow well and spring to be visible
- Maintain through repeated cutting & mowing





## Area 7. Anderson Park

The Anderson Park Zone is located west of I-35 and stretches to the Nine Mile Creek trail crossing Wildwood Lake. This zone is broken down into uplands and lowlands. The uplands include Upland Forests, Oak Woodlands, and Prairies that were part of an Oak Savanna environment. The lowlands are made up of Floodplain Forests, Wetlands, and Marshes/Meadows.



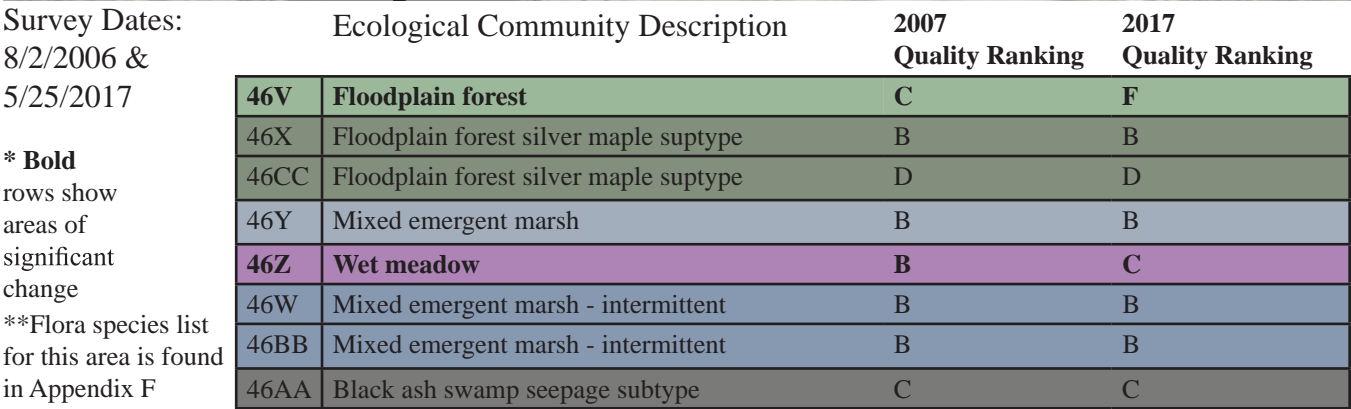
**Site Size:** 84.27 acres (74.08 acres lowlands, 10.19 acres uplands)

**Site Access:** Floodplain access from Lyndale Ave trailhead. Upland access more difficult due to steep slopes and lack of access from uphill.

**Machine Accessibility:** The floodplain is easily accessed from the Lyndale Ave trailhead. Machine access to the seeps is difficult, and operation in muck soils is not recommended.



The Anderson Park Lowlands can be easily accessed, is visible due to the nearby trailhead and confluence of River Valley and Nine Mile Creek trails, and the site offers existing high quality ecosystems. The biggest threat is the overgrowth of woody species and excessive dead, fallen wood.





**Current State:**

Open floodplain habitat



Marsh area experiences frequent flooding



Perched seep surrounded by encroaching box elder, ash, elm and buckthorn

**Forested Floodplain**

The floodplain, 46V, is similar to other floodplain forests in the Minnesota River Valley. Open growth trees are subsumed by straight, spindly trees. Soils are often bare due to lack of sunlight. The excessive dead wood leaches nutrients into surface soils and waters.

46CC is a large, wooded floodplain forest that contains old, open growth silver maple trees. This site is overgrown, with little vegetation at the ground level.

**Marsh/Meadow & Wetland**

The wetlands and marshlands are dominated by native plants and are fed mostly by calcareous seeps that help maintain unique plant assemblages. The water quality in the wetlands along the base of the bluffs is excellent, but woody plant encroachment threatens the ecosystem's diversity and functionality. The seeps in this zone drain into the wetlands and marshlands of 46Y, 46W, 46X, and 46BB, where vegetation is dominated by river bulrush, arrowhead and smartweed species.

**Restoration Target**

The convergence of floodplain, wetland, and marshland (46V, 46W, 46X) provides an excellent model to help plan floodplain management throughout the valley. The floodplain itself exhibits excessive dead, fallen wood, but the adjacent lowland polygons feature open landscapes with widely spaced, open growth trees with continuous grass cover. The understory is cool and breezy, and the stench of rotting wood and mud is minimal.

**Priority Management Recommendations****1. Enhance/restore to a more open floodplain forest**

- Thin trees
- Remove or burn cut woody vegetation

**1. Maintain and enhance existing plant diversity**

- Remove dead vegetation, leaf litter, and dead, fallen wood
- Conduct selective tree thinning to sustain 50% sunlight to the ground level
- Remove or burn cut woody vegetation

**2. Enhance/restore beaver populations**

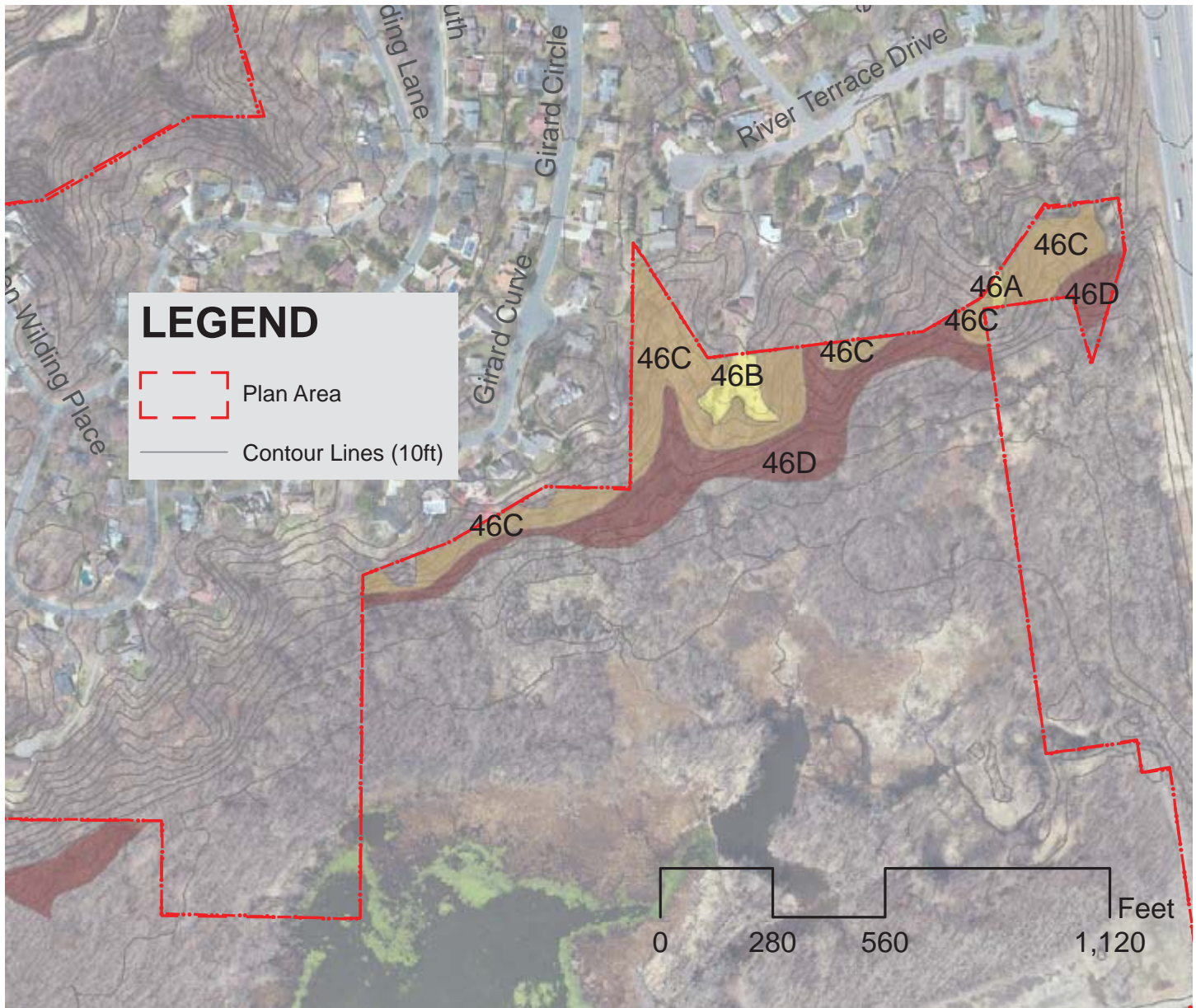
- Cut old stems of willows and allow resprouts to grow

**3. Restore perennial graminoid/herbaceous ground layer vegetation**

- Plant wetland grasses, sedges, and forbs that are semi-shade tolerant

## Site 7.2 Anderson Park - Uplands

The Anderson Park Uplands contain remnant prairies, with large oak and basswood trees for an ideal oak savanna restoration. However, this site is difficult to access due to steep slopes and distant trailheads. Most of this site abuts private residential property to the north.



Survey Dates:

8/2/2006 &  
5/25/2017

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

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>46A</b>	<b>Southern dry prairie</b>	<b>C</b>	<b>D-</b>
<b>46B</b>	<b>Southern dry prairie</b>	<b>B</b>	<b>C</b>
<b>46C</b>	<b>Oak woodland-brushland</b>	<b>D</b>	<b>F</b>
<b>46D</b>	<b>Lowland forest</b>	<b>D</b>	<b>F</b>

\*\*Flora species list for this area is found in Appendix E



## Current State:



Deer have controlled sumac and Siberian elm in 46B, which was noted as a problem in the 2007 survey. There are unique species associated with this unit, but fully restoring this site will require prescribed burns, biomass harvest, and introductions of outside genetic pools.



Prairie ground plum, a Native American food and a unique grassland plant this far east. This species was not recorded in the 2007 survey



The youngest bur oak found during the 2017 survey. This tree likely grew in a recently afforested prairie knoll. In this shade, the tree will not survive. As elsewhere in the valley, bur oaks are not regenerating.

## Prairie, Oak woodlands, & Oak Forest

There are amazing oaks and basswood trees in the uplands. The oak groves are situated in an ideal landscape, with massive bur oaks set in a dry gravel oak savanna, perched over sparkling springs that host plants like skunk cabbage, angelica, Michigan lily, and wild iris. However, the uplands are severely afforested, with remnant groves of open growth bur oak that are surrounded by weedy woody vegetation. Dense stands of underbrush, both native and non-native, and excessive dead, fallen wood make walking difficult. Hackberry, in particular, has become very weedy and is the dominate understory tree. The ground layer is composed of low quality vegetation and bare soils. The ravines are covered with wood nettle, garlic mustard,

and buckthorn. The 1853 Public Land Survey field notes describe aspen and hazel as common species. Today, only one aspen tree, no hazel shrubs, and no oak regeneration is found.

Portions of the uplands have recently transitioned from an open savanna to an overgrown forest plant community. This is evidenced by dead red cedar trees and thickets of fast growing underbrush such as prickly ash, honeysuckle, and buckthorn. The youngest bur oak documented in this survey, around 30 years old, is found in this area. However, it is not likely to survive due to sunlight competition from faster growing trees. Additionally, one of few remaining quaking aspen, an iconic savanna keystone species in the

Minnesota River Valley, is found in this area.

There are two small prairie remnants that contain unique, dry sand gravel grassland plants. Both prairies have declined in integrity since the 2006 inventory. 46A is almost entirely consumed by non-native plants, such as smooth brome and crown vetch. Although 46B is dominated by native plants, threats from woody encroachment, leafy spurge, and genetic inbreeding depression are transforming this site into a weedy woodland.

## Priority Management Recommendations

### 1. Enhance oak groves

- Thin trees by 70 to 80% (by hand)
  - use species quality index (Appendix C) to first remove least desirable species (in some cases, oaks may need to be thinned)
- Graze long-term





## Area 8. Colman Lake

**Context:** This unit covers the portion of the valley between the Nine Mile Creek confluence with the Minnesota River and Savage Bridge. Most of the bluffs in this area are privately owned. This area features high quality wetlands, a high quality shallow water lake, many springs and seeps that feed Colman Lake, open grasslands on the south side of the lake, old growth cottonwood and silver maple, and a sandy terrace along the Minnesota River that provides a trail frequented by mountain bikers and hikers.

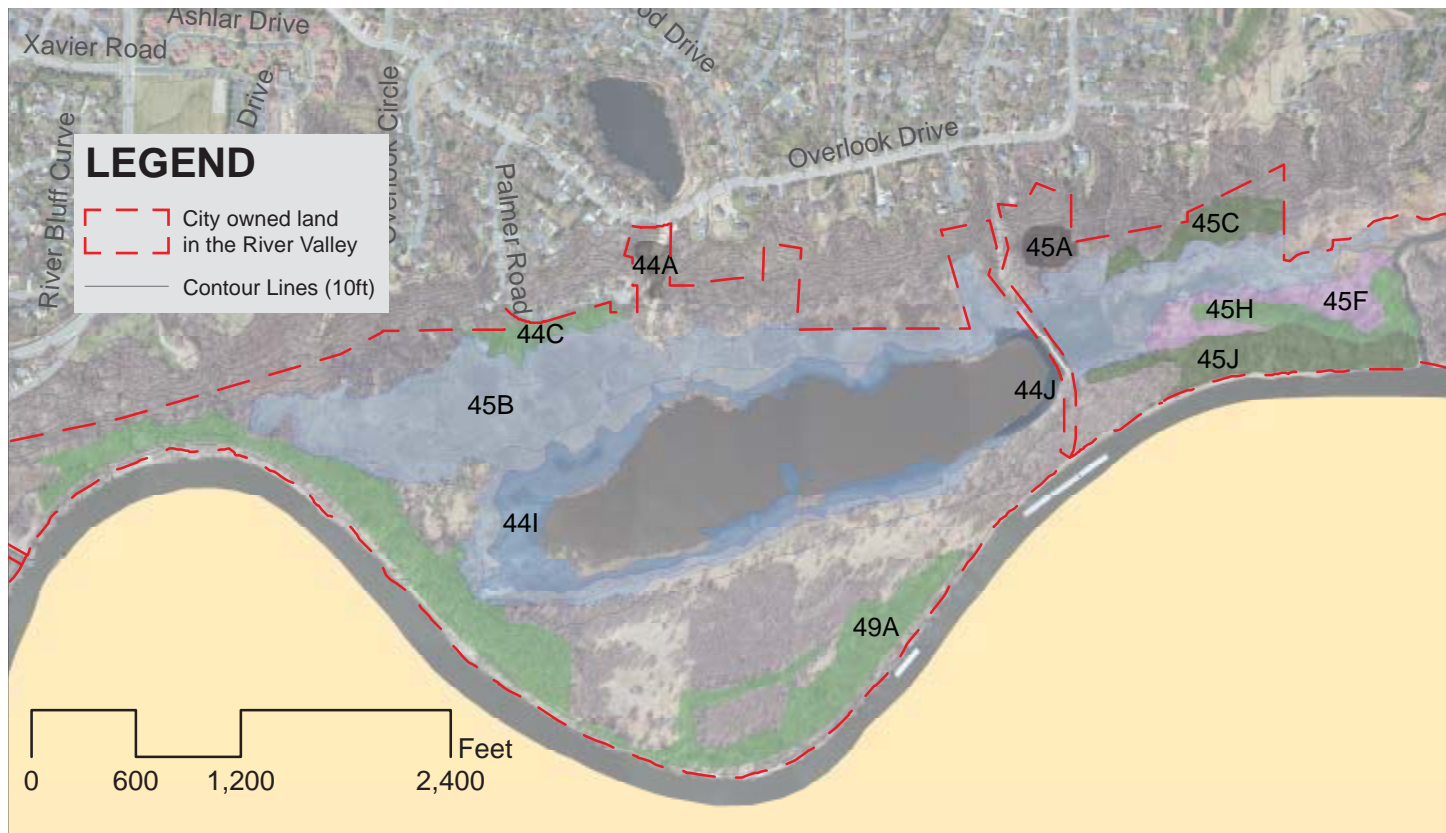


**Site Size:** 221 acres (52.94 uplands, 168.06 lowlands)

**Site Access:** There is a river access trail at the intersection of Overlook Drive & Goodrich Road.

**Machine Accessibility:** Machines should only be used in the floodplain. The road offers good access, but can be slightly steep for trucks, tractors, feller-bunchers, mowers, and other large machinery.

## Site 8.1 Colman Lake - Lowlands



Survey Dates:  
7/31/2007 &  
5/25/2017

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

\*\*Flora species list  
for this area is found  
in Appendix E

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
<b>44A</b>	<b>Black ash swamp seepage subtype</b>	<b>D</b>	<b>B</b>
<b>45A</b>	<b>Black ash swamp seepage subtype</b>	<b>C</b>	<b>D</b>
44C	Floodplain forest	D	D
<b>45C</b>	<b>Floodplain forest silver maple subtype</b>	<b>C</b>	<b>D</b>
45H	Floodplain forest	D	F
45J	Floodplain forest silver maple subtype	D	D
49A	Floodplain forest	D	D
44I	Mixed emergent marsh - intermittently exposed	B	B
44J	Mixed emergent marsh - permanently flooded	B	B
45B	Mixed emegent marsh	B	B
45F	Wet meadow - seasonally flooded	C	C



**Current State:**

Willow encroachment near the wetlands



Floodplain forest system dynamics dominated by silver maple.



Reed canary grass, phragmites, and cattails are among the undesirable species that dominate area dynamics.

**Floodplain Forest**

The floodplains are in various stages of overgrowth. The lowest floodplain, 45H, succeeded to silver maples before the cessation of agriculture. 45J and 49A exhibit recent weedy woody plant overgrowth, with sparse, low quality ground vegetation, such as wood nettles. There are two open grasslands that are dominated by undesirable species such as reed canary grass, stingle nettle, and Canada thistle.

**Wetlands & Marsh/Meadow**

The wetlands and marshlands contain good native plant diversity. This is due to calcareous seep springwaters, which tie up excess nitrogen. However, this area is threatened by nitrogen deposition from stormwater runoff, woody plant and leaf decomposition, and woody plant encroachment. The current vegetation has been resilient to current threats, but ecosystems can rapidly transition from diverse high-quality states to monotypic dysfunctional states once a threshold is passed. A transition is beginning to show in 44C, 45A, and 45C with faster and taller growing plants. This survey notes extensive domination by native phragmites and cattails. Both species are nitrophiles, and their tall growth shades out lower growing species. Additionally, better drained soils allow the proliferation of reed canary grass and Canada thistle, which are both nitrophiles.

**Priority Management Recommendations****2. Enhance floodplain with a mosaic of shady & sunny patches, and continuous ground cover**

- Thin young trees (by machine)
- Mow
- Hay
- Prescribed burns
- Grazing

**Note:** Long-term maintenance of mowing, haying, burning and grazing will prevent this area from reverting to a lower quality plant assemblage.

**1. Maintain & enhance existing vegetation**

- Prescribed burn
- Mow with high flotation mowers
- Hay as able

**2. Restore beaver populations**

- Cut old stems of willows and allow resprouts to grow

## Site 8.2 Colman Lake - Uplands



Survey Dates:  
8/2/2006 &  
5/15/2017

Ecological Community Description

2006

Quality Ranking

2017

Quality Ranking

<b>44F</b>	<b>Oak woodland-brushland</b>	<b>D</b>	<b>F</b>
<b>45D</b>	<b>Oak woodland-brushland</b>	<b>D</b>	<b>F</b>

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

\*\*Flora species list for this area is found in Appendix E

### Current State

The uplands exhibit symptoms similar to other oak woodlands throughout the River Valley. The open growth bur oaks are surrounded by an overgrowth of weedy trees with sparse, low quality ground vegetation.

### Priority Management Recommendations

#### 3. Maintain & enhance oak grove

- Thin trees
- Mow
- Graze

Due to limited area, adjacent private ownership, and limited access, the strategy at this site is to educate landowners about their oaks, the understory, the bare soils, and to encourage their participation in conducting restoration.



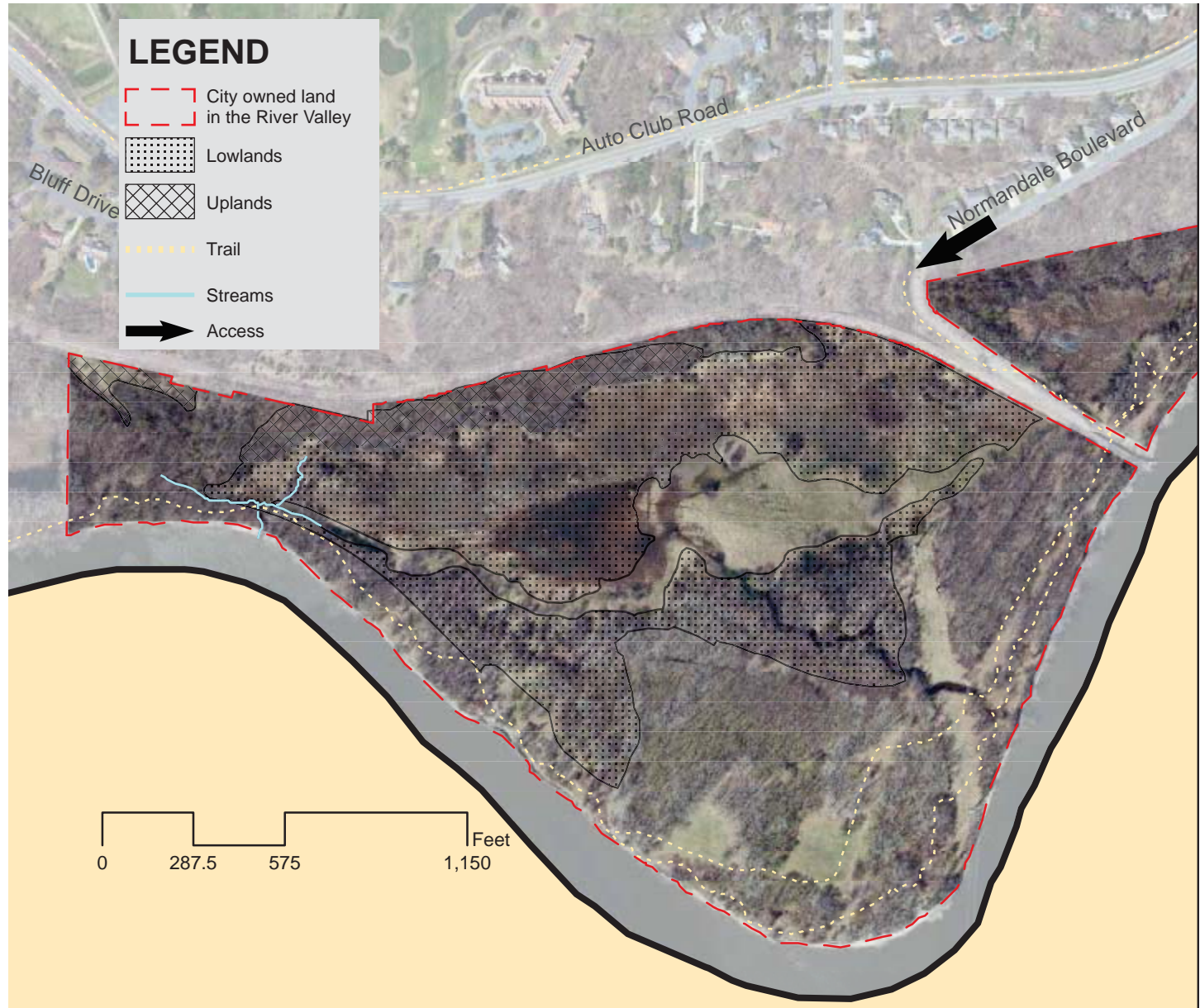
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## Area 9. Savage Bridge

This area extends from the Savage Bridge on the east and to the adjacent US Fish & Wildlife Service property on the west, with the railroad forming the north boundary. Due to lack of parking, this area is mostly visited by mountain bikers.



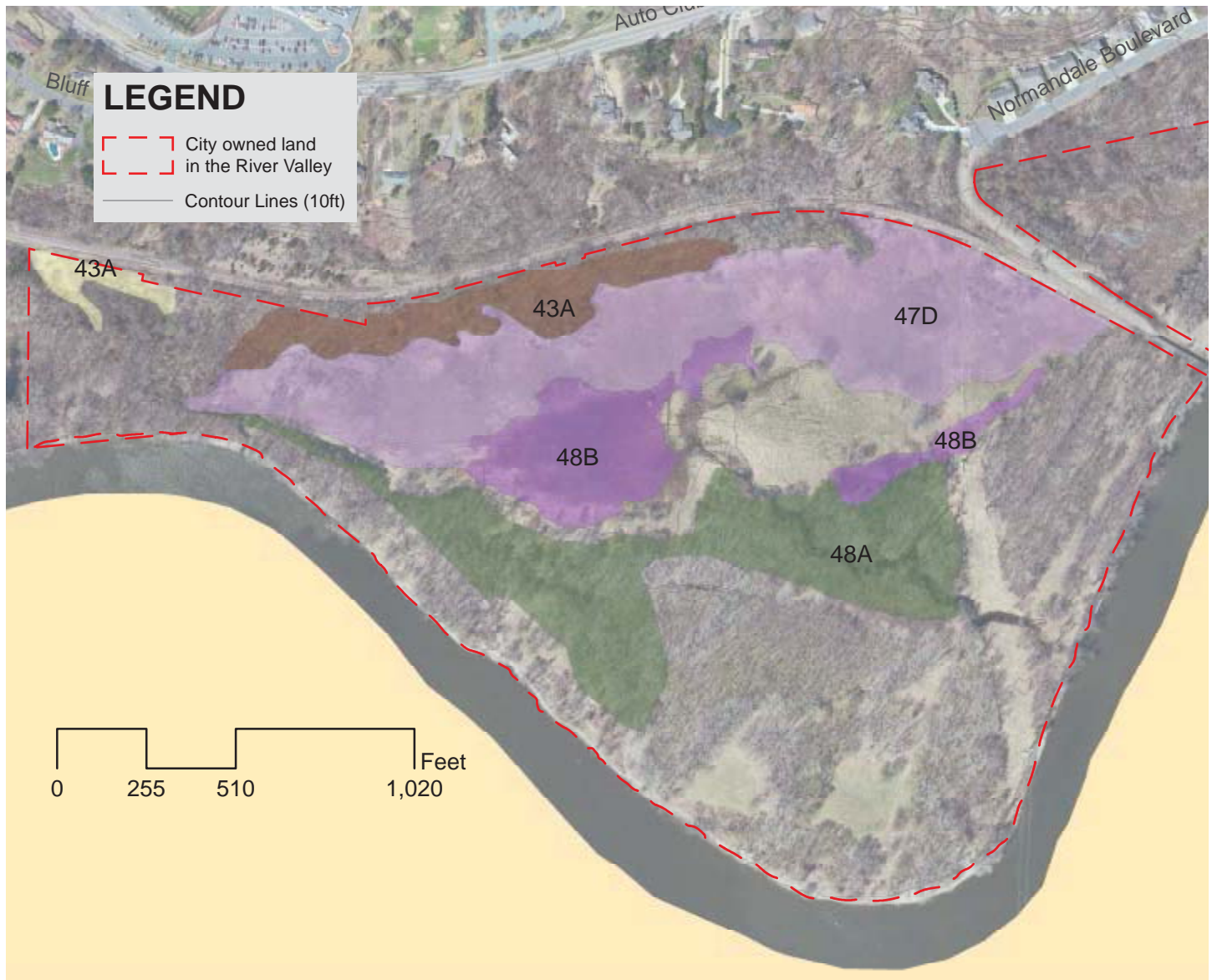
**Site Size:** 43.54 acres (6.37 uplands, 37.17 lowlands)

**Site Access:** The south end of Normandale Boulevard offers site access. There is a paved maintenance road, which turns into a dirt trail for biking and hiking.

**Machine Accessibility:** Large machinery may enter from the access road. However, clearance under the railroad bridge is limited. Terrain within the forested floodplain is level and soils are well drained.

## Savage Bridge

This area extends from the Savage Bridge on the east to the adjacent US Fish & Wildlife Service property on the west, with the railroad forming the north boundary. Due to lack of parking, this area is mostly visited by mountain bikers. The northwest corner of 43A is difficult to access unless walking along the railroad tracks.



Survey Dates:  
7/31/2007 &  
5/25/2017

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

\*\*Flora species list  
for this area is found  
in Appendix E

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
43A	Dry sand gravel prairie	-	F
<b>48A</b>	<b>Floodplain forest silver maple subtype</b>	<b>B</b>	<b>D</b>
47D	Wet meadow - seasonally flooded	D	D
<b>48B</b>	<b>Mixed emergent marsh - semi-permanently flooded</b>	<b>B</b>	<b>C</b>



**Current State:**

Several grassy openings are dominated with slender wheat grass and leafy spurge, which is a noxious weed. Unlike the afforested woods, the grasslands offer edible vegetation for wildlife.



An open growth silver maple (80" dbh) suggests this area contained less tree cover historically.



A potential restoration target is Mesic Savanna, where enough sunlight allows for higher quality grassland species to coexist with pools of shade.

**Oak Forest & Prairie**

The far northwest corner of 43A contains remnant prairie, albeit degraded and overgrown by sumac. Some remnant bur oak occur along the length of this site, but they are severely stressed by surrounding green ash, red elm, hackberry, and cottonwood trees. Dense buckthorn dominates the understory, and the soils are bare or dominated by garlic mustard.

**Floodplain Forest**

Boxelder and cottonwood trees currently control ecosystem dynamics. There are a few open sites that are breezier, drier, and less buggy. They are dominated by slender wheat grass and include some leafy spurge. However, most of the floodplain is overgrown and weedy. As tree density increases, ground vegetation becomes dominated by wood nettles, wind speeds decrease, humidity rises, and biting insects are frequent. One large, open growth silver maple occurs in the southwest corner of this area.

**Marsh/Meadow**

The wet prairie sedge meadows contain good plant diversity. However, symptoms of eutrophication are evident with woody encroachment of willow species in 47D and phragmites in 47D and 48B, which are major threats.

**Priority Management Recommendations****1. Enhance remnant prairie**

- Brush cut sumac (by hand)
- Cut & stump treat buckthorn
- Prescribed burn

**1. Enhance floodplain with a mosaic of shady & sunny patches, and continuous ground cover**

- Mow (short-term)
- Prescribed burns (short-term)
- Grazing (long-term)

**2. Restore beaver populations**

- Cut old stems of willows and allow resprouts to grow

**1. Maintain & enhance existing vegetation**

- Prescribed burns

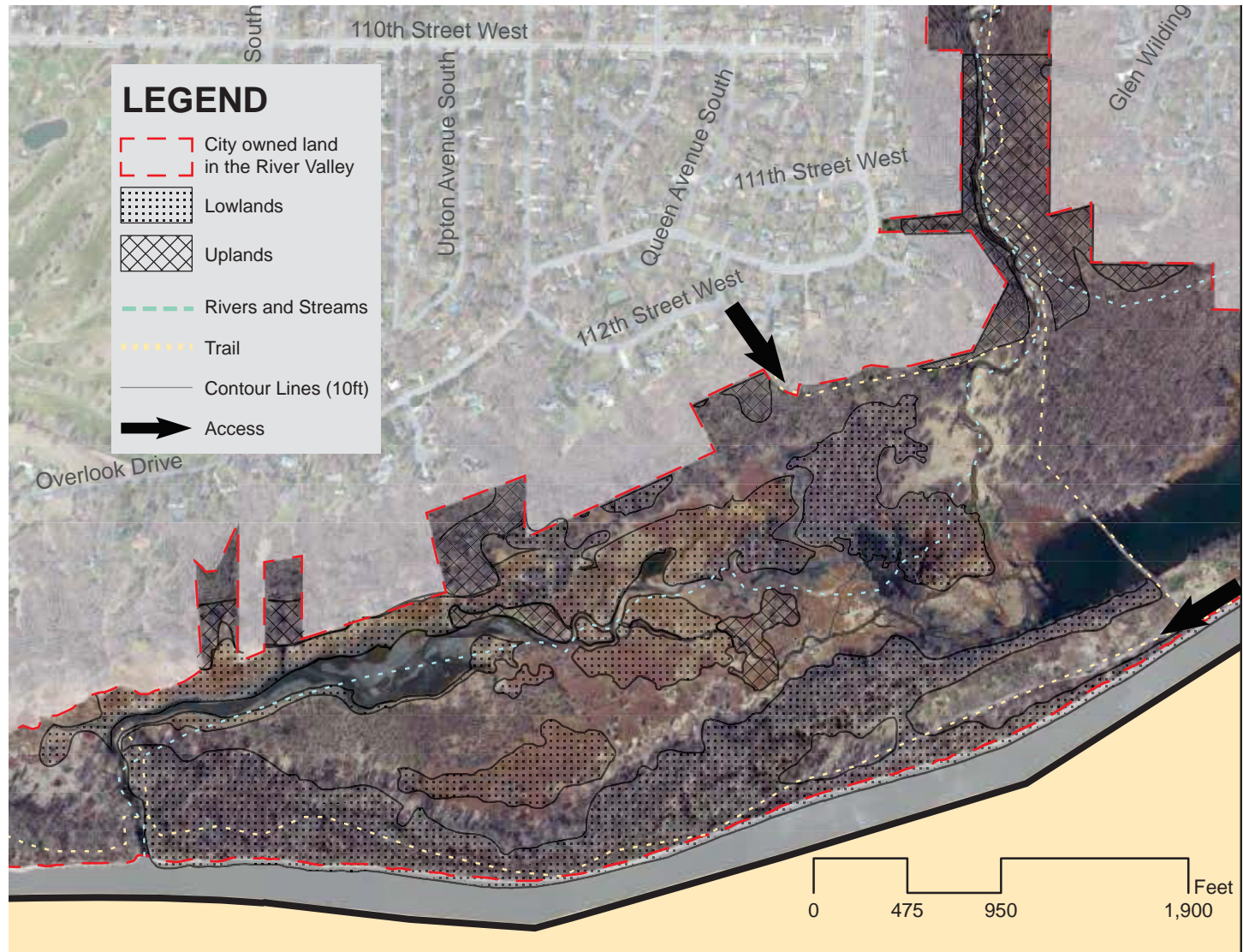
Invading woody vegetation and phragmites can be controlled with prescribed burns. This area is almost completely contained, making prescribed fire feasible.





## Area 10. Nine Mile Creek

This area is located between the Nine Mile Creek confluence with the Minnesota River and the bluffs along Nine Mile Creek. The area does not extend further north than 110th Street. The wetlands receive water from both calcareous springs and urban runoff via Nine Mile Creek. The runoff contains higher nutrient loads resulting in expansive growth of non-native reed canary grass and woody vegetation. For this reason, the wetlands and marshlands received lower quality rankings in 2017 than in 2007. The bluffs exhibit overgrown conditions, with stressed, open growth oaks and bare soils. Good restoration opportunities exist in the floodplains, wetlands, and bluffs, especially those with road access along the Minnesota River and Nine Mile Creek.

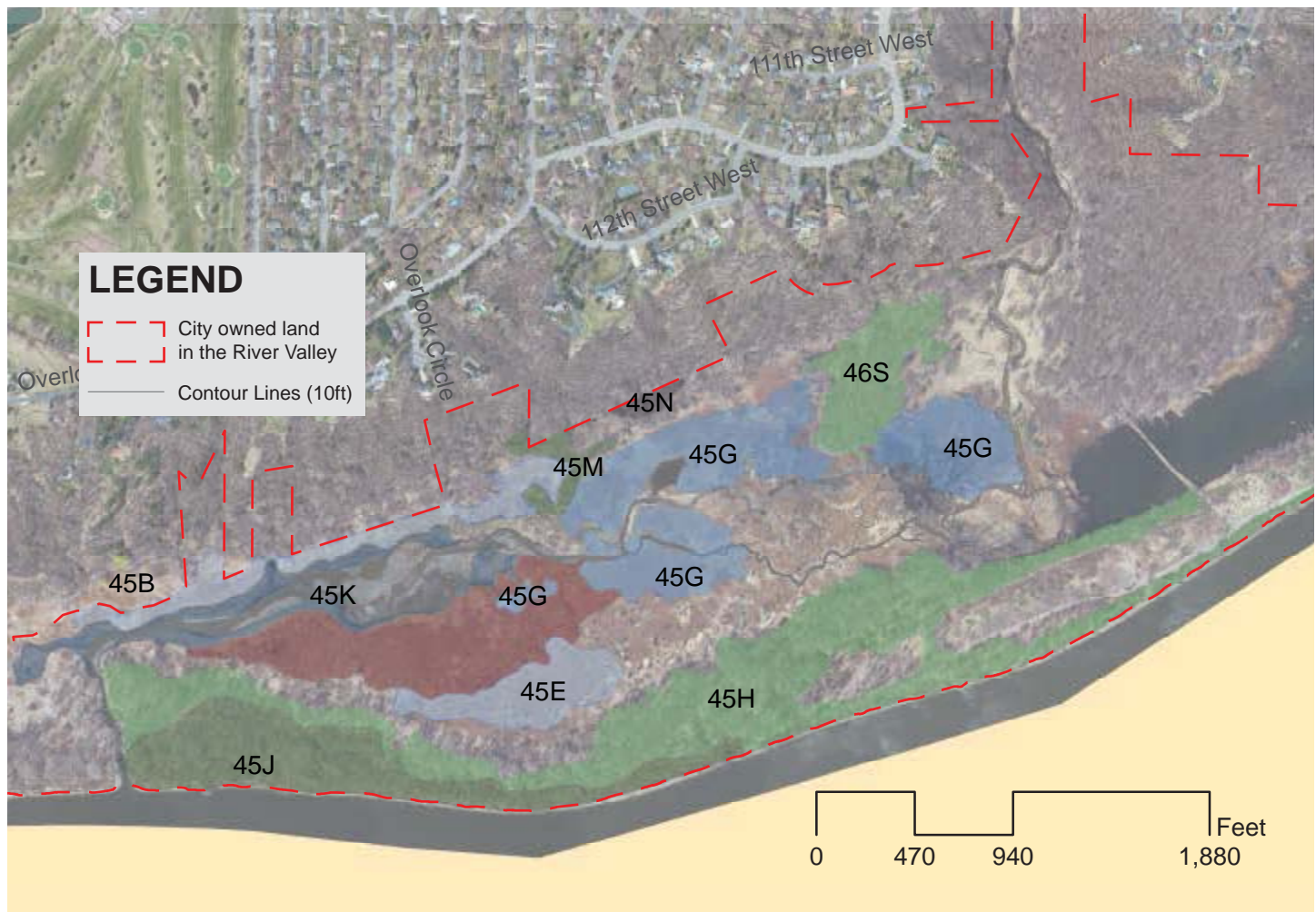


**Site Size:** 267.94 acres (101.15 uplands, 166.79 lowlands)

**Site Access:** The floodplain is best accessed by the Lyndale Avenue trailhead. Portions of the uplands can be accessed via the end of Queen Avenue S.

**Machine Accessibility:** The uplands and lowlands both offer good potential for machine access with level terrain and mostly dry soils.

## Site 10.1 Nine Mile Creek - Lowlands



Survey Dates:  
8/19/2007 &  
6/24/2017

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

\*\*Flora species list  
for this area is found  
in Appendix E

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
45N	Black ash swamp seepage subtype	C	C/D
<b>45H</b>	<b>Floodplain forest</b>	<b>C</b>	<b>D-</b>
<b>45J</b>	<b>Floodplain forest silver maple subtype</b>	<b>C</b>	<b>D-</b>
<b>45M</b>	<b>Floodplain forest silver maple subtype</b>	<b>C</b>	<b>D</b>
46S	Floodplain forest	B	D
45B	Mixed emergent marsh	B	B/C
45E	Mixed emergent marsh	B	B/C
45G	Mixed emergent marsh - intermittently exposed	B	B/C
45K	Mixed emergent marsh - permanently flooded	B	B/C



**Current State:**

Nine Mile Creek vegetation is dominated by reed canary grass, a nitrophile.



The wetland and marshland areas are primarily dominated by native plants

**Floodplain Forest**

The floodplains are in various stages of overgrowth. The lowest site, 45H, succeeded to silver maple following agriculture cessation. 45J and 46L are more recently wooded and exhibit early succession species, such as boxelder. The floodplain areas all show a closed canopy configuration, which contrasts with the open canopy depicted in 1937 aerial photographs (Plan Section 2.3).

**Wetland & Marsh/Meadow**

The wetlands and marshlands are mostly dominated by native plants, but the diversity is low compared to the Colman Lake area. For instance, plants such as mint and tufted loosestrife are nearly absent in the Nine Mile Creek area, but they are common in the Colman Lake area. Surface runoff and associated nutrients negatively impact plant biodiversity in the Nine Mile Creek area. For instance, reed canary grass, an invasive nitrophile, is dominant.

**Priority Management Recommendations**

**1. Enhance floodplain with a mosaic of shady & sunny patches, and continuous ground cover by high quality plants**

- Remove dead, fallen wood & leaf litter
- Thin young trees & preferably haul off-site or burn in piles
- Prescribed burns
- Mow (by machine)
- Hay (by machine)
- Graze (long-term)

Continuous management should focus on reducing nutrient inputs.

**1. Maintain & enhance existing vegetation**

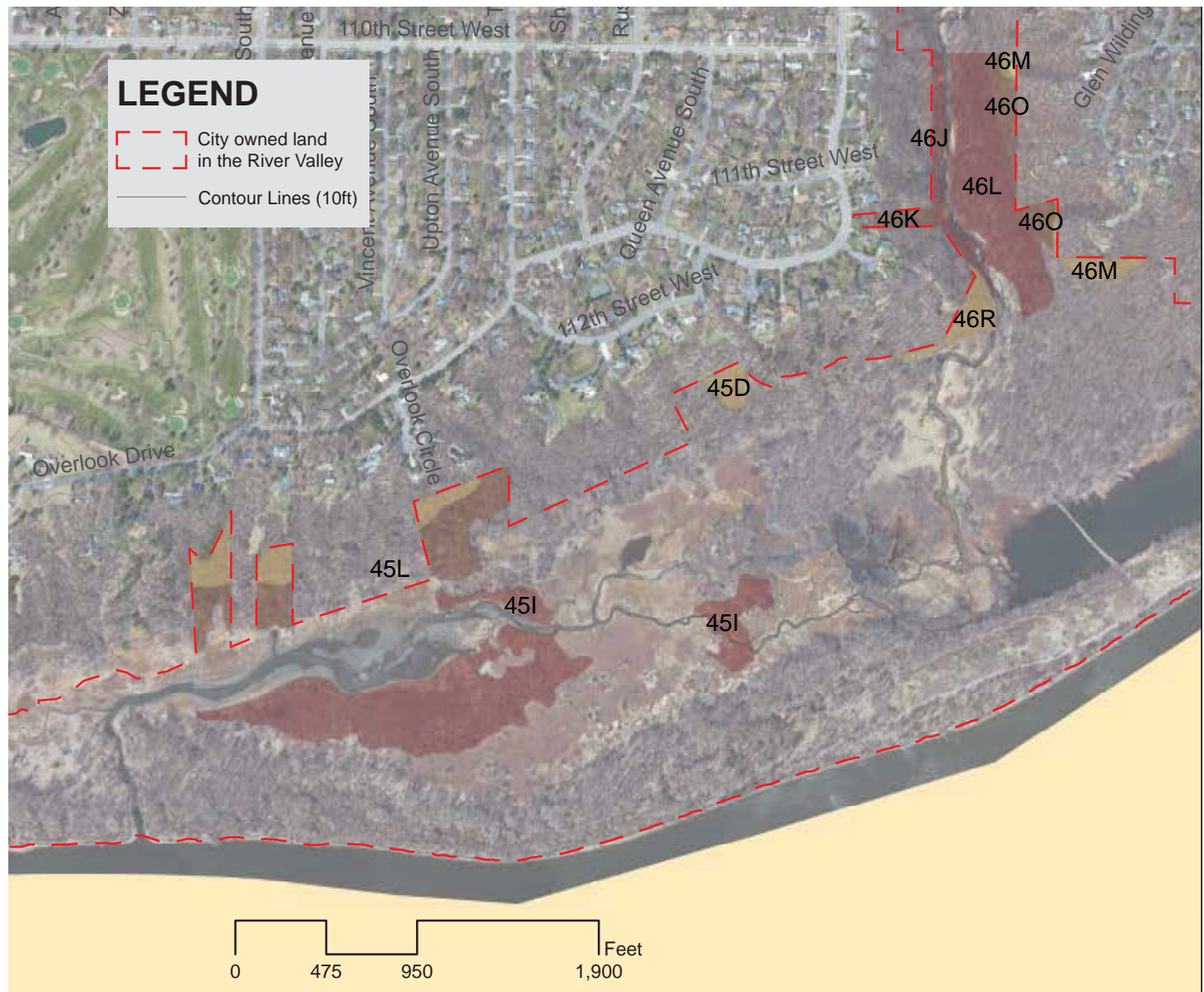
- Prescribed burn (in dry conditions)
- Flotation mow
- Hay as able

**2. Restore beaver populations**

- Cut old stems of willows and allow resprouts to grow

## Site 10.2 Nine Mile Creek - Uplands

There is good machine access at the Queen Ave. S location, and level terrain offers some machine clearing. The adjacency of Nine Mile Creek makes this a showcase project for park visitors.



Survey Dates:  
8/19/2007 &  
6/24/2017

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

\*\*Flora species list  
for this area is found  
in Appendix E

	Ecological Community Description	2007 Quality Ranking	2017 Quality Ranking
45D	Oak woodland-brushland	D	D
46M	Oak woodland-brushland	C/D	D
46R	Oak woodland-brushland	D	D
45I	Lowland hardwood forest	D	D
46J	Lowland hardwood forest	C	D
<b>46L</b>	<b>Lowland hardwood forest</b>	<b>C</b>	<b>D-</b>
45L	Oak forest mesic subtype	D	D
46K	Oak forest mesic subtype	C/D	D
<b>46O</b>	<b>Oak forest mesic subtype</b>	<b>C</b>	<b>D</b>



**Current State:**

Bare soils associated with an afforested tract in the southern tip of 46M.



46O shows good ground layer vegetation due to being repeatedly cleared of buckthorn by a neighbor.



Open growth bur oak is stressed by native trees growing up through their limbs, and competing for sunlight.

**Oak Forest**

The bluffslands show stressed, open growth bur oaks surrounded by weedy trees and sparse, low quality ground vegetation, which is similar to bluffslands throughout the valley. The aspen or hazel described in the 1853 Public Land Survey field notes do not occur today, nor is oak regeneration observed.

Some areas in 46O have been cleared of buckthorn, with ground vegetation dominated by sedges, waterleaf, ginger, woodbine and other fair, native plants. The non-thinned native trees, such as red elm, green ash, hackberry, and ironwood are competing with the open growth oaks for sunlight. Buckthorn is rampant where thinning has not occurred. Also noteworthy, there is a small opening in 46O with native grassland vegetation, such as bergamot, Hill's thistle, big bluestem, puccoon, lead plant early sunflower, and Scribner's panic grass.

On the east aspect slopes of 46K, shade tolerant red oak dominate canopy dynamics. Similar to the east facing slopes in Mound Springs Park and Pond Dakota Mission West, ground vegetation resembles a forest community, with maidenhairs fern, lady fern, ginger, early meadow rue, bloodroot and yellow trout lily.

**Oak Woodland**

46R contains a nice grove of old, open growth bur oaks. The understory has medium densities of buckthorn, and the mostly native ground vegetation covers 50% of the soils, with species such as pennsylvania sedge and enchanter's night shade.

West of the Queen Ave entrance is a little-known area in 46D with a bench from the Friends of the Minnesota River Valley. The bench has a nice overlook of the valley in the winter, but the summer view is occluded by dense woody vegetation, such as buckthorn, prickly ash, red elm, hackberry, and green ash. Dense stands of wood nettle dominate ground layer vegetation, which is not typical at this elevation in dry gravel soils. West of the bench, stressed, open growth bur oak continue into private property. The ravines are saturated with wood nettle, garlic mustard, and buckthorn. Excessive dead, fallen wood makes walking nearly impossible.

**Priority Management Recommendations****1. Restore oak savanna**

- Thin undesired woody species (by machine)
- Mow firebreaks and prune lower branches of cedar trees in preparation for prescribed burn
- Prescribed burn

Manage continuously by thinning and seeding, starting from the opening in 46O and working outwards.

**2. Enhance viewsheds of the valley**

- Strategically thin trees and shrubs
- Remove dead, fallen wood