



Richfield City Council Agenda

July 14, 2026 -- 5:15 PM

**Richfield Municipal Center
Bartholomew Conference Room
6700 Portland Avenue South**

- 1. Call to Order**
- 2. Item Discussion**
 - a. Multi-Community Wellhead Protection Plan and Source Water Sustainability Updates**
 - b. Social Media Comments Discussion**
 - c. Natural Resources Management Plan**
- 3. Adjournment**

Auxiliary aids for individuals with disabilities are available upon request. Requests must be made at least 96 hours in advance to the City Clerk at 612-861-9739.

Includes Materials - Materials relating to these agenda items can be found in the Council Chambers Agenda Packet book located by the entrance. The complete Council Agenda Packet is available electronically on the City of Richfield website.



Report Prepared By:

Mattias Oddsson, Water Resources Engineer

Department Director:

Kristin Asher, Public Works Director

Item for Consideration:

Multi-Community Wellhead Protection Plan and Source Water Sustainability Updates

EXECUTIVE SUMMARY

Staff will present an update on the status of the West Metro Multi-Community Wellhead Protection Plan (WHPP) and on groundwater quantity trends in the Metro Area. Part 1 of the WHPP has been officially adopted, and is available for review upon request (approximately 1,000 pages). Part 2 of the WHPP is currently in development. A consideration of both the WHPP and the City's Water Supply Plan is the sustainability of groundwater withdrawals and the City's drinking water supply. Staff will present a summary of aquifer and water usage trends in the Twin Cities.

RECOMMENDED ACTION

No action is required of the council at this time.

HISTORICAL CONTEXT

Since 2024, Richfield has partnered with Bloomington, Chanhassen, Eden Prairie, Edina, Hopkins, Minnetonka, Saint Louis Park, the Metropolitan Council, and the Minnesota Department of Health on a pilot Multi-Community WHPP. This plan will delineate a joint drinking water supply management area (DWSMA) for participating cities and describe actions to be taken to protect water supply groundwater sources from contamination. This plan, once complete, will replace the City's individual WHPP adopted in 2017 (part 1) and 2019 (part 2).

EQUITABLE OR STRATEGIC CONSIDERATIONS OR IMPACTS

Development of the Multi-Community WHPP supports the City's strategic goals of operational excellence and sustainable infrastructure.

POLICIES (RESOLUTIONS, ORDINANCES, REGULATIONS, STATUTES, ETC.)

The development and contents of wellhead protection plans are guided by the state Wellhead Protection Rule (MNR 4720). Public water suppliers are required under this rule to delineate a wellhead protection area and DWSMA, as well as prepare a WHPP. State rules also describe the required contents of the plan and standards for data elements to be included. The Minnesota Department of Health administers the Wellhead Protection Rule, while the Department of Natural Resources oversees water appropriations permitting.

CRITICAL TIMING ISSUES

None at this time. A public hearing will be needed in late fall 2026 to formally adopt part 2 of the WHPP.

FINANCIAL IMPACT

No immediate financial impact. Staff time is being contributed to support plan development and implementation.

LEGAL CONSIDERATIONS

None at this time.

ALTERNATIVE RECOMMENDATION(S)

None at this time.

ATTACHMENTS

1. 7_14_26_WHPP and Groundwater Work Session

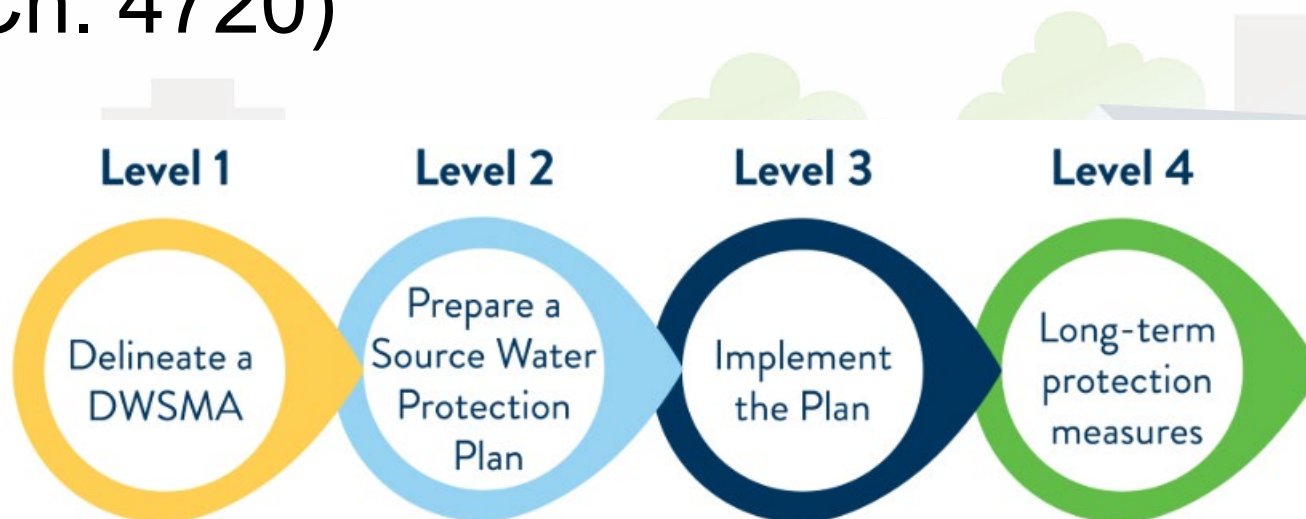


Multi-Community Wellhead Protection Plan Update



Background

- Wellhead protection planning aims to protect public water supplies from potential contaminants
- Guided by state Wellhead Protection Rule (Ch. 4720)



Source Water Protection Framework for public water systems

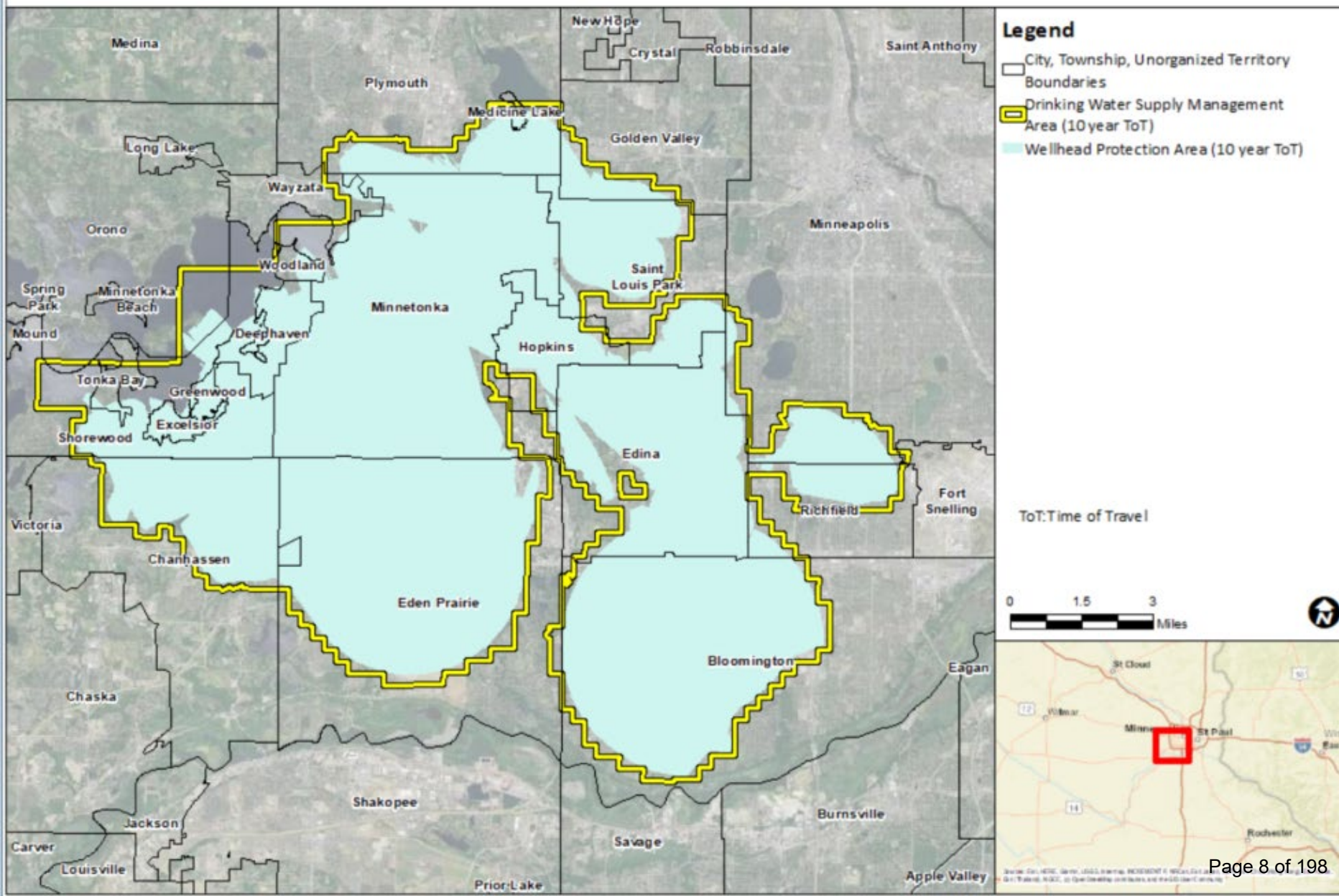
Background

- Historically each public water supplier (PWS) completed its own plan
- In areas where DWSMAs overlapped, this created contradiction, confusion, and inefficiencies
- From 2024, 8 West Metro cities partnered with the MN Department of Health (MDH) and Metropolitan Council to pilot a multi-community approach

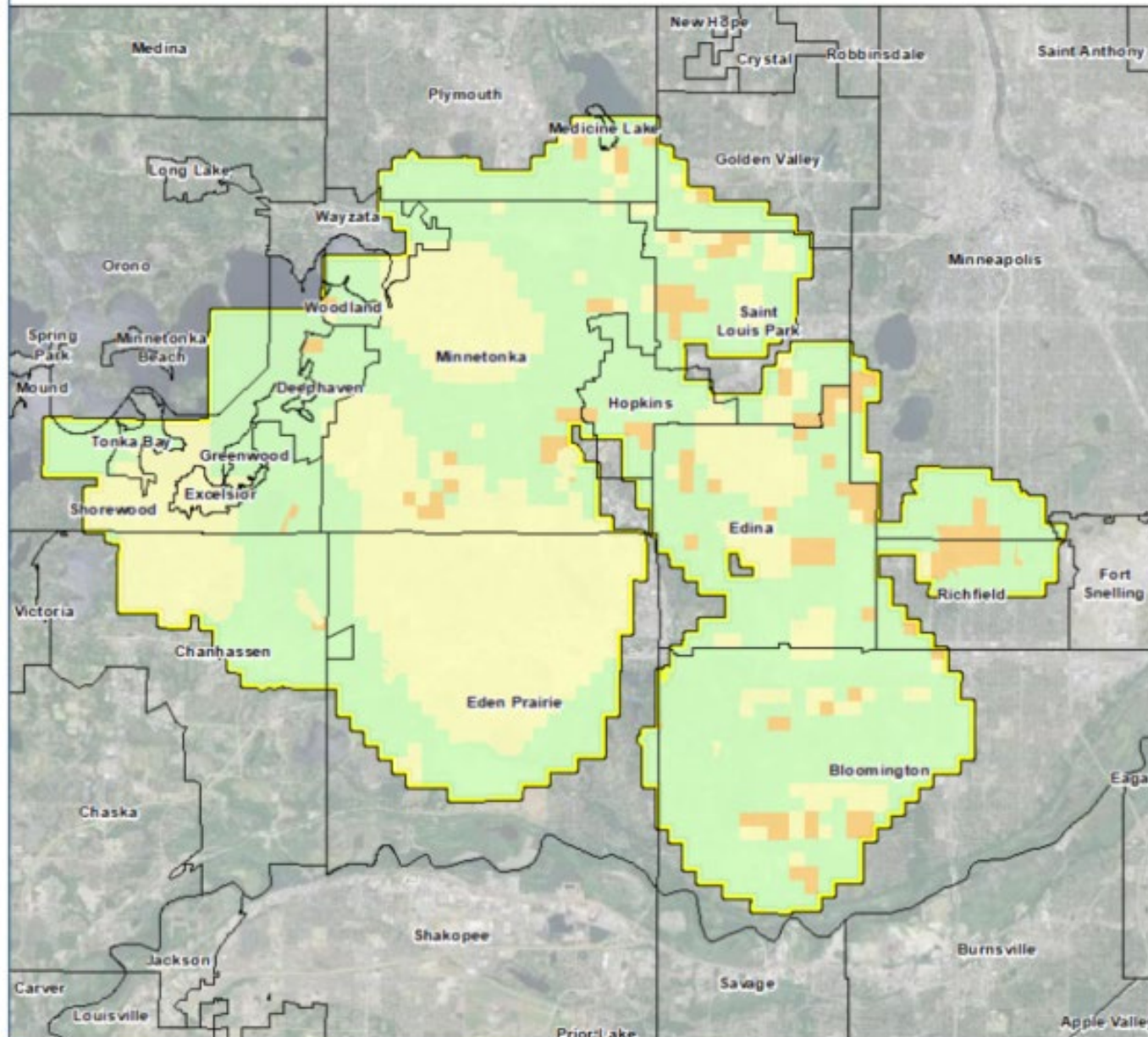
Part 1 Plan

- Analyzed time of travel to 88 existing community supply wells and one planned supply well
- A new sub-regional groundwater flow model was developed from the existing Metro Model 3 regional groundwater model to delineate the WHPA and DWSMA.
 - Incorporated the most up-to-date geology and pumping information
- The DWSMA area was determined using the sub-regional groundwater model, fracture flow calculations, and overland flow
- Vulnerability was determined for PLSS quarter-quarter sections, based on water chemistry data, soils data, and geology

West Metro Multi-community Wellhead Protection Plan



MINNESOTA DEPARTMENT OF HEALTH



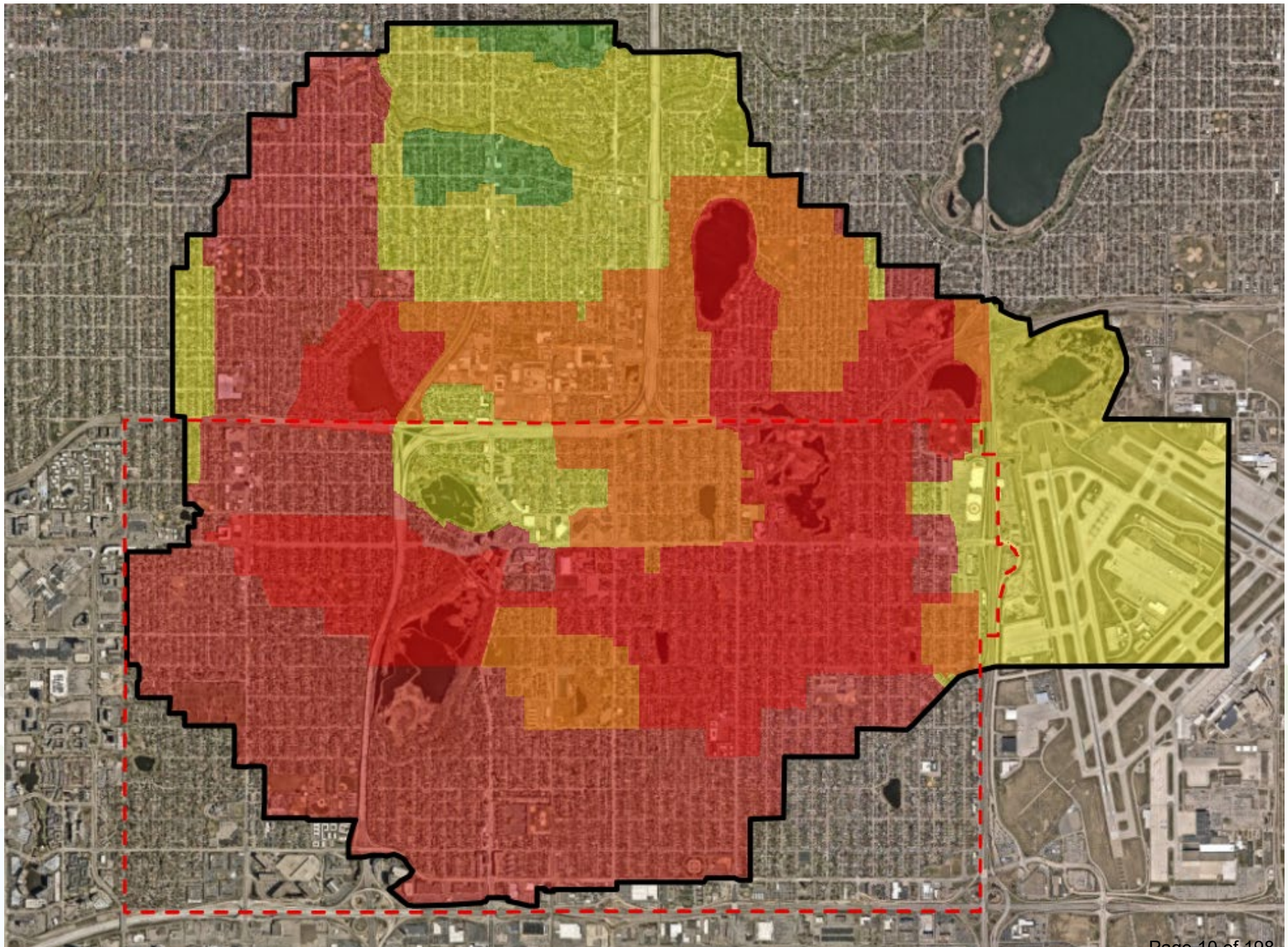
☐ City, Township, Unorganized Territory
Boundaries

Drinking Water Supply Management Area Vulnerability

■ High
■ Moderate
■ Low

ToT: Time of Travel I





DWSMA Changes

- The changes to the DWSMA are due to:
 - Reduction of pumping required for fracture flow calculations,
 - Reduced overall pumping, and
 - Changes to surface water contribution area calculations.
- This resulted in smaller extents and changes to vulnerability classifications

Current Status

- Part 1 was approved in spring 2025
- MDH is working with consultant to finalize Potential Contaminant Source Inventory
- Draft chapters of Part 2 are being developed by MDH and participating cities
 - Currently drafted chapters:
 - Goals and Objectives
 - Issues, Problems and Opportunities
 - Implementation Measures
 - Alternative Water Supply Contingency
 - Plan Evaluation, Coordination, and Documentation
 - Will cover implementation of actions to protect source water quality

Next Steps

Step	Timeframe
Complete Potential Contaminant Source Inventory (PCSI)	June to August 2026
Prepare Part 2 Plan Chapters (group review throughout)- <i>Plan Evaluation; Data Elements and Assessment; Water Supply Emergency and Contingency</i>	June to August 2026
Full Draft Plan Review by Group	August to September 2026
Submit Draft Part 2 Plan to LGUs	September 2026
Consider Comments Received by LGUs and Incorporate Response to Comments in Plan	November to December 2026
Hold Public Hearings	November 2026
Submit Final Part 2 Plan to MDH	December 2026
MDH Approval	February/March 2027
Provide Notice to LGUs about Plan Approval	March 2027
Begin Plan Implementation	March 2027



Groundwater Supply and Sustainability



The Big Picture

- Freshwater resources are under strain worldwide
- Groundwater comprises 99% of liquid freshwater available for human use
- Groundwater depletion is a growing issue, often occurring in tandem with or following depletion of surface water resources
- Ensuring a sustainable water supply requires proactive, thoughtful management.

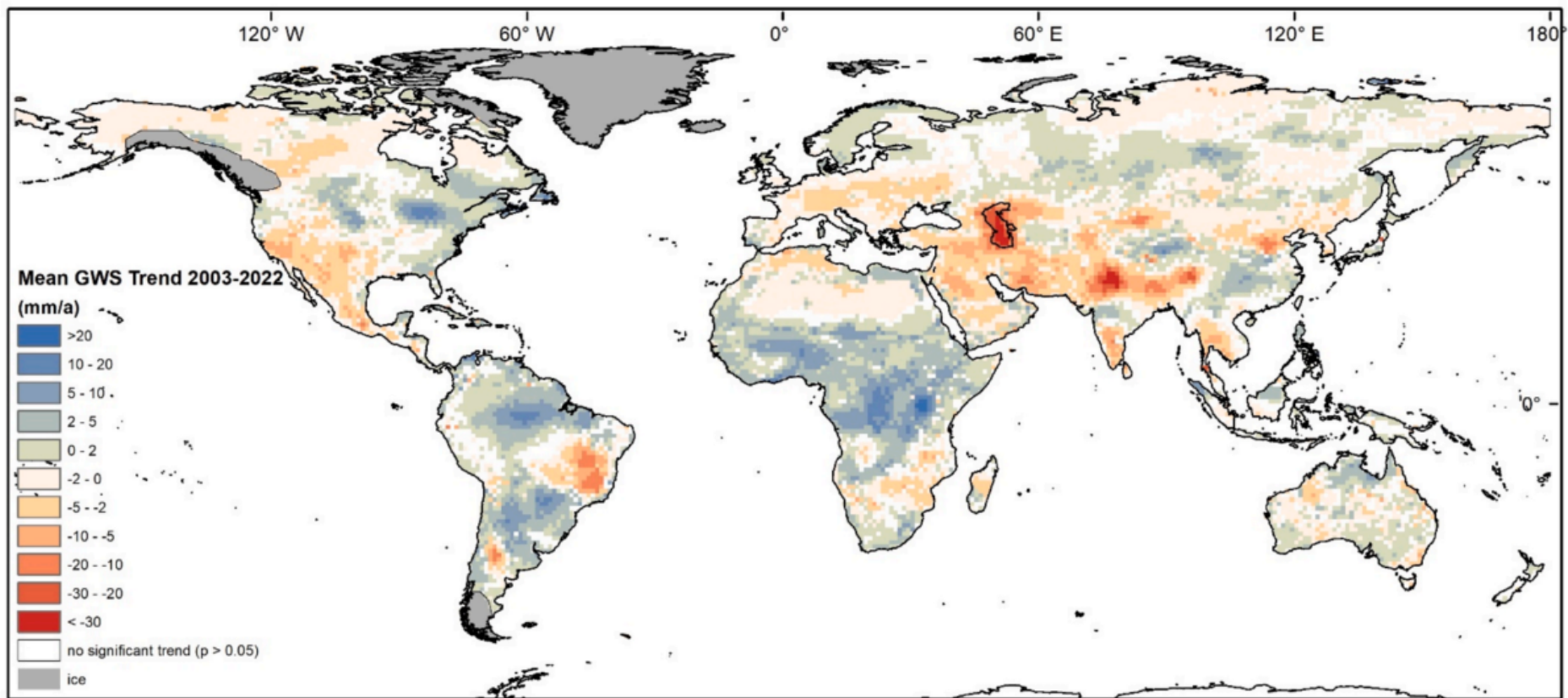
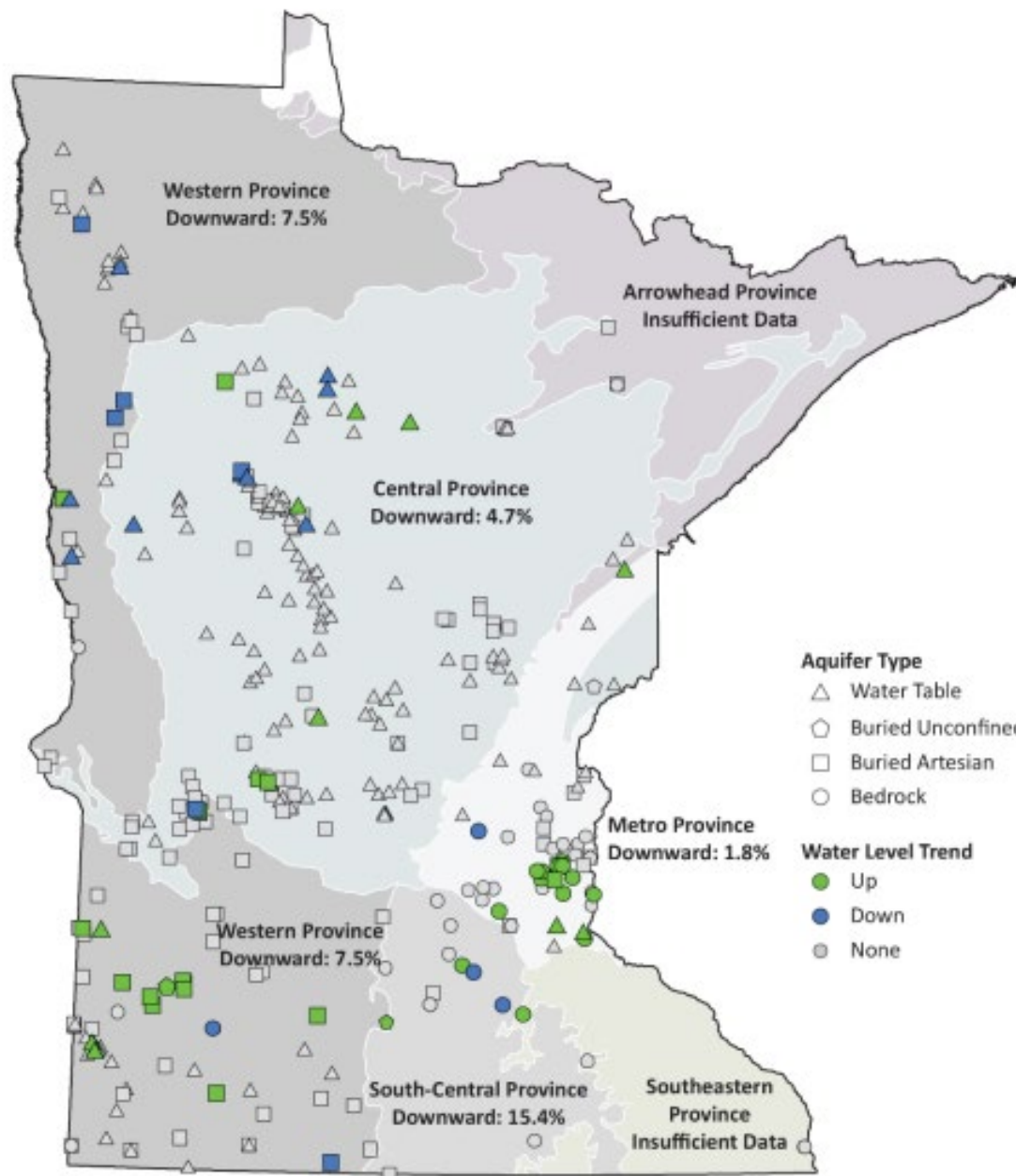


Fig. 1. Mean annual trends of GRACE-derived global GWS for the period of 2003–2022 (mm/a). Red areas indicate regions with declining groundwater storage, while blue areas show regions with increases. All calculations use the original dataset resolution of 1° , with colored areas in the figure representing statistically significant trends at the 95% confidence level. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

(Zhang, Liesch, & Goldscheider, 2026)

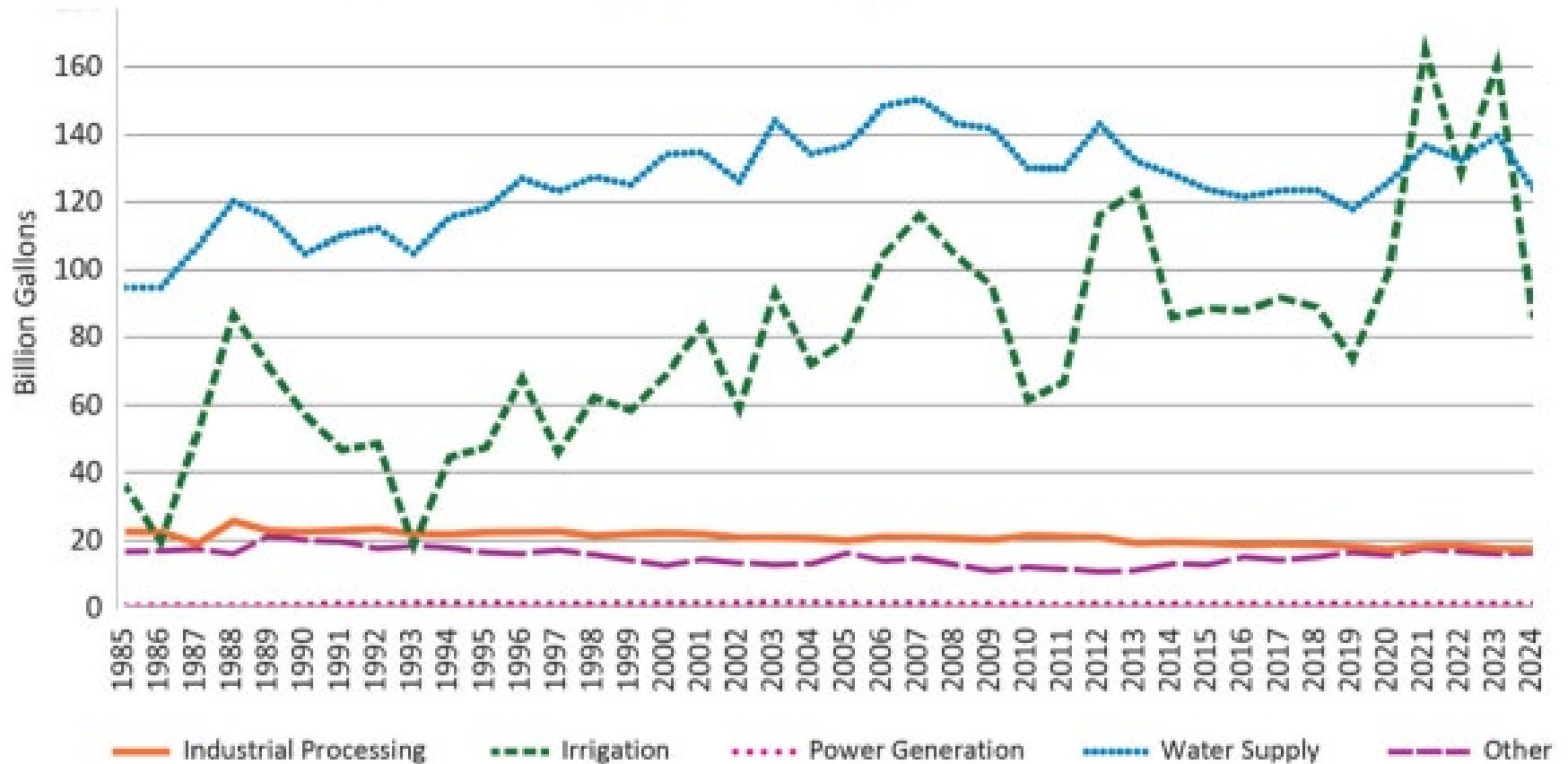
Water Usage and Groundwater in Minnesota

- Total water use in Minnesota generally increased over the last decades of the 20th century.
- Water use in the 21st century has been declining.
 - In total, Minnesota's overall water use has decreased over the past twenty years by about 27%
 - However, groundwater use increased sharply during the drought of 2021-2023
- Agricultural irrigation, primarily from groundwater, has been increasing
- Groundwater trends are variable and region-specific
 - Depends on local aquifer characteristics and pumping trends
- Over-withdrawal, well interference, surface water impacts, and contamination are primary concerns



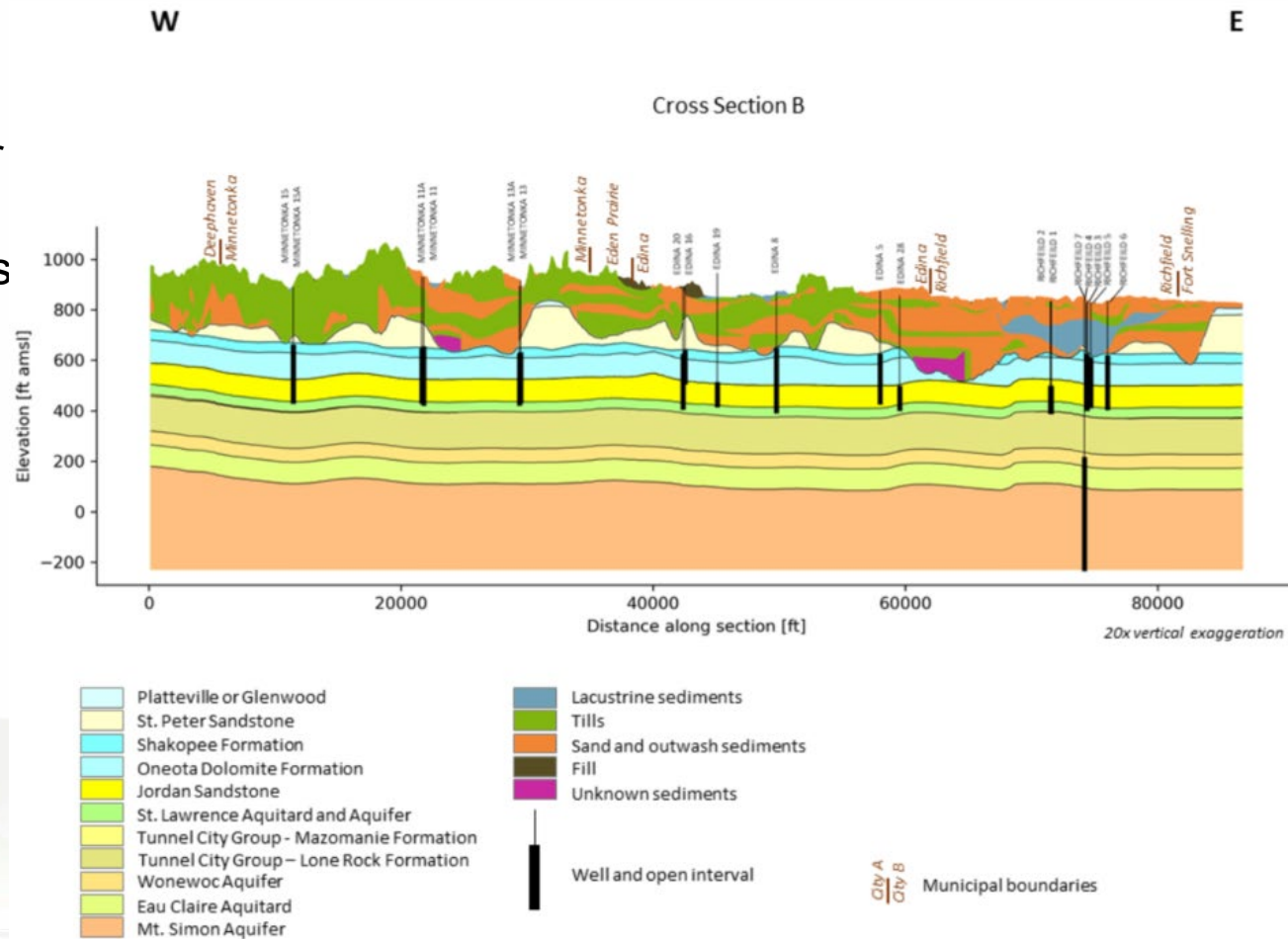
(Water Availability and Assessment Report 2025)

Figure 19. Minnesota groundwater use by permit category



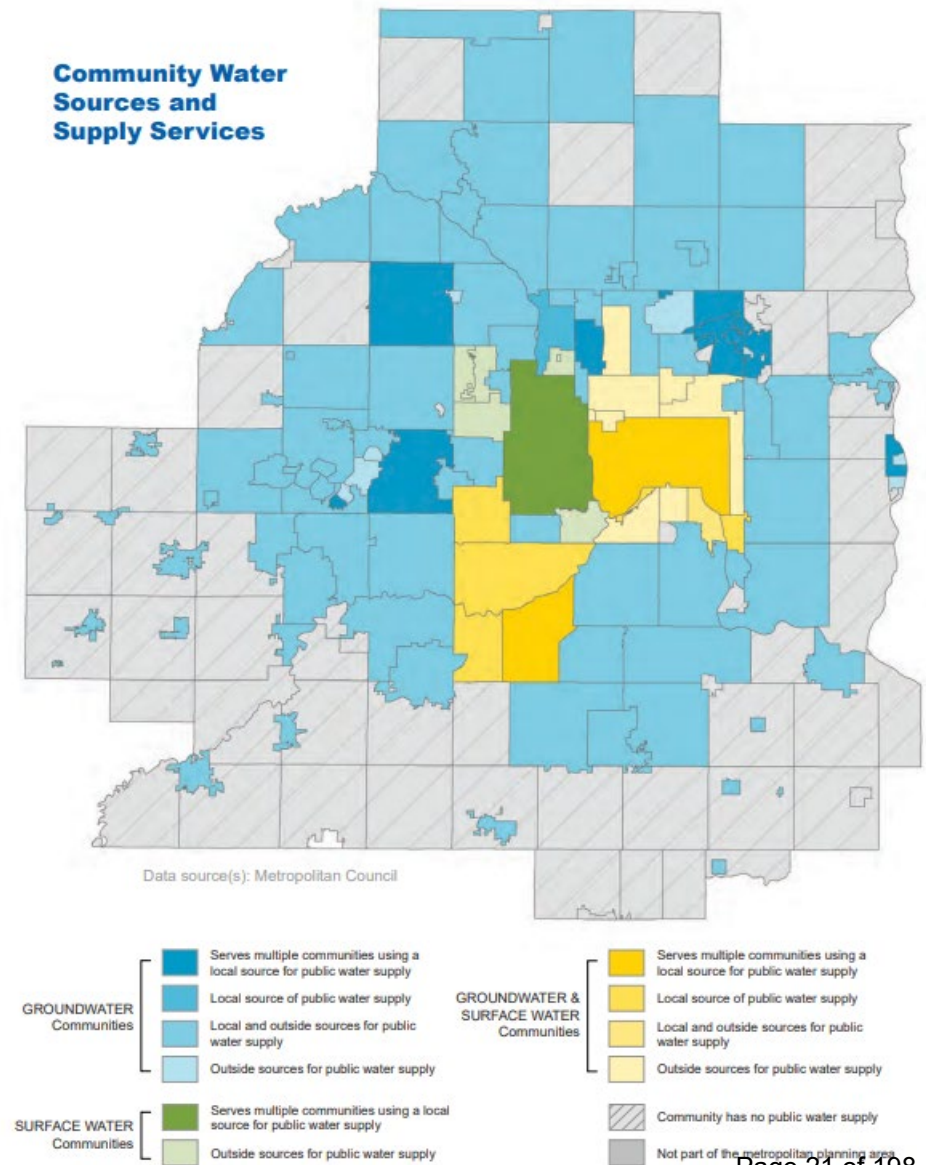
Water Supply in the Twin Cities

- Public water supply is roughly 35% surface water, 65% groundwater
- The Prairie du Chien /Jordan aquifer accounts for 41% of groundwater pumping in Hennepin County.
 - 6 of Richfield's 7 wells are in this aquifer.
- Seasonal fluctuations in water levels are prominent



Tradeoffs of Drinking Water Sources

“Water from the Mississippi is more easily replenished than groundwater aquifers; however, pollution also travels more quickly to and through surface waters. Surface waters also respond more quickly to changing weather conditions and drought than deep bedrock aquifers. The Mississippi River and the chain of lakes just north of Saint Paul provide water to nearly 20% of all Minnesotans” (Water Supply Planning Atlas for the Twin Cities Metropolitan Area)



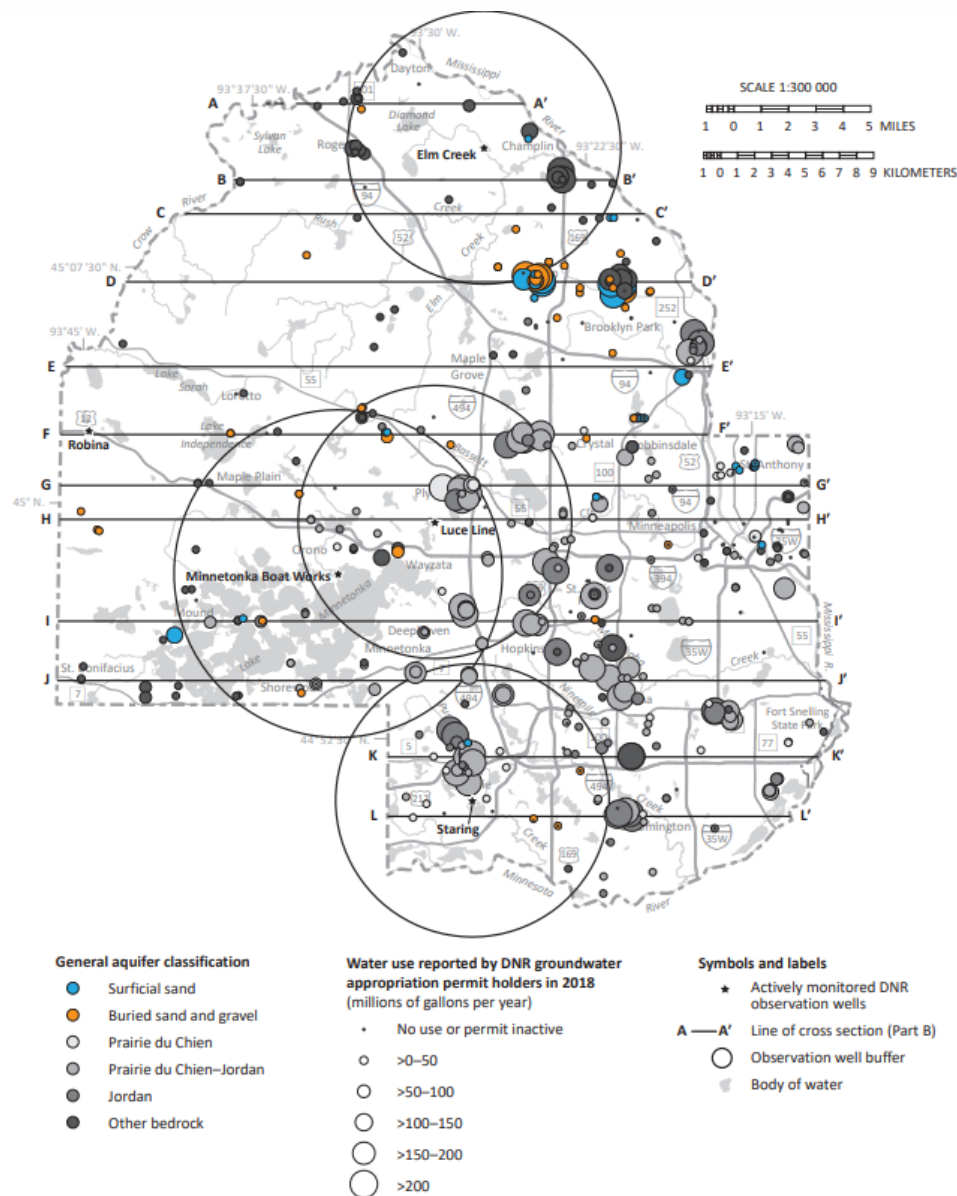


Figure 49. Groundwater use by aquifer and observation well groups

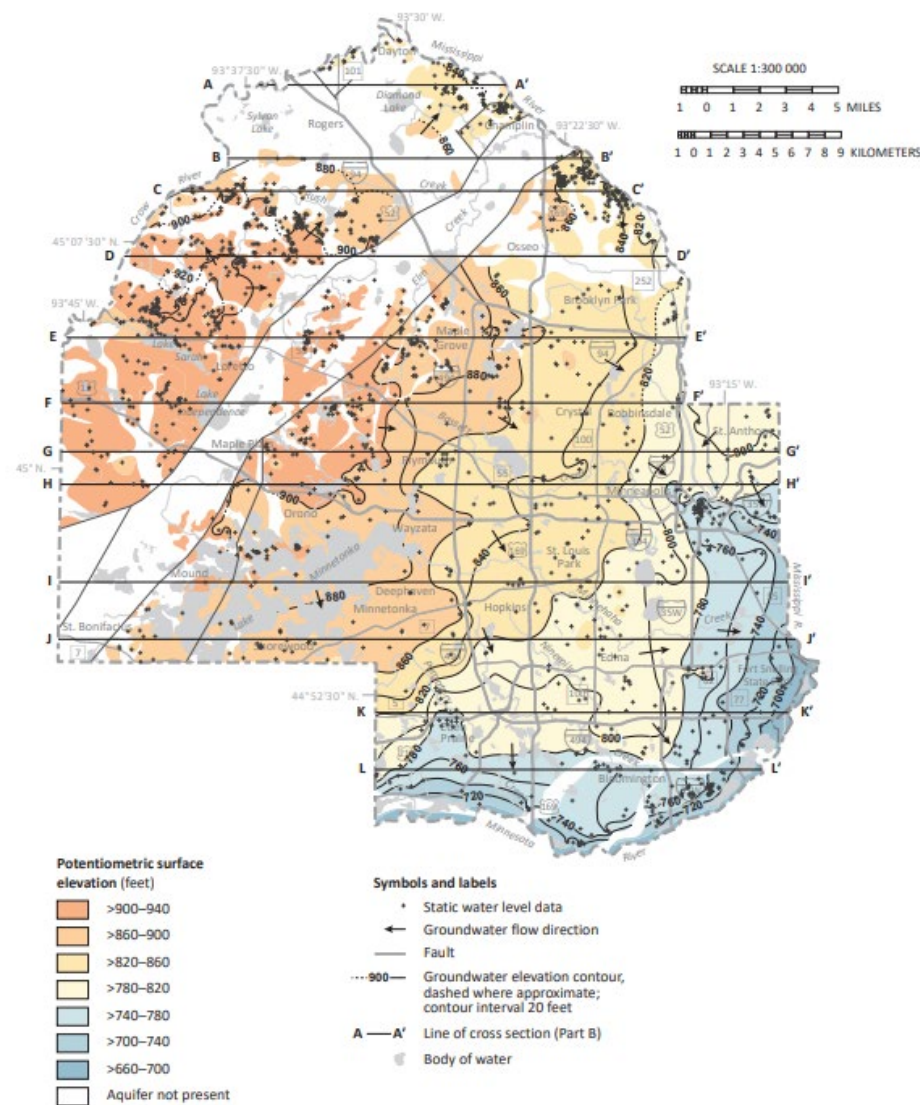
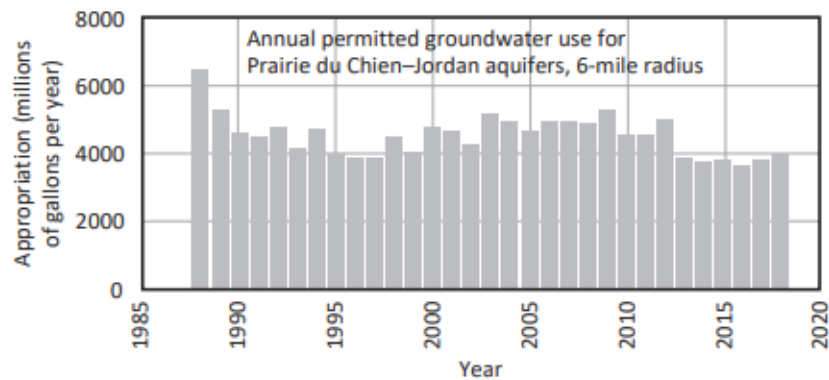
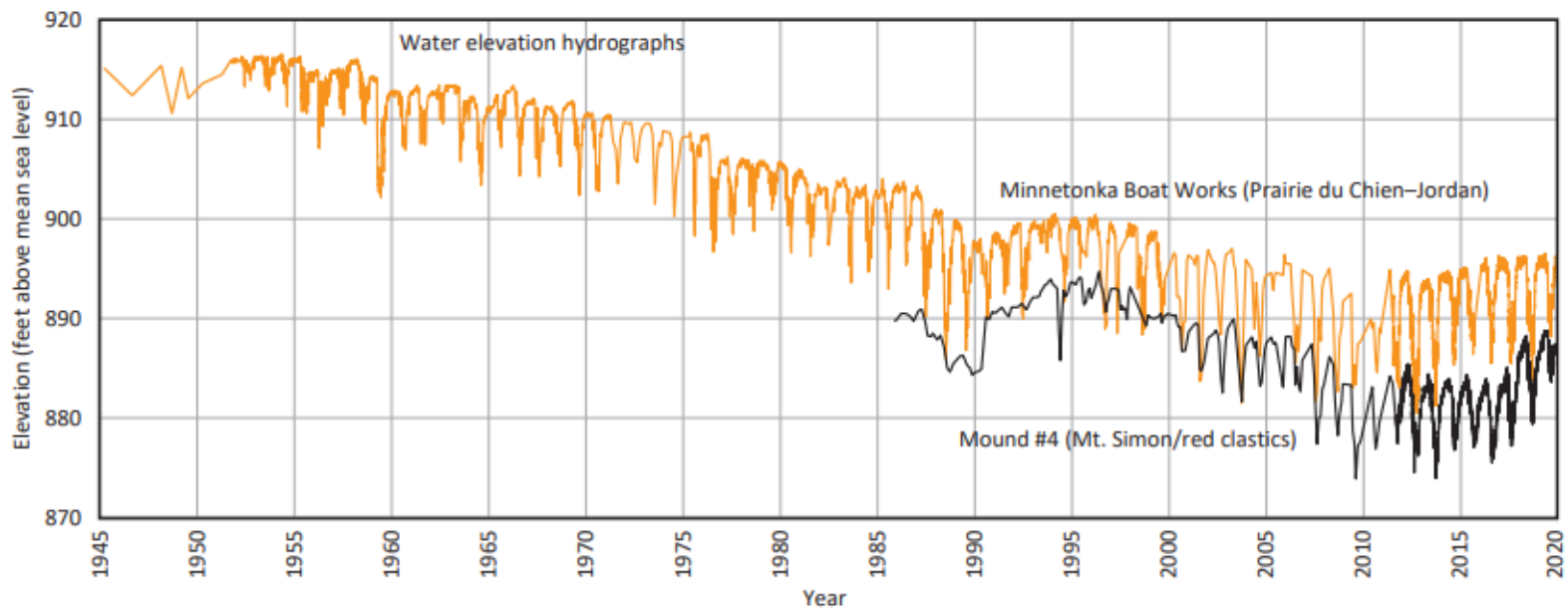
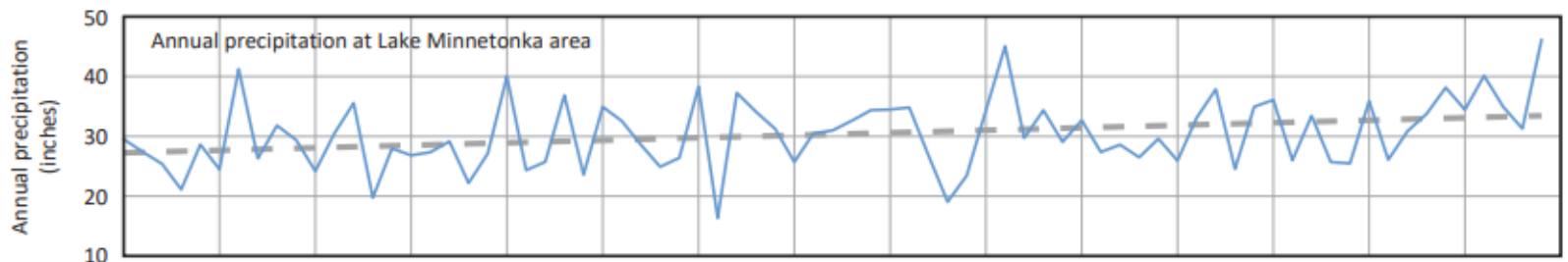
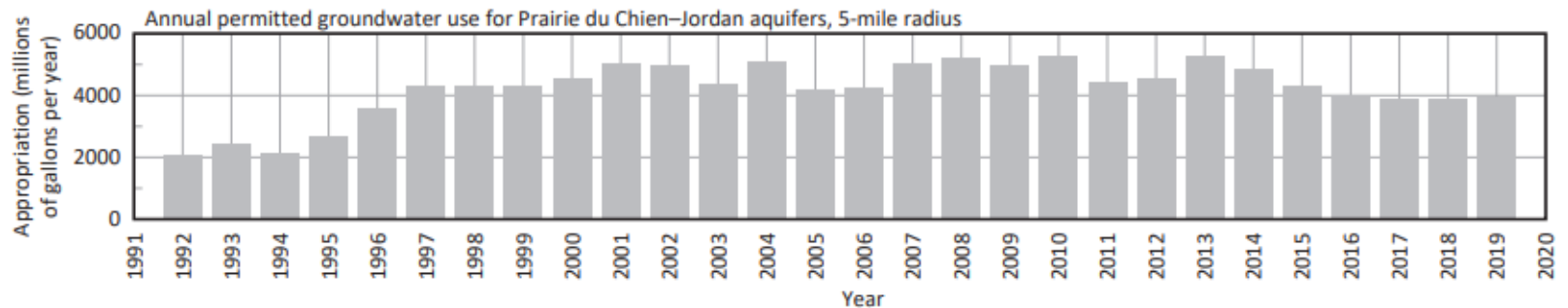
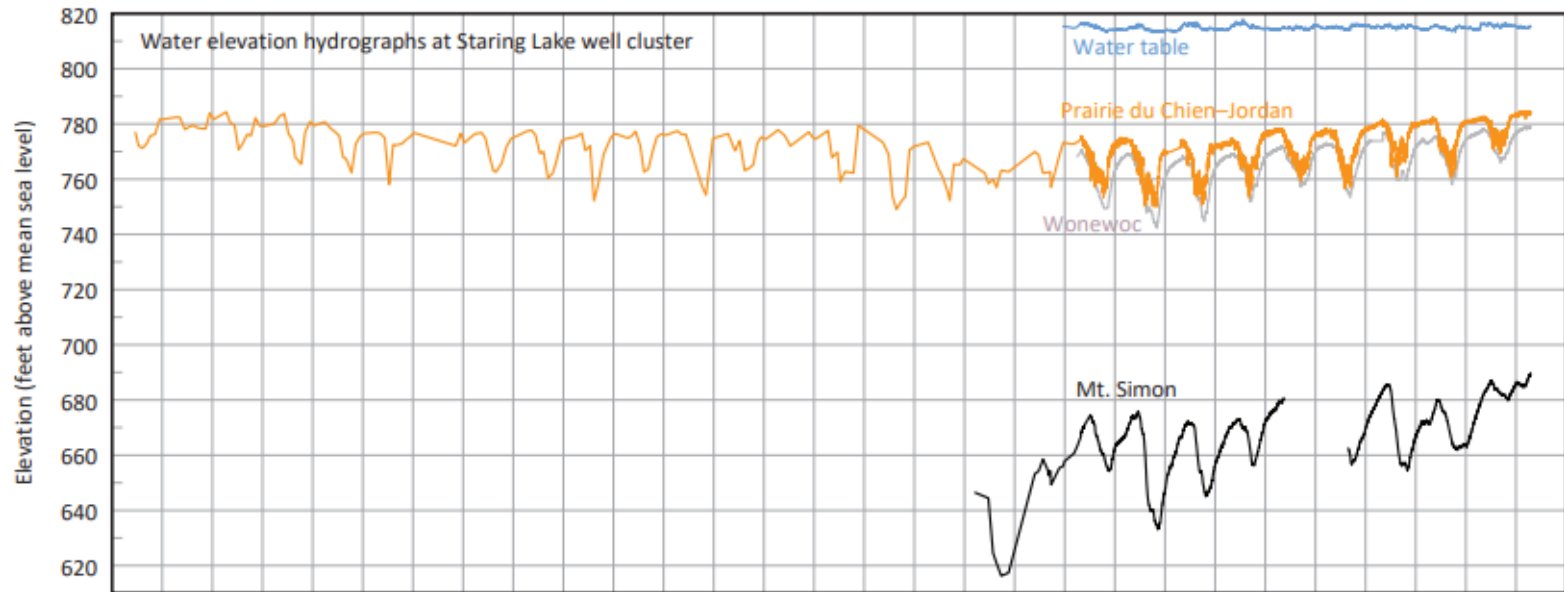
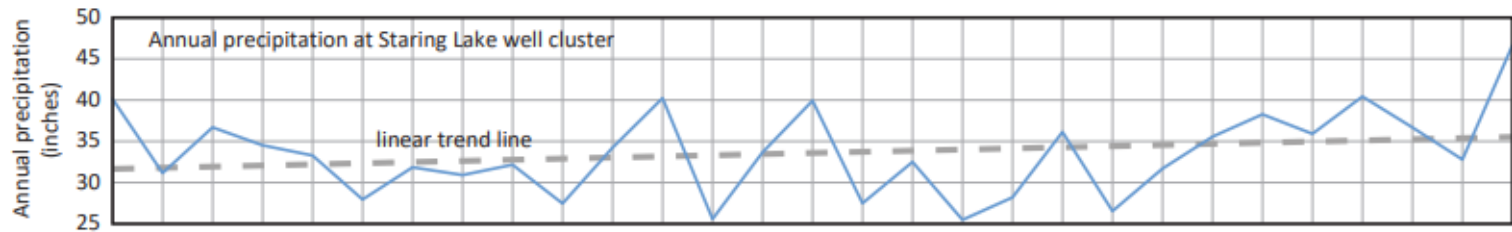


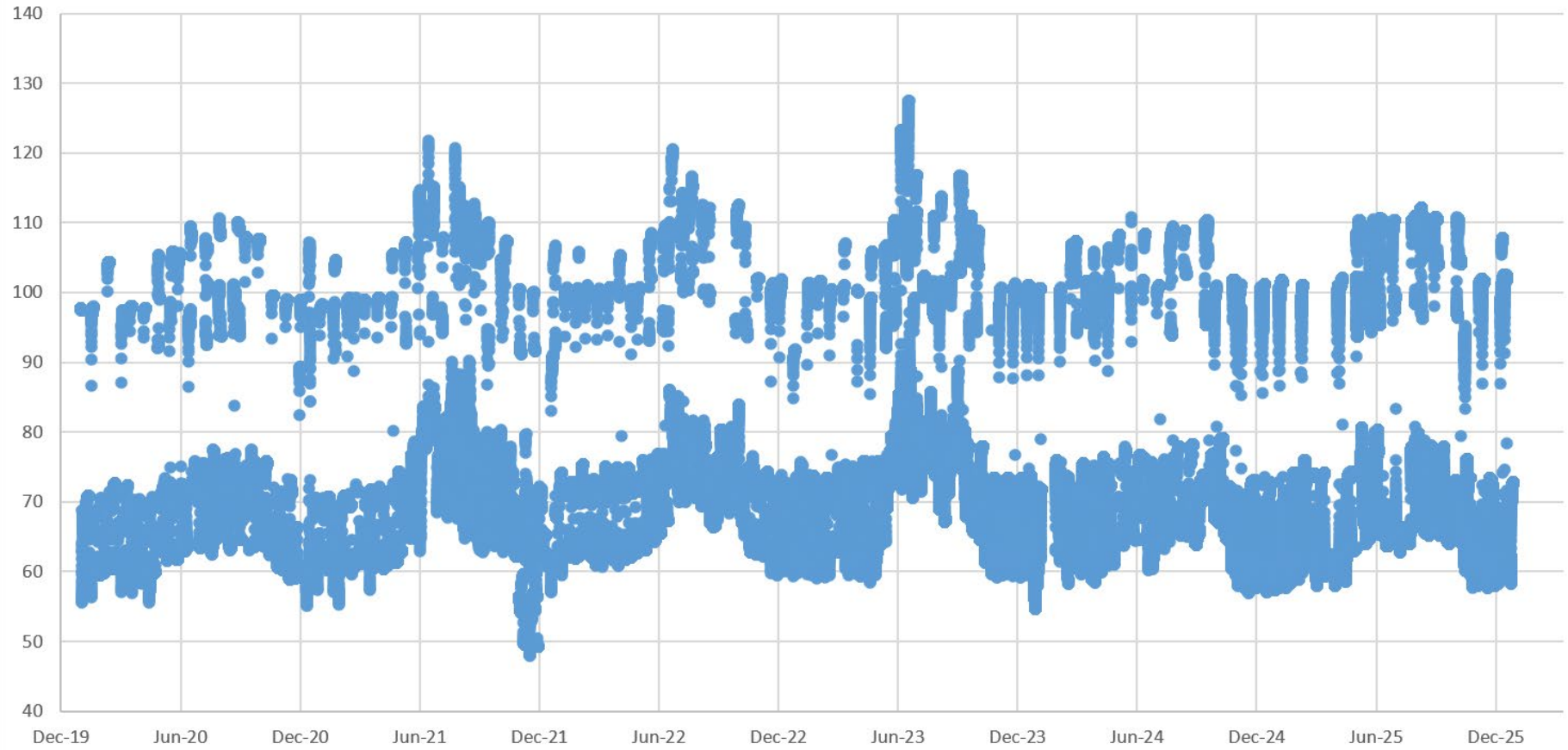
Figure 20. Potentiometric surface of the combined Prairie du Chien-Jordan and Jordan wells.



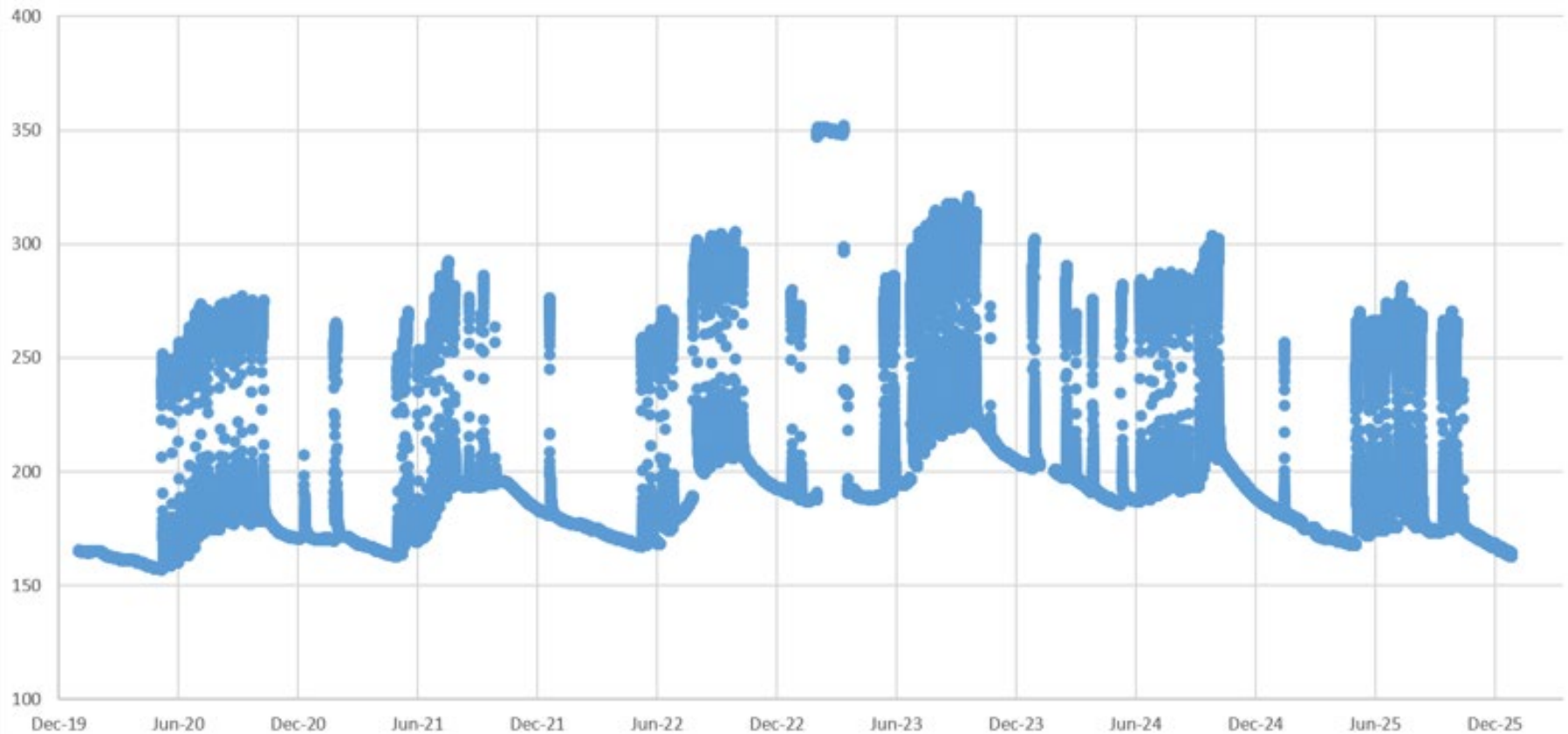


Richfield's Water Supply – Well Levels

Well 6- Transducer Depth to Water, ft (2020-2025)



Well 7- Transducer Depth to Water, ft (2020-2025)



Summary

- Whether any given water source is sustainable is a complex and nuanced question
- Groundwater in the Twin Cities can be used sustainably into the future – with thoughtful, proactive management
 - Modeling of future aquifer conditions suggests groundwater levels could increase with reduced pumping, or decline if pumping increases
- Continued conservation measures and coordinating with regulators and other groundwater communities are vital

References

- Berg, James. *Groundwater Atlas of Hennepin County, Minnesota*. n.d.
- Berg, Jim. "The Suburban Aquifers, Hennepin County." *Minnesota Ground Water Association*, March 9, 2022. <https://www.mgwa.org/newsletter/the-suburban-aquifers-hennepin-county/>.
- Dalin, Carole, Makoto Taniguchi, and Timothy R. Green. "Unsustainable Groundwater Use for Global Food Production and Related International Trade." *Global Sustainability* 2 (2019): 11. <https://doi.org/10.1017/sus.2019.7>.
- Kanwar, Pooja, Ellen Considine, and Jason Moeckel. *Water Availability and Assessment Report 2025*. With Vanessa Baratta-Person, Jay Frischman, Jon Hansen, et al. Minnesota Department of Natural Resources, 2025.
- Neuschler, Catherine, Catherine Villa-Watt, Jeff Berg, et al. *2025 Groundwater Policy Report*. Minnesota Environmental Quality Board, 2025.
- Sanocki, Christopher, Susan Langer, and Jason Menard. *Potentiometric Surfaces and Changes in Groundwater Levels in Selected Bedrock Aquifers in the Twin Cities Metropolitan Area, March–August 2008 and 1988–2008*. Scientific Investigations Report. Scientific Investigations Report. 2009.
- Water Supply Planning Atlas for the Twin Cities Metropolitan Area*. n.d.
- "West Metro Multi-Community WHPP Pilot - Part 1 - Jan 2025." n.d.
- Zhang, Jiawen, Tanja Liesch, and Nico Goldscheider. "Impacts of Climate Change and Human Activities on Global Groundwater Storage from 2003 to 2022." *Journal of Hydrology* 664 (January 2026): 134298. <https://doi.org/10.1016/j.jhydrol.2025.134298>.

Questions/Open Discussion





Report Prepared By:

Kate Aitchison, Communications and Engagement Manager

Department Director:

Sack Thongvanh, Assistant City Manager

Item for Consideration:

Social Media Comments Discussion

EXECUTIVE SUMMARY

On May 12, 2026, Mayor Mary Supple asked staff and council to consider a policy change which would eliminate the comment sections from the city's Facebook channel and other social media platforms. This followed vitriolic comments from a Facebook post related to the April 29 officer-involved-shooting in Richfield. The city has had previous Facebook posts go viral which have attracted "trolling" behavior from audiences outside our typical reach. Richfield's social media channels include Facebook, Instagram, YouTube and LinkedIn. If the council were to decide to remove the ability to comment from a platform, it must be consistently applied across that platform. The council could choose to allow comments on certain platforms and remove them from others. To date, a few cities in Minnesota have elected to remove the comment sections of their social media accounts. Bloomington removed its comments from its Facebook platform in 2023. Rochester followed suit in 2024, removing comments from Facebook, Instagram and YouTube. Most recently, Golden Valley has decided to remove the comment sections from Facebook and Instagram.

Communications Manager Kate Aitchison and Communications Specialist Brianna Darling will be in attendance to present staff findings and recommendations.

RECOMMENDED ACTION

Staff is requesting feedback based on the information presented today.

HISTORICAL CONTEXT

Richfield last substantially revised its Social Media Policy in November 2024, with minor updates completed earlier this year. The updated policy was developed per best practices in government communications, and with input from the city attorney.

EQUITABLE OR STRATEGIC CONSIDERATIONS OR IMPACTS

POLICIES (RESOLUTIONS, ORDINANCES, REGULATIONS, STATUTES, ETC.)

The most recent Social Media Policy is attached.

CRITICAL TIMING ISSUES

FINANCIAL IMPACT

Removing comments would require additional work by staff, as comments must be manually turned off after a post has been published. This makes it impossible to schedule future posts. Additionally, it is not possible to turn comments off of Facebook Ads or Events, making those tools unavailable to the city. The Recreation Services department heavily uses Facebook Events.

LEGAL CONSIDERATIONS

When the city publishes a social media post and allows comments, the post becomes a limited public forum subject to various free speech and related considerations. It is sometimes helpful to think about the comments section like the Open Forum portion of a City Council meeting. In order to comply with the First Amendment rights of the audience, moderation of comments (including hiding or deleting comments) is extremely limited. Any restrictions on content must be applied consistently and in a viewpoint-neutral manner. The city's policy outlines the specific scenarios that would justify removing a comment from view.

Per the policy: City staff will not edit any posted comments or restrict comments based on commentor's viewpoints. However, comments posted by members of the public will be removed if they are obscene, defamatory, in violation of the copyright, trademark right or other intellectual property right of any third party, or malware.

ALTERNATIVE RECOMMENDATION(S)

ATTACHMENTS

1. Social Media Policy - 2026
2. Removing Social Media Comments presentation v2 7.14.26

CITY OF RICHFIELD

CITY POLICY

DATE: March 30, 2026
(Supersedes Social Media Comments Policy dated November 30, 2024)

SUBJECT: Social Media Use and Moderation

Purpose

Using social networks serves to communicate and deliver messages directly to the community and to encourage public involvement, interaction, and feedback. The City of Richfield recognizes the value of social media to provide accurate, consistent and timely information about City functions, services, and activities to strengthen the City's relationship with the community through engagement.

The purpose of this policy is to establish a procedure for monitoring the City's online discussion while protecting the free speech rights of its users. The City recognizes that by maintaining a social media page and allowing users to comment on said page, it has created a limited public forum. The City of Richfield uses social media applications to present news and information relating to the City. We encourage people to submit questions, comments, and concerns. The City reminds users that social media feeds are accessible to the public, and asks users to keep comments appropriate and civil.

The City of Richfield wishes to establish a positive and informative social media presence. City representatives have the responsibility to use the City's social media resources in an efficient, effective, ethical, and lawful manner pursuant to all existing City policies.

Scope

The City of Richfield's social media accounts are considered a City asset and administrator access to these accounts will be securely administered in accordance with the City's Social Media Policy. The City reserves the right to shut down any of its social media sites or accounts for any reason without notice. The City does not create or maintain social media accounts for its elected officials.

This policy applies to any existing or proposed social media websites sponsored, established, registered, or authorized by the City of Richfield. The City does not create, collect, disseminate, or regulate use of any other social media accounts, including the personal accounts of its elected officials and staff.

Rules Of Use and Moderation

City staff will not edit any posted comments or restrict comments based on commentor's viewpoints. However, comments posted by members of the public will be removed if they are obscene, defamatory, in violation of the copyright, trademark right or other intellectual property right of any third party, or malware. The following are examples of content that may be removed

by City staff before or shortly after being published:

- (i) Comments containing defamatory statements against a person, either as determined by a court or comments that are patently defamatory by easily discoverable facts;
- (ii) Comments containing obscenity, which is defined as sexually explicit and/or pornographic content that is patently offensive, appeals to prurient interest, and lacks serious literary, artistic, political, or scientific value;
- (iii) Comments that promote or advocate illegal discrimination based on race, age, religion, gender, national origin, disability, sexual orientation, veteran status, or any other legally protected class;
- (iv) Comments that encourage or promote illegal activity or compromise public safety, including comments that contain direct threats to persons or property;
- (v) Duplicate comments posted repeatedly within a short period of time;
- (vi) Comments that are spam or promotion;
- (vii) Comments that are plagiarized, or infringe on copyrights or trademarks;
- (viii) Comments that publish statutorily private, confidential, or nonpublic data.

A member of the public whose comment is removed may appeal the removal of the comment and seek reconsideration of its removal by contacting the City to discuss the decision to remove the comment with the Communications and Engagement Manager. If necessary, the decision may be discussed for further review by the City Manager, and as appropriate, the City Attorney.

When possible, comments that are removed for falling into one of the above categories will be hidden or archived, and not permanently deleted. When a comment is hidden or removed, a copy or electronic record of the comment will be retained or archived pursuant to applicable law and the City's record retention policy, along with a brief description of the reason the content was deleted. Some comments may be permanently deleted immediately consistent with law.

Please note that any public comments expressed on a City site do not reflect the opinions and position of the City of Richfield. The City does not endorse any product, service, company or organization advertising on its social media pages. The ads that appear on social media pages are sold, posted and maintained by those social media companies.

If you have any questions concerning the operation of any Richfield online moderated discussion site, please contact the Communications and Engagement Manager.

Approved:

Katie Rodriguez

City Manager

Signature: *Katie Rodriguez*

Email: krdriguez@richfieldmn.gov

Social Media Comments

Legal restrictions, Options & Best Practices

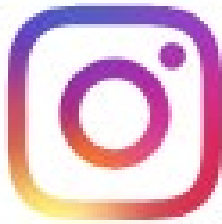
July 14, 2026

The city manages four social media platforms:



~15k followers

Other channels include: PD, WLNC, Farmers Market, etc.



~3,700 followers

Other channels include: WLNC, Farmers Market



~1,000 followers



~900 followers

Comment Section as Limited Public Forum

- Government accounts are treated differently than private accounts.
- When the city publishes a social media post and allows comments, the post becomes a ***limited public forum*** subject to various free speech and related considerations (similar to Open Forum at council meeting).
- In order to comply with the First Amendment rights of the audience, moderation of comments (including hiding or deleting comments) is ***extremely limited***. Any restrictions on content must be applied ***consistently*** and in a ***viewpoint-neutral*** manner.

Existing social media policy (3/30/26):

City staff will not edit any posted comments or restrict comments based on commentor's viewpoints. However, comments posted by members of the public will be removed if they are obscene, defamatory, in violation of the copyright, trademark right or other intellectual property right of any third party, or malware. The following are examples of content that may be removed by City staff before or shortly after being published:

- (i) Comments containing **defamatory statements against a person**, either as determined by a court or comments that are patently defamatory by easily discoverable facts;
- (ii) Comments containing **obscenity**, which is defined as sexually explicit and/or pornographic content that is patently offensive, appeals to prurient interest, and lacks serious literary, artistic, political, or scientific value;
- (iii) Comments that promote or advocate **illegal discrimination** based on race, age, religion, gender, national origin, disability, sexual orientation, veteran status, or any other legally protected class;
- (iv) Comments that encourage or **promote illegal activity or compromise public safety**, including comments that contain direct threats to persons or property;
- (v) **Duplicate comments** posted repeatedly within a short period of time;
- (vi) Comments that are **spam or promotion**;
- (vii) Comments that are **plagiarized, or infringe on copyrights or trademarks**;
- (viii) Comments that publish **statutorily private, confidential, or nonpublic data**.

Current strategy:

- Facebook Profanity Filter
- When possible, use one-way channels to share sensitive information that may attract unwanted online attention (typically DEI topics).
- Work to build audiences on other platforms to strengthen additional channels for communicating with residents (Richfield Recap, Instagram, etc).
- Attempt to work against the Facebook algorithm with ‘boring’ posts (add links, static graphics, etc.).



Analysis

Topic	Pros - No comments	Cons - No comments
Decency and decorum	Eliminates perceived hate speech/harmful content visible to the community on public channels.	Missed opportunity for community members to “self-police” the space, correct misinformation and show support.

Topic	Pros - No comments	Cons - No comments
Communication & Information Sharing		• Reduces perception of local government transparency / gives impression that local government isn't interested in hearing from the community. • May breed misinformation as information is shared and comments occur in other spaces where the city cannot comment or clarify. Moves responsibility onto council or other residents to clarify misinformation. • Cannot run Ads or use Facebook Events* to promote events or programs. <i>* Heavily used by Recreation other depts.</i>

Topic	Pros - No comments	Cons - No comments
Engagement		• Removes a popular channel for collecting public input and listening to community. No other channels have the same reach & audience. • Silences "fans" of popular content (Farmers Market, Rec, Water, etc.) • Additional barriers to users getting clarification on information posted. Instead of commenting, must send a direct message (DM), make a call or send an email. Added barrier will mean many people do not seek clarification.

Topic	Pros - No comments	Cons - No comments
Alignment with Core Values: • Equitable • Lead the Way • Community-centered • Responsive • Stewardship	• Equitable: Turning off comments may reduce offensive comments and reflect an increased commitment to equity for people viewing the posts.	• Equitable: Turning off comments could lead to <u>inequity</u>, by removing an accessible space to ask questions or raise concerns. Related Accessibility concerns: Many community members may have difficulty or lack of knowledge of more traditional public participation (attending meetings, calling council rep, emailing staff, etc.) • Responsive: Makes it more difficult for staff to respond to questions/concerns. • Community Centered: Could be perceived as muting voices of the community.

Topic	Pros - No comments	Cons - No comments
Staff Workload:	• Reduces time needed to monitor posts. • Reduces emotional labor required to manage, review and respond to comments on viral posts.	• Eliminates the ability to automate publishing, requiring staff to manually publish each post and disable comments. This increases workload and complicates coverage during PTO and absences, given Richfield's small communications team (1.6 FTE). • Increases pressure on staff time and budgets to develop and facilitate other ways to collect input from residents. • Increases staff time spent developing new strategies for promoting events and communicating with attendees.



Staff feedback

- When asked, **city staff across all departments strongly prefer to keep the ability to comment on our city channels.** Staff acknowledge the frustration and pain caused by hurtful comments but see the benefits of two-way communications as far more beneficial to their work.

Staff Recommendation:

Given the best practice recommendations from local and national sources, the need for ongoing city engagement tools and input from staff, **we recommend allowing comments on posts for all platforms.**



Molly McElroy
Very well deserved! 🥰

1w Like Reply Hide



Sarah Wanes
Soooo proud of you, Maria! Thank you!!!

1w Like Reply Hide



Penelope Parker-Tower
So wonderful! Thank you, Maria!

1w Like Reply Hide



Ryan Sparker
Congratulations 🎉👏 thank you 🥰

1w Like Reply Hide



Delia
Everyone? Even senior citizens?
No.
No they absolutely were not.
Forgotten again.
#inclusionisnotathingforseniors

1w Like Reply Hide

View all 6 replies

Discussion:

1. What have you heard from residents on this topic? How many residents have contacted you with concerns about social media comments? Do they understand the implications of removing social media comments?
2. What is the end-goal of removing comments?
3. If social media comments were not available, how would you, as council members, gather public input on topics?
 - Comprehensive Plan
 - Strategic Plan
 - Policy change related to sidewalks / boulevard trees / etc.



Report Prepared By:

Karl Huemiller, Recreation Director

Department Director:

Karl Huemiller, Recreation Director

Item for Consideration:

Natural Resources Management Plan

EXECUTIVE SUMMARY

Richfield has more than 300 acres of natural areas in parks, the majority of which are in four parks: Richfield Lake Park, Taft Park, Veterans Park, and Wood Lake Nature Center. Each year, the City receives frequent requests related to the maintenance of these natural areas, as well as inquiries from residents and partner organizations seeking volunteer opportunities to support ecological stewardship.

Significant county, state, and federal resources, including technical assistance and grant funding, are available to support the long-term care of natural resources. However, access to many of these programs requires the City to have a formal Natural Resources Management Plan. Richfield has not previously had such a plan. This has limited the City's ability to pursue funding and partnerships or to provide consistent maintenance across the sites.

To address this need, City staff have contracted with Great River Greening to develop Richfield's first Natural Resources Management Plan. Great River Greening brings extensive technical experience in ecological planning and restoration, having prepared Natural Resources Management Plans for several Minnesota cities, including Crystal, Saint Louis Park, and Woodbury. They have also been working with staff on grant-funded natural resources projects at Wood Lake Nature Center.

The purpose of the Natural Resources Management Plan is to establish clear goals, priorities, and a long-term framework for managing the City's natural areas in a way that balances ecological health, recreation, and community expectations. The draft plan outlines existing conditions, key challenges, and recommended objectives for each of the City's major natural areas, along with a phased approach for achieving those objectives. Cost estimates will be added once the goals and phasing have been further refined. When a more complete draft is ready, it will be published for public review and comment.

RECOMMENDED ACTION

Staff is looking for feedback related to the goals for each site in the Natural Resources Management Plan.

HISTORICAL CONTEXT

EQUITABLE OR STRATEGIC CONSIDERATIONS OR IMPACTS

Having a Natural Resources Management Plan will help to manage the City's natural areas in a sustainable way based on long-term objectives.

POLICIES (RESOLUTIONS, ORDINANCES, REGULATIONS, STATUTES, ETC.)

None

CRITICAL TIMING ISSUES

None

FINANCIAL IMPACT

The Natural Resources Management Plan will provide guidance on the cost and phasing on natural resources work in the identified parks. The plan will be an important resource when applying for grants.

LEGAL CONSIDERATIONS

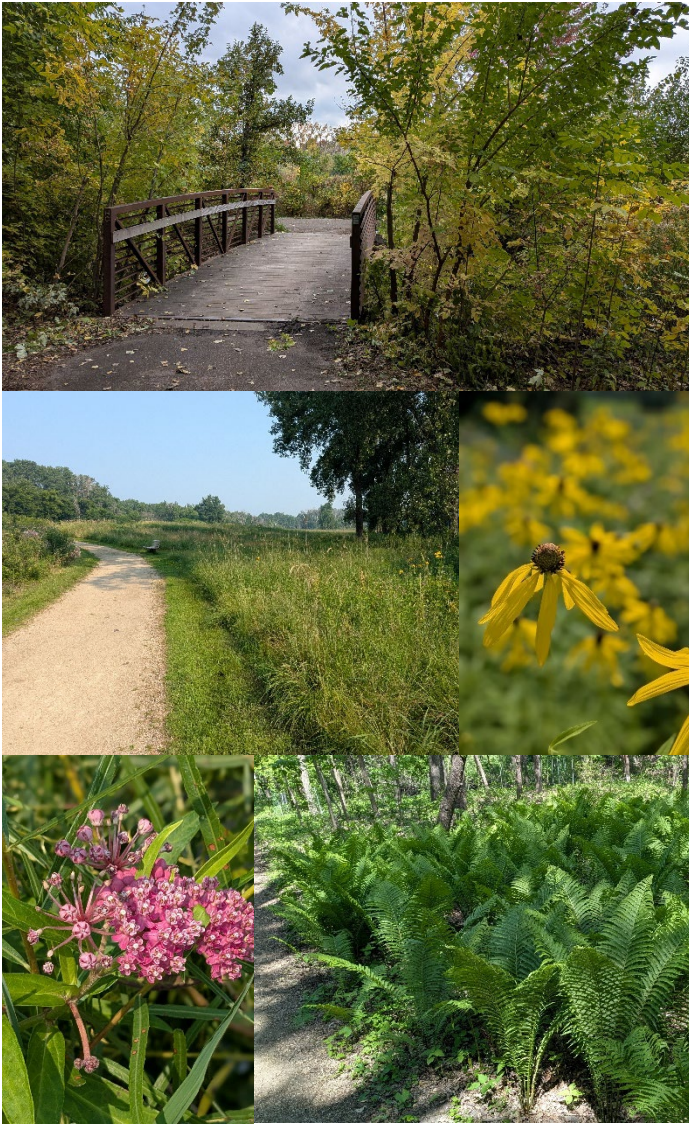
None

ALTERNATIVE RECOMMENDATION(S)

None

ATTACHMENTS

1. Draft Natural Resources Management Plan
2. Natural Resources Management Plan Council Work Session Presentation



NATURAL RESOURCE MANAGEMENT PLAN

CITY OF RICHFIELD

Richfield Lake Park, Veterans Memorial
Park, Taft Park, and Wood Lake Nature
Center

Karl Huemiller

Great River Greening

2026

DRAFT

Natural Resource Management Plan:

City of Richfield

Richfield Lake Park, Veterans Memorial Park, Taft Park,
and Wood Lake Nature Center

Prepared for: The City of Richfield

Prepared by: Great River Greening, March 2026

Contributing Authors:
Rebecca Tucker
Evelyn Moran



Suggested Citation: Great River Greening, 2026. Natural Resource Management Plan: City of Richfield, Richfield Lake Park, Veterans Memorial Park, Taft Park, and Wood Lake Nature Center.

Front Cover Images taken by Rebecca Tucker: Entrance bridge at Richfield Lake Park, path and prairie at Wood Lake Nature Center, gray-headed coneflower (*Ratibida pinnata*) at Veterans Lake Park, swamp milkweed (*Asclepias incarnata*) at Taft Lake Park, and ostrich fern (*Matteuccia struthiopteris*) at Wood Lake Nature Center.

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Evelyn started as an ecologist as a part of Great River Greening's Conservation Program staff in 2023 and has since transitioned into the metro regional project manager role. She is responsible for preliminary site assessments, assisting with development and design of restoration management, conducting vegetation surveys, pollinator habitat assessment, and cultivating long-term relationships for each project. At UW-Madison, Evelyn studied the suitability of wild rice habitat (*Zizania palustris* and *Zizania aquatica*) which involved water quality monitoring, vegetation surveys, climate modeling, and invasive species control. His research provides a framework to implement innovative restoration management strategies that are both technically feasible and scientifically valid.

GREAT RIVER GREENING

Great River Greening's mission is to secure the legacy of Minnesota land and water through community-based restoration, stewardship, and partnership, striving to improve Minnesota's natural resources, protect clean air and water, and increase community access to sustainable open space.

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1. Executive Summary

Project description

The City of Richfield seeks to improve the quality of its existing vegetation through ecological restoration and management efforts. This Natural Resources Management Plan (NRMP) identifies the City's natural resource management goals for Richfield Lake Park, Taft Park, Veterans Memorial Park, and Wood Lake Nature Center, and serves as a guideline and resource for those important tasks. The natural landscapes in these public parks support a vast range of ecological functions including pollinator and wildlife habitat, carbon storage, water filtration, flood regulation, and the development and enrichment of soil. Land use intensification has significantly reduced native plant community habitats. Great River Greening's assessment of the project sites provides information on the existing plant community structure and informs restoration recommendations. Restoration of these project sites will support pollinator foraging resources, water quality and streambank erosion, pollutant uptake from urban surface runoff, climate resiliency, and overall visual enhancement of this public outdoor space.

The focus area for this document includes over 300 acres of publicly accessible woodland, floodplain, shoreline, and open water. The four sites of interest will be referred to as Richfield Lake Park, Veterans Memorial Park, Taft Park, and Wood Lake Nature Center for the duration of the management plan. However, vegetation inventories and management recommendations are specific to the project boundaries defined in Figure 1. The hydrology of the focus areas and all wetland or lake specific habitat and restoration is beyond the scope of this document. This management plan is guided by existing vegetation, soils, and topography and will provide guidance on woody invasive control, debris and hazard tree removal, understory enhancement, invasive herbaceous control, shoreline enhancements, and turf to prairie conversion throughout project units. The recommendations of each management unit should be considered the initial phase of a long-term commitment to land management.

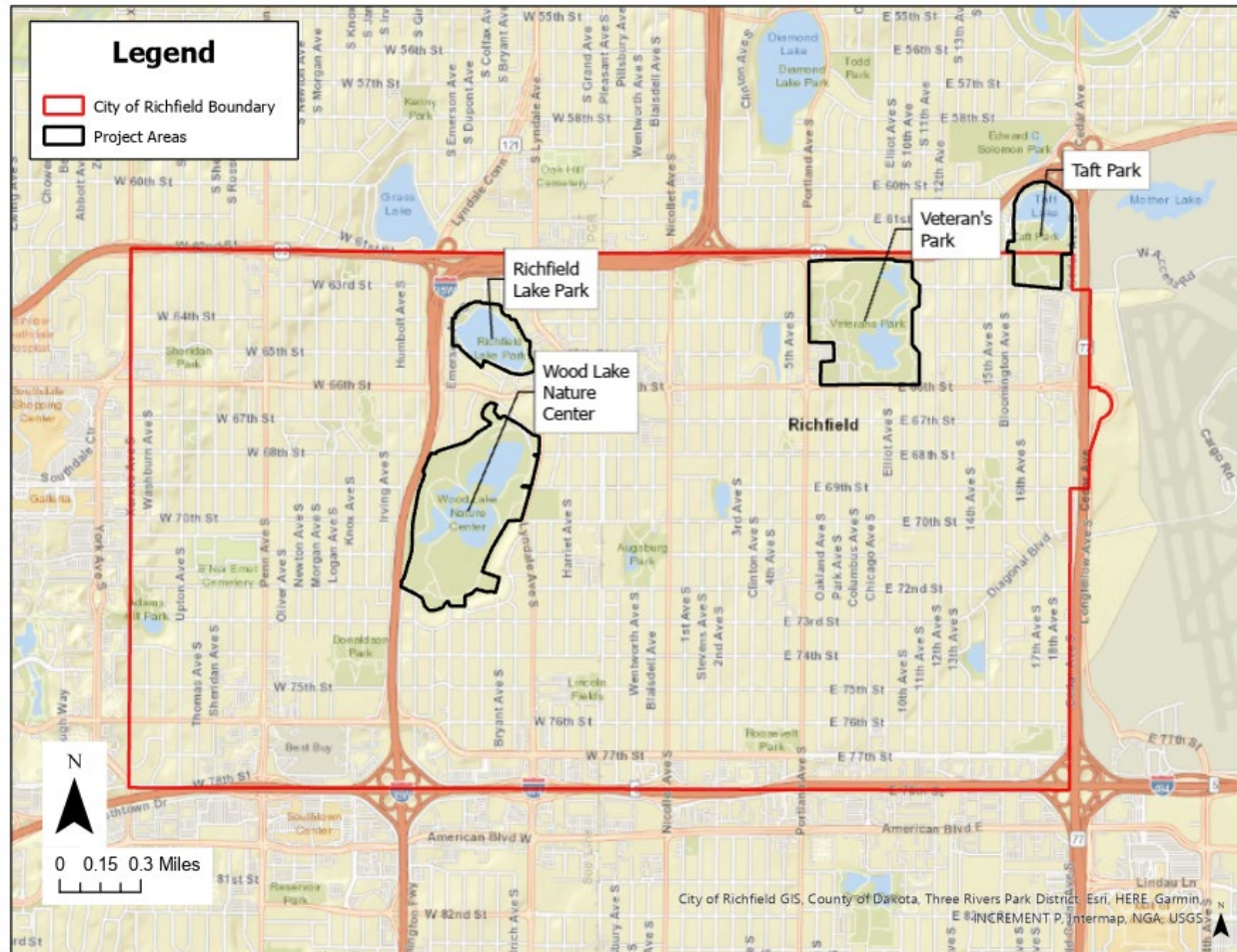
2. General City Background and Context

2.a. Location of city in relation to region.

The City of Richfield is located northwest of the Minnesota River between Minneapolis and Bloomington in Hennepin County, Minnesota. It is bordered by Highways 62 and 77 and Interstate 494 with Interstate 35W passing through the center. As part of the Saint Paul – Minneapolis metropolitan area, Richfield primarily consists of residential and commercial land use with a population greater than 36,000. Of the approximately 7 sq miles of city area, the City of Richfield's park system currently consists of 450 acres of designated park land throughout 23 park sites¹.

Much of the current parklands were previously farmed in the early 1900s or were areas adjacent to bodies of water leading to limited areas unimpacted by land-use or development in the recent century. The park system began development in the 1960's and 70's after the suburb's mid-century population boom and highway development, with the 150-acre Wood Lake Nature Center opening in 1971, establishing one of the earliest public environmental educational facilities in the Twin Cities^{2,3}. Continued expansion of the public spaces in the city now provide natural spaces throughout this residential city that serve as corridors for the movement of wildlife and protection of natural resources as well as areas of outdoor recreation for the community.

2.b. Location of parks within city



City of Richfield NRMP - 4-Park Site Context



Figure 1. Location of project sites Richfield Lake Park, Veterans Memorial, Taft Park, and Wood Lake Nature Center within the City of Richfield.

The four parks of focus in this NRMP are Richfield Lake Park, Veterans Memorial Park, Taft Park, and Wood Lake Nature Center. These parks sit directly or adjacent to several of the main roadways and are under the flight path of the Minneapolis-Saint Paul International Airport. The prominent lakes in the four focus parks, Richfield Lake, Legion Lake, Wood Lake, and Taft Lake, respectively, are managed for habitat, recreation, water retention and stormwater management. Open water areas and wetlands will not be addressed directly in this NRMP beyond the shorelines and adjacent upland habitats.

2.c. Broad summary of resource threats and management goals

These parks broadly represent a widely visited “mixed-use” urban park system. The native or unmanaged areas of the parks are heavily impacted by both the park design and activities, turf lawns mowed for public access or paved parking lots with impermeable surfaces, as well as by the surrounding urban landscape and share several common themes for conservation concern. The established, mature vegetation, primarily mature trees, and developed or stewarded “natural” areas have some degree of resilience against external threats to the resources which city staff, and public volunteers are working to

maintain and steward. However, several potential pressures are worth noting, as they have potential to affect both the current and restored conditions.

Invasive Species

Any site in an urban context is prone to an array of invasive species vectors. In Richfield, there are pre-existing infestations of invasive species that have the potential to spread and migrate around the site. In addition to these “internal” populations, seeds may be introduced to the site via pedestrian traffic (shoes, dogs, etc.), equipment used to maintain the site and potentially spread by wind or wildlife in the case of many invasive species. It is recommended that any efforts to manage the site prioritize invasive removal site-wide, and that early detection and mitigation of invasive species be considered an ongoing maintenance priority. Long term, the best protection against invasive species is to establish a robust, competitive native vegetation because this makes the site less prone to colonization by invasive species that create a monoculture.

The prominent set of problematic plant species that may suppress or negatively impact native habitats throughout these four parks are common to Minnesota and the Twin Cities, consisting of but not limited to the exotic and invasive shrubs (common and glossy buckthorn, multiple honeysuckles), grasses (reed canary grass), forbs (garlic mustard, purple loosestrife), and trees (black locust, Siberian elm). More details on specific populations in each park can be found in their respective sections, and a larger list of potential species with their management recommendations can be found in Appendix F: Invasive and Noxious Terrestrial Plant Management.

Climate change and shifting weather patterns

The effects of climate change may be difficult to predict with accuracy, but scientific consensus indicates warming global temperatures have already and will continue to influence localized conditions here in Minnesota⁷. Recent years have seen increased incidents of 100- and 500-year floods, followed by prolonged significant drought in 2022 and 2023⁶. Increases in average temperatures and degree days are also projected to increase, which may alter the viability of native species and their ability to survive and thrive in our environment⁵. Given this threat, future revegetation may favor what is termed “accelerated migration,” meaning selection of plants that have a demonstrated tolerance of climatic conditions that resemble what we may experience in our local area. Enhancing landscapes to be more resilient to drought (prairies and oak savannas) is a recommended strategy⁴. Another potential impact of climate-driven weather events is the potential for problematic conditions (prolonged drought, flooding, etc.), that in addition to impacting survival of some species, may make it difficult to execute management in a conventional way, meet deadlines, and keep activities within cost parameters.

Public disturbance

As a well-utilized public park system, many of these sites see a significant amount of foot traffic. It is worth noting that there are several natural areas where individuals have altered the site to create unsanctioned foot trails or adjacent landowners have encroached on city property, as well as some areas where native plantings have been started but overall management of adjacent areas have superseded or degraded the establishment of the plants. While some of this activity may have been done with good intention, it can run counter to the larger habitat management goals of the sites and should be addressed.

Larger efforts to leverage the interest on the part of park users to engage in the restoration of the site according to the management objectives set forth by the city, with the goal of providing viable and appropriate ways for the community to interact with the site, may steward connection to these restored or enhanced areas. This could take shape as volunteer planting events, construction of city-sanctioned soft trails using chipped material from restoration activities (woody removals), signage explaining newly installed plantings, etc. Communication and engagement with the public will be essential for the long-term success of restoration activities.

Erosion

Both climate and pedestrian activity may contribute to increased risk of erosive activity in high trafficked areas with limited native vegetation. Management strategies should include robust understory vegetation installation and may require erosion control blanketing for successful establishment. Pedestrian accessible areas should be clearly defined to avoid trampling or encroaching management efforts (i.e. mowing) which create more opportunities for runoff. Removal of invasive brush and subsequent revegetation are also important activities to reduce erosive effects, particularly adjacent to wetlands or low-lying areas.

3. RICHFIELD LAKE PARK

3.a. Project Site Vegetation and Habitat Assessment

Figure 1. General location of Richfield Lake Park project boundary within the City of Richfield, MN.

Richfield Lake Park is 24 acres of city parkland dominated by Richfield Lake, with approximately 1 mile of paved walking trails on an elevated causeway surrounding the lake and a developed play area with a basketball half-court. Multiple neighborhood entrance points provide pedestrian access to this park, which is ringed with both residential and business properties. The manageable upland habitat of Richfield Lake Park covers only 10.3 acres, with inaccessible islands scattered throughout the lake. This upland habitat extends on both sides of the narrow walkway as well as on the outer shoreline, frequently sharing property boundaries with private homes or apartment complexes. Some access exists to these outer shoreline upland areas, but many areas are steep with no direct connection to public property.

The following summary of vegetation structure reflects the dominant and notable species identified throughout the 2025 growing season at Richfield Lake Park and does not reflect a comprehensive survey of all species within the project site.

Table 1. Terrestrial vegetation observed at Richfield Lake Park throughout fall, 2025.

	Scientific Name	Common Name	Nativity
Canopy	<i>Acer negundo</i>	Box Elder	Native
	<i>Morus alba</i>	White Mulberry	Non-native, Invasive
	<i>Populus deltoides</i>	Cottonwood	Native
	<i>Populus tremuloides</i>	Quaking Aspen	Native, weedy
	<i>Fraxinus pennsylvanica</i>	Green Ash	Native
	<i>Acer saccharum</i>	Sugar Maple	Native

	<i>Ulmus americana</i>	American Elm	Native
	<i>Acer saccharinum</i>	Silver Maple	Native
	<i>Quercus macrocarpa</i>	Bur Oak	Native
	<i>Ulmus pumila</i>	Siberian Elm	Non-native, Invasive
	<i>Salix interior</i>	Sandbar Willow	Native
	<i>Salix petiolaris</i>	Slender Willow	Native
	<i>Quercus bicolor</i>	Swamp White Oak	Native
Sub-canopy	<i>Rhamnus cathartica</i>	Common Buckthorn	Non-native, Invasive
	<i>Sambucus canadensis</i>	Common Elderberry	Native
	<i>Salix eriocephala</i>	Heart-Leaved Willow	Native
	<i>Cornus rugosa</i>	Round-Leaved Dogwood	Native
	<i>Cornus sericea</i>	Red-Osier Dogwood	Native
	<i>Apocynum cannabinum</i>	American Hemp	Native
Ground vegetation	<i>Impatiens capensis</i>	Spotted Touch-Me-Not	Native
	<i>Sicyos angulatus</i>	Bur Cucumber	Native
	<i>Ageratina altissima</i>	White Snakeroot	Native
	<i>Arctium minus</i>	Common Burdock	Non-native, Invasive
	<i>Leonurus cardiaca</i>	Common Motherwort	Non-native, Invasive
	<i>Melilotus albus</i>	White Sweet Clover	Non-native, Invasive
	<i>Solidago canadensis</i>	Canada Goldenrod	Native
	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native
	<i>Circaea canadensis</i>	Common Enchanter's Nightshade	Native
	<i>Maianthemum racemosum</i>	Common False Solomon's Seal	Native
	<i>Urtica dioica</i>	Stinging Nettle	Native
	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	Native
	<i>Calystegia sepium</i>	Hedge Bindweed	Native
	<i>Verbena stricta</i>	Hoary Vervain	Native
	<i>Fragaria virginiana</i>	Common Strawberry	Native
	<i>Lythrum salicaria</i>	Purple Loosestrife	Non-native, Invasive
	<i>Asclepias syriaca</i>	Common Milkweed	Native
	<i>Vitis riparia</i>	Wild Grape	Native
	<i>Ambrosia trifida</i>	Great ragweed	Native

Minnesota Land Cover Classification System (MLCCS)

The Minnesota Land Cover Classification System (MLCCS) cover types for Richfield Lake Park are shown in Table 6 and Figure 3. Although this classification system informs our understanding of site composition and habitat complexes, technological limitations of MLCCS and land use changes should be considered to accurately depict current conditions. Due to the rapidly changing nature of urban parks and redundancies amongst code definitions, the MLCCS cover types were condensed and simplified into general land use categories and descriptions for Richfield Lake Park.

The MLCCS survey identified fourteen different land cover types representing five general land use types within the project boundary (Table 6). Most of the site is mapped as altered, non-native deciduous woodland and palustrine open water, with mixed emergent marsh habitat scattered along the northern shoreline. The deciduous woodlands at Richfield Lake Park have seen significant disturbance with land use intensification, resulting in non-native encroachment and poor habitat quality overall. Richfield Lake surface water flows southbound to Wood Lake, and all water levels are managed. Seasonal flooding is evident in areas of the site, identified as mixed emergent marsh habitat and intermittently exposed non-native vegetation in Figure 3. Recreational land use, consisting of a playground, basketball court, turf grass, and paved trails, occurs in the northwest corner of the project area, classified as short grasses on upland soils.

Table 2. Minnesota Land Cover Classification System codes throughout Richfield Park, Richfield, MN

Map ID	MLCCS Codes	Category	MLCCS Code Name/Description
1	52220, 42130, 42210	Woodlands	Altered/non-native deciduous woodland and shrubland with temporary flooding exists throughout 33% of the project area.
2	23211, 13114	Maintained short grasses	Short grasses on upland soils with sparse canopy and impervious cover exists throughout 2% of the project area.
4	14122, 14113, 14123	Buildings and Pavement	Buildings and pavement exist throughout 4% of the project area.
5	14214	Transitional Land	Other exposed/transitional land with minimal impervious cover exists throughout 1% of the project area.
6	93300	Open Water	Palustrine open water exists throughout 37% of the project area.
7	61730, 61480, 61520, 61620	Wetlands	Seasonally flooded mixed emergent marsh with altered/non-native graminoid vegetation exists throughout 23% of the project area.



Minnesota Land Cover Classifications System (MLCCS) Richfield Lake Park, Richfield, MN

Figure 2. Minnesota Land Cover Classification System codes throughout Richfield Park, Richfield, MN.

Minnesota DNR Native Plant Community Classification (MNDNR NPC)



Image 1. Wooded corridor along southern shoreline of Richfield Lake, Richfield, MN.

Native plant community (NPC) types are defined by dominant canopy trees, variation in substrate, or fine-scale differences in environmental factors such as moisture or nutrients, based on vegetation surveys collected between 1995 and 2003. While these NPCs describe remnant habitat structures that existed in this region of Minnesota, significant changes in land use throughout the surrounding metro have caused disturbance and fragmentation. Therefore, the following NPCs help to inform the historical, current, and target vegetation structure rather than define exact conditions. The nature of this site being within a disturbed metro landscape means it is faced with varying levels of habitat degradation, invasive species introduction, hydrologic regime shifts, and the suppressions of natural disturbance regimes required by native ecosystems, which is evident based on the vegetation composition (Image 1).

The current canopy includes flood tolerant species including silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), swamp white oak (*Quercus bicolor*), willows (*Salix spp.*), and common elderberry (*Sambucus canadensis*), indicating floodplain forest habitat (FFs59). Mesic hardwood indicator species exist throughout the project area including green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), boxelder (*Acer negundo*), and various dogwood species (*Cornus spp.*) (MHs49 and MHs37). Upland areas of open canopy contain more mesic to dry tolerant herbaceous species like hoary vervain (*Verbena stricta*) and Canada goldenrod (*Solidago canadensis*), indicative of dryer soil conditions (like a southern mesic prairie (UPs23). However, due to the fragmented nature of this habitat type and canopy goals of the site, this NPC will not directly guide restoration. Descriptions of primary native plant community types that are indicative of the dominant vegetation throughout Richfield Lake Park are provided below. Due to the density and composition of NPC indicator species, FFs59 Southern Terrace Forrest and MHs49 Southern Wet-Mesic Hardwood Forest will guide the target restoration plant community for the shoreline and upland areas at Richfield Lake Park, respectively, and is further outlined in the following sections.

Table 3. Primary MN DNR native plant community types indicative of the dominant vegetation at Richfield Lake Park, Richfield, MN.

NPC Code	NPC Code Name	Description
FFs59	Southern Terrace Forest	Wet-mesic deciduous forests on silty or sandy alluvium on level, occasionally flooded sites along small streams to large rivers in the southern half of Minnesota. Species composition is variable, but American elm, green ash, hackberry, basswood, box elder, silver maple, black ash, and cottonwood are often common. Swamp white oak is important in some stands in southeastern Minnesota.
MHs49	Southern Wet-Mesic Hardwood Forest	Rich, wet-mesic lowland hardwood forests on level silty alluvium in stream valleys and on level glacial till bordering lakes. Sites are protected from fire, and soils remain moist throughout the growing season.

3.b. Restoration Objectives

The overall management goals for Richfield Lake Park are to balance the recreational use of the space with ecological and environmental needs. Richfield Lake fills an important recreational role in the City, offering walking paths and lake views. It also provides important water-retention services and contains valuable habitat for a diverse range of wildlife and shoreline plant species. Narrow pathways and the largely inaccessible outer shoreline pose restoration challenges that will affect how the stated goals can be achieved. Ideal canopy structure currently exists on the east side of Richfield Lake and should be referenced for target canopy density as it allows visibility of the lake (Image X). Proposed management activities will consider the challenges of restoring a disturbed urban landscape and should continue to be evaluated as environmental conditions change over time. The priority outcome of all restoration areas is diverse, resilient, and sustainable plant communities that provide the desired recreational experience.

Within this context of urbanized natural habitats, there are several areas that group into the following management complexes defined in the unit descriptions in section 3.b.c. The restoration objectives below, and the following proposed activities and timelines for management and maintenance, may overlap between units where the targeted Native Plant Communities are similar.

Recreation Management Area Objectives

- ❖ Maintain a diversity of views of the lake for recreational users at benches and lake access points. Provide other views where feasible (Figure 3).
- ❖ Stabilize shoreline to reduce trail maintenance and shoreline erosion.
- ❖ Develop canopy to shade walking trail.
- ❖ Maintain a healthy natural space by removing invasive species and encouraging the growth of native plants at all forest levels.
- ❖ Protect Stormwater infrastructure
- ❖ Manage impacts of geese

Ecological Restoration Objectives

1. Restore and enhance upland woody habitat (MHs49 – Southern Wet-Mesic Hardwood Forest)
 - a. Strategies
 - i. Initial removal and continued control of invasive, hazard, and non-suitable trees and shrubs.
 - ii. Re-establish a native tree canopy cover of 50-100% after undesirable canopy removal.
 - iii. Maintain a representative age class to allow for regeneration.
 - iv. Prevent shoreline erosion through vegetation establishment.
 - v. Enhance understory diversity with deep rooted mesic-woodland grass, forbs, and shrub species native to Minnesota. See Appendix B for recommended species.
 - vi. Historical and existing native vegetation structure should be considered for future habitat enhancement species selection.
2. Restore and enhance shoreline habitat (FFs59 – Southern Terrace Forrest)
 - a. Strategies

- i. Initial removal and continued control of invasive, hazard, and non-suitable trees and shrubs.
 - ii. Re-canopy areas targeted for invasive, hazard, and undesirable woody removal to filter pollutants carried by runoff from the landscape into nearby surface water.
 - iii. Improve shoreline stabilization and soil health by planting deep rooted native floodplain species.
- 3. Reduction/mitigation of non-native and invasive species introduction
 - a. Strategies
 - i. Management of invasive vegetation prior to seed production is a priority to limit encroachment to areas with active control.
 - ii. Document location, density, and area of invasive populations with GIS.
 - iii. When feasible, use biological control.
 - iv. Where biological control is not available, use chemical and mechanical means to control.
 - v. Monitor infested areas for effectiveness of control.
 - vi. Provide education to community members and adjacent landowners regarding prevention and management.
- 4. Consider impacts to wildlife, habitat management, and visitor use of Richfield Lake Park
 - a. Strategies
 - i. Install signage of restoration and management activities at entry points that explain restoration activities and their importance to ecosystem health.
 - ii. When possible, remove or stack felled or dead trees away from trails.
 - iii. Provide access that is sensitive to surrounding landscape and minimizes impact on natural resources.



Image 2. Eastern shoreline with oaks at Richfield Lake Park in June 2026, representing ideal viewsapes from trail and target restoration ecosystem canopy density for shoreline work unit.



Richfield Lake Park Restoration Work Units



Figure 2. Target restoration ecosystems, by work unit, defined by MN DNR Native Plant Communities recommended for Richfield Lake Park, Richfield, MN.

3.c. Habitat Complexes and Management Comments

These habitat complexes are guided by the Native Plant Communities (NPC), defined by the MNDNR, and have been simplified to streamline the recommended management activities. Following the description of each habitat type, observations and commentary on the specifics of each identified management unit at Richfield Lake Park are discussed.

The following section also contains specific recommendations for the execution of management objectives at each work unit (Fig. 5). In each unit, observations are detailed based on observed conditions as of Fall of 2025. The recommended activities are proposed here generally as a sequential timeline, with high-disturbance activities such as woody debris and major invasive control being first priority, followed by subsequent follow-up measures and vegetation enhancement. Management comments should continue to be evaluated as environmental conditions change over time. A more structured presentation of the proposed activity timeline across the site is detailed in the cost summary table in section 3.d., with the per-unit tasks broken down in the table found in 3.e.. Recommended activities could be phased across a wider time frame, or by specific units per phase, as funding and capacity require, although it should be recognized that alignment of similar management activities chronologically across the entire site will likely provide increased efficiency and lower cost-per-acre, due to efficiency of scale. Long-term maintenance recommendations are broken down into 5-10- and 10-20-year recommendations in section 3.e., however, inflation changes should be considered. Section 3.f. lists recommended specifications related to the associated management actions. Refinement of exact specifications will still be required when any management guidance is translated into a request for proposals or implementation by city staff.

Target Ecosystem MHs49 – Southern Wet-Mesic Hardwood Forest

Work Unit 1: Upland Woodland

Description: The canopy in this unit is indicative of upland dry-mesic woodland, dominant with American elm, cottonwood, maples, green ash, and occasional bur oaks. The inner lowland boundary of this unit transitions into stormwater ponds with minimally fluctuating water levels. Occasional dead down woody debris is distributed throughout this unit resulting from historical stormwater restoration efforts. Avoid removing debris that is providing topsoil stabilization to prevent unnecessary erosion. Invasive species like Siberian elm and common buckthorn occur at variable densities and should be priority for removal. The canopy is also dense with native but aggressive species like boxelder and white mulberry. There is almost no understory vegetation in these dense areas, therefore, thinning of overabundant boxelders and mulberries will create opportunities for more diversity in the understory vegetation (see Image 1). A stormwater drain is located at the southernmost point of the unit containing native forbs, which



Image 3. Unit 1 woodland understory surrounding eastern access point at Richfield Lake Park.

could be a great opportunity for pocket prairie planting. The recreational turf area located on the northwest west edge of unit 1 will remain in its existing condition, but proximal work should consider the presence of park-users.

Management comments:

1. Disposal of existing woody debris is suggested to be conducted prior to woody invasive removal to maximize accessibility.
2. Cutting, treating, and removing woody herbaceous species like buckthorn, white mulberry, and Siberian elm is recommended in winter under frozen ground conditions.
3. Proactive and hazard tree removal should be conducted to prevent trail obstructions and could be done simultaneously with woody invasive control and disposal.
4. Continued thinning of weedy native trees like boxelder, silver maple, green ash, and American elm should be considered for this unit to maintain opportunity for successful native understory establishment and views. Based on current (2026) densities and high abundance of small saplings, the woodland unit could benefit from ~20% removal of each species without compromising shoreline stabilization.
5. Woody debris within a 6-foot buffer of wetland could be slashed and bucked up for erosion control and habitat structure purposes. If equipment can be used on frozen soils to minimize disturbance, this is preferred, but if growing season removal occurs, disturbed areas should be stabilized. This should be completed prior to any habitat enhancement.
6. Following woody removal and control of non-native herbaceous cover, the area should be seeded with native graminoids. Following satisfactory follow-up control of invasive species, native forbs could be added.
7. After the ground layer has received supplemental vegetation, the shrub layer could be enhanced
8. Continued spot maintenance of woody and herbaceous invasive species is required several years following initial removal to improve establishment of seeded areas.
9. Stinging Nettle (*Urtica dioica*) indicates that surplus nutrients may emerge and require multiple activities to prepare the site for reseeding.



Image 4. Hazard dead standing tree adjacent to path on eastern shoreline of Richfield Lake Park.

Target Ecosystem FFs59 – Southern Terrace Forrest

Work Unit 2: Shoreline

Description: Surface water exists on both sides of the paved walking trail throughout most of this work unit except for the southwest wooded shoreline, making erosion control a general priority for all restoration efforts. The southwest wooded shoreline has been minimally managed due to limited access

and wet soil conditions. Thinning of weedy trees like boxelder and mulberry is also recommended in this unit, however, indicator species like swamp white oak and bur oak makes the overstory a candidate for preservation. Dense monocultures of willows exist throughout much of the site, and replacement with native shrubs and trees is recommended to enhance diversity and reconnect the canopy after initial woody removals. The wooded shoreline surrounding the western access point becomes denser with silver maples and is like unit 1 in that understory is very shaded and bare. The northwest shoreline transitions into mixed emergent marsh habitat, containing herbaceous species like purple loosestrife that will require follow up treatment (see Image 2). Silver maple continues to be dominant in the canopy throughout the north and east side of the shoreline unit. Willows become very dense along the eastern shoreline where upland habitat narrows (see Image X).



Image 5 Emergent marsh habitat in northwest shoreline of Richfield Lake Park.

1. Several standing dead trees adjacent to the walking trail in the northern and eastern part of this unit should be considered for priority hazard removal (Image X). Dead down debris removal and disposal, especially along the southwest shoreline, should be kept to a minimum throughout this unit to maintain shoreline stabilization. Consider biochar production if onsite disposal when necessary.
2. There are several large trees overhanging the stormwater ponds, which should be removed to prevent stormwater infrastructure obstruction. Debris along the southwest shoreline should be bucked up and dispersed to provide shoreline stabilization or habitat piles.
3. Following hazard tree removal, the next target should be invasive trees and shrubs, especially common buckthorn, Siberian elm, and white mulberry.
4. This unit contains numerous mature cottonwoods and oaks. Although dense, removal of boxelders and silver maple should be less extensive compared to unit 1 to minimize non-target damage to these high-quality native trees and maintain erosion control.
5. Willows are highly dense throughout much of this unit, especially on the north side of the shoreline (Image X). They are providing a critical source of shoreline stabilization, therefore it is recommended to only remove small, isolated populations of willow, rather than large clonal stands. More aggressive willow removal will be conducted in the Open Canopy subunit of the shoreline, explained below.



Image 6. Dense willow suckers along narrow northeastern shoreline at Richfield Lake Park.

6. Following woody removal and control of non-native herbaceous cover, the area should be seeded with native graminoids. This would be an excellent time frame to have community shrub/tree planting effort to restore target canopy cover.
7. Following satisfactory follow-up control of invasive species, native forbs could be added.
8. After the ground layer receives supplemental vegetation, the shrub layer could be enhanced with native woody plantings.
9. Winter seeding in compact soil areas is recommended because foot traffic will be reduced, and freeze-thaw cycles tend to loosen soils and allow seed to migrate to establish good soil contact especially given the compacted soils where disturbance has occurred.

10. Maintain Bench Views & Open Canopy Area

- a. The stretch of shoreline indicated as open canopy on Figure X contains existing pockets of open canopy. However, density increases by the westernmost access point, obstructing visibility of bikes turning the corner (Image 7). This segment of the shoreline is dense with white mulberry and boxelder. Removal of 60% of the canopy around the trail curve is recommended to improve visibility.
- b. All woody species will be cut, treated, and removed within a 50-foot linear stretch in front (facing the lake) of all benches throughout unit 1 to maintain views.
- c. Interior sandbar willow should be cut and stump treated with an aquatic grade herbicide.
- d. The southern stretch of this subunit has two stormwater filtration infrastructure areas where the canopy must always remain open (50-ft diameter) for city access.
- e. Continued management of emerging herbaceous and woody invasive species will be necessary for understory establishment.
- f. Overseeding this area every fall with the recommended seed mix defined in Appendix B to encourage lakeshore edge diversity.
- g. Image X depicts the long-term target canopy cover around the shoreline to maintain views of the lake.



Image 7. Area indicated as 'Maintain Open Canopy' on the Richfield Lake Work Unit Map.

3.d. Restoration Management Phasing & Cost Estimate Summary

Total management costs* were based on 5-year management plans. Total 5-year costs for all vegetation management are \$XXX,XXX. Cost estimation is based on current 2025 market rates, subcontracting all implementation and necessary oversight, and the assumption that all management units are implemented concurrently. Management unit nuances may influence cost totals and should be considered.

**All prices are estimates based on current market rates at the time of writing. Estimates do not factor in any state dollars being used to perform activities. Due to new language change in statute as of August 1, 2024, any natural resource related projects need to follow state prevailing wage requirements. This change in state statute language will have an increase in actual costs.*

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Applicable Management Units
Dead down woody disposal	\$XX,XXX					1, 2
Hazard tree removal	\$XX,XXX					1, 2
Woody invasive control	\$XX,XXX	\$X,XXX	\$X,XXX	\$X,XXX		1, 2
Establishment maintenance	\$XX,XXX	\$X,XXX	\$X,XXX	\$X,XXX	\$3,900	1, 2
Herbaceous invasive control		\$X,XXX				1, 2
Non-native grass removal		\$X,XXX				1, 2
Woody follow up maintenance		\$X,XXX	\$X,XXX			1, 2
Reed canary grass control		\$X,XXX	\$X,XXX	\$X,XXX		1, 2
Plant native savanna trees		\$X,XXX	\$X,XXX	\$X,XXX	\$600	1, 2
Understory seeding		\$X,XXX	\$X,XXX	\$X,XXX	\$1,800	1, 2
Plant native pollinator shrubs			\$X,XXX			1, 2
Reseeding			\$X,XXX			1, 2
Shoreline buffer plantings			\$X,XXX	\$X,XXX	\$X,XXX	1, 2
Planting of native trees and shrubs				\$X,XXX	\$X,XXX	1, 2
Total	\$XXX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$X,XXX	\$XXX,XXX

3.e. Management Unit Recommendations

Note: Priority index is on a scale from 1 to 5 (1=high priority, 5=low priority).

Existing Land Cover Types	Acres	Target Land Cover	Recommended Actions	Priority Index	Year 1	Year 2	Year 3	Year 4	Year 5	Assumptions and Notes
Management Unit 1										
Altered/non-native mesic hardwood	4.3	Upland woody habitat (MHs49 – Southern Wet-Mesic Hardwood Forest)	Woody invasive control	1	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		Cut, treat, pile, burn on site or chip
			Hazard tree removal	2	\$XX,XXX					Haul off or chip for trails
			Dead down woody disposal	1	\$XX,XXX					
			Reed canary grass control	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		Two treatments year 2, Rx burn year 3, final spray and seeding year 4
			Understory seeding	3		\$XX,XXX		\$XX,XXX		Seed understory after BT removal, seed grasslands after RCG removal
			Planting of native trees and shrubs	4				\$XX,XXX	\$XX,XXX	Plant year 4, maintenance year 5
Management Unit 2										
Altered/non-native mesic hardwood	6	Shoreline habitat (FFs59 – Southern Terrace Forrest)	Dead down woody disposal	1	\$XX,XXX					SWWD is conducting management in this area. Chip into walking trail
			Hazard tree removal	1	\$XX,XXX					
			Seed, Blanket, Cover Crop	2			\$XX,XXX			Seeding should be accompanied by some form of erosion control
			Woody invasive control	1	\$XX,XXX	\$XX,XXX				

3.f. Long Term Maintenance Recommendations

While it can be difficult to accurately forecast longer term maintenance needs once the initial restoration phase is complete, provided here are estimates of likely activities that may be necessary to maintain the sites and continue to enhance the diversity and floristic quality of the management units.

Management Units	Activity	Year 5-10 Cost Estimate*	Year 10-20 Cost Estimate*
All	Invasive control	\$XX,XXX	\$XX,XXX
All	Enhancement plantings and maintenance	\$XX,XXX	\$XX,XXX
All	Prescribed burn or burn alternative	\$XX,XXX	\$XX,XXX
All	Invasive control	\$XX,XXX	\$XX,XXX
All	Booster seedings	\$XX,XXX	\$XX,XXX
All	Tree maintenance and replacement	\$XX,XXX	\$XX,XXX
Totals		\$XX,XXX	\$XX,XXX

**Cost estimates here do not reflect inflation, changes to market rates for services, etc., but are intended to provide a relative reference point for longer-term maintenance needs.*

4. VETERANS MEMORIAL PARK

4.a. Project Site Vegetation and Habitat Assessment



Veteran's Memorial Park and Project Area Overview

Richfield, Minnesota



Figure 6. General location of Richfield Lake Park project boundary within the City of Richfield, MN.

Veterans Memorial Park is 106 acres of city parkland located directly south of highway 62, dominated by Legion Lake, with over three miles of paved walking trails meandering through various degrees of developed land use. The western portion of Veterans Memorial Park consists of approximately 30 acres of recreational amenities including mini golf, playgrounds, and athletic facilities. Multiple neighborhood entrance points provide pedestrian access to this park which is ringed with both residential and business properties. The following management recommendations focus on the eastern portion of Veterans Memorial Park, dominated by a mosaic of woodland, turf grass, prairie, wetland, and aquatic habitat. The primary objectives for the 57 acre project area include removal of invasive woody and herbaceous species and enhancement of native plant diversity to improve overall habitat quality for wildlife. The eastern edge of the project area frequently shares property boundaries directly adjacent to private

homes or apartment complexes, however, access roads into the project area exist on all sides of the park.

The following summary of vegetation structure reflects the dominant and notable species identified throughout the 2025 growing season at Veterans Memorial Park and does not reflect a comprehensive survey of all species within the project site.



Image 8. View of woodland turf interface on east side of Legion Lake, Veterans Memorial Park, Richfield, MN.

Table 8. Terrestrial vegetation observed at Veterans Memorial Park throughout Fall 2025.

	Scientific Name	Common Name	Nativity
Canopy	<i>Juglans nigra</i>	Black Walnut	Native
	<i>Acer negundo</i>	Box Elder	Native
	<i>Morus alba</i>	White Mulberry	Non-native, Invasive
	<i>Acer saccharinum</i>	Silver Maple	Native
	<i>Celtis occidentalis</i>	Hackberry	Native
	<i>Ulmus americana</i>	American Elm	Native
	<i>Populus tremuloides</i>	Quaking Aspen	Native, weedy
	<i>Fraxinus pennsylvanica</i>	Green Ash	Native
	<i>Salix alba</i>	White Willow	Non-native, Invasive
	<i>Ulmus pumila</i>	Siberian Elm	Non-native, Invasive
	<i>Catalpa speciosa</i>	Catalpa	Native to SE US
	<i>Tilia americana</i>	Basswood	Native
	<i>Salix nigra</i>	Black Willow	Native
	<i>Salix amygdaloides</i>	Peach-Leaved Willow	Native
	<i>Gleditsia triacanthos</i>	Honey Locust	Native
	<i>Acer ginnala</i>	Amur Maple	Non-native, Invasive
	<i>Populus deltoides</i>	Cottonwood	Native

Sub-Canopy	<i>Sambucus canadensis</i>	Common Elder	Native
	<i>Rhamnus cathartica</i>	Common Buckthorn	Non-native, Invasive
	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Non-native, Invasive
	<i>Salix interior</i>	Sandbar Willow	Native
	<i>Sambucus racemosa</i>	Red-Berried Elder	Native
	<i>Prunus americana</i>	Wild Plum	Native
	<i>Ribes americanum</i>	Wild Black Currant	Native
	<i>Cornus sericea</i>	Red-Osier Dogwood	Native
	<i>Lonicera morrowii</i>	Morrow's Honeysuckle	Non-native, Invasive
Ground vegetation	<i>Impatiens capensis</i>	Spotted Touch-Me-Not	Native
	<i>Viola sororia</i>	Common Blue Violet	Native
	<i>Ageratina altissima</i>	White Snakeroot	Native
	<i>Solidago canadensis</i>	Canada Goldenrod	Native
	<i>Urtica dioica</i>	Stinging Nettle	Native
	<i>Arctium minus</i>	Common Burdock	Non-native, Invasive
	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native
	<i>Hackelia virginiana</i>	Virginia Stickseed	Native
	<i>Alliaria petiolata</i>	Garlic Mustard	Non-native, Invasive
	<i>Solanum ptychanthum</i>	Black Nightshade	Native, weedy
	<i>Cirsium arvense</i>	Canada Thistle	Non-native, Invasive
	<i>Leonurus cardiaca</i>	Common Motherwort	Non-native, Invasive
	<i>Asclepias syriaca</i>	Common Milkweed	Native
	<i>Asclepias incarnata</i>	Swamp Milkweed	Native
	<i>Ratibida pinnata</i>	Gray-Headed Coneflower	Native
	<i>Nepeta cataria</i>	Catnip	Non-native, weedy
	<i>Lythrum salicaria</i>	Purple Loosestrife	Non-native, Invasive
	<i>Verbena urticifolia</i>	White Vervain	Native
	<i>Heliopsis helianthoides</i>	Ox-Eye	Native
	<i>Polygonatum biflorum</i>	Giant Solomon's Seal	Native
	<i>Verbena stricta</i>	Hoary Vervain	Native
	<i>Sarracenia purpurea</i>	Pitcher Plant	Native
	<i>Circaea canadensis</i>	Common Enchanter's Nightshade	Native
	<i>Rudbeckia hirta</i>	Black-Eyed Susan	Native
	<i>Veronicastrum virginicum</i>	Culver's Root	Native
	<i>Rudbeckia triloba</i>	Three-Leaved Coneflower	Native
	<i>Symphotrichum lateriflorum</i>	Side-Flowering Aster	Native
	<i>Securigera varia</i>	Crown Vetch	Non-native, Invasive
	<i>Acalypha rhomboidea</i>	Three-Seeded Mercury	Native
	<i>Utricularia vulgaris</i>	Common Bladderwort	Native
	<i>Verbascum thapsus</i>	Common Mullein	Non-native, Invasive
	<i>Solanum dulcamara</i>	Bittersweet Nightshade	Non-native, Invasive
	<i>Cirsium vulgare</i>	Bull Thistle	Non-native, Invasive
	<i>Agastache foeniculum</i>	Blue Giant Hyssop	Native

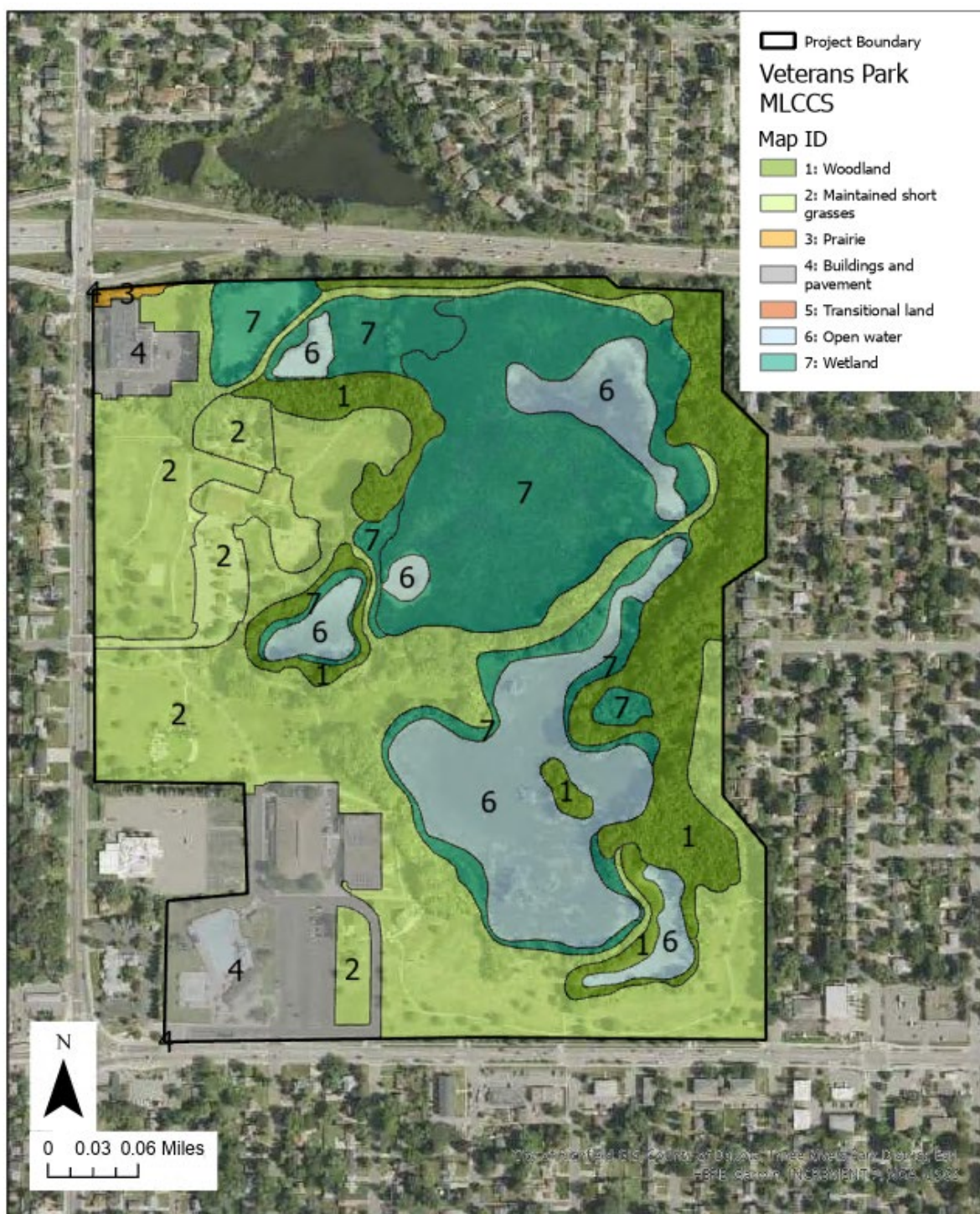
Minnesota Land Cover Classification System (MLCCS)

The Minnesota Land Cover Classification System (MLCCS) cover types for Veterans Memorial Park are shown in Table 6 and Figure 3. Although this classification system informs our understanding of site composition and habitat complexes, technological limitations of MLCCS and land use changes should be considered to accurately depict current conditions. Due to the rapidly changing nature of urban parks and redundancies amongst code definitions, the MLCCS cover types were condensed and simplified into general land use categories and descriptions for Veterans memorial Park.

The MLCCS survey identified fifteen different land cover types representing six general land use types within the project boundary (Table 9). All terrestrial land use types are classified as altered including recreational turf throughout the western portion of the site, deciduous woodlands, and seasonally flooded wetland vegetation with urban soils and varying degrees of non-native vegetation encroachment. Woodlands with areas of significant hazard trees and dead down debris border most of the trails and wetlands. A network of paved trails exists throughout upland areas of the park. Areas with turf grass and buffers around trails are currently mowed by the City of Richfield. Seasonal flooding is evident surrounding the retention ponds on the northwest and southeast edges of Legion Lake that were previously natural wetland, identified as mixed emergent marsh habitat and intermittently exposed non-native vegetation in Figure 3.

Table 9. Minnesota Land Cover Classification System codes throughout Veterans Memorial Park, Richfield, MN.

Map ID	MLCCS Codes	Category	MLCCS Code Name/Description
1	52540, 42310, 42210	Woodlands	Altered/non-native deciduous woodland and shrubland with temporary to semi-permanent flooding exists throughout 14% of the project area.
2	23211, 13221, 13241	Maintained short grasses	Mowed turf grass on upland soils with sparse canopy and impervious cover exists throughout 39% of the project area.
3	23112	Prairie	Long grasses with sparse tree cover on upland soils exist throughout 0.2% of the project area.
4	14122, 14113, 14123	Buildings and Pavement	Buildings and pavement exist throughout 10% of the project area.
5	-	Transitional Land	-
6	93300	Open Water	Palustrine open water exists throughout 15% of the project area.
7	61630, 61530, 61630, 61730, 61480	Wetlands	Seasonally flooded mixed emergent marsh with altered/non-native vegetation exists throughout 22% of the project area.



Minnesota Land Cover Classifications System (MLCCS) Veterans Park, Richfield, MN

Figure 7. Minnesota Land Cover Classification System codes throughout Veterans Park, Richfield, MN.

Minnesota DNR Native Plant Community Classification (MNDNR NPC)

Native plant community (NPC) types are defined by dominant canopy trees, variation in substrate, or fine-scale differences in environmental factors such as moisture or nutrients, based on vegetation surveys collected between 1995 and 2003. While these NPCs describe remnant habitat structures that existed in this region of Minnesota, significant changes in land use throughout the surrounding metro have caused disturbance and fragmentation. Therefore, the following NPCs help to inform the historical, current, and target vegetation structure rather than define exact conditions. The nature of this site being within a disturbed metro landscape means it is faced with varying levels of habitat degradation, invasive species introduction, hydrologic regime shifts, and the suppressions of natural disturbance regimes required by native ecosystems, which is evident based on the vegetation composition.

Current vegetation throughout unmanaged areas of Veterans Park indicates a mosaic of habitats with variable degrees of disturbance including mesic woodland, seasonally flooded marsh habitat, and wet prairie in areas of open canopy. The existing canopy consists of flood tolerant species including silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), black walnut (*Juglans nigra*), and hackberry (*Celtis occidentalis*), indicating floodplain forest habitat (FFs59 and FFs68). Mesic hardwood indicator species exist throughout the project area including green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), boxelder (*Acer negundo*), common elder (*Sambucus canadensis*), and dogwood (*Cornus spp.*) (MHs49). The variety of willows and flood tolerant herbaceous species like swamp milkweed (*Asclepias incarnata*), Culver's root (*Veronicastrum virginicum*), stinging nettle (*Urtica dioica*), red-osier dogwood (*Cornus sericea*), and gray-headed coneflower (*Ratibida pinnata*) indicate saturated soils (WPs54). Upland soils with mowed turf exist along the southern edge of the project area, which will be restored to upland prairie pollinator habitat (UPs23) further defined in the following sections. Descriptions of native plant community types that are indicative of the dominant vegetation throughout Veterans Park are provided below.

Due to the density and composition of NPC indicator species, FFs59/68 Southern Floodplain Forest and UPs23 Southern Mesic Prairie will guide the target restoration plant communities for the woodland, wetland, and prairie units, respectively.

Table 10. Minnesota DNR Native Plant Communities identified throughout Veterans Park, Richfield, MN.

NPC Code	NPC Code Name	Description
FFs59/FFs68	Southern Terrace/ Floodplain Forest	Wet-mesic deciduous forests on silty or sandy alluvium on level, occasionally flooded sites along small streams to large rivers in the southern half of Minnesota. Species composition is variable, but American elm, green ash, hackberry, basswood, box elder, silver maple, black ash, and cottonwood are often common. Swamp white oak is important in some stands in southeastern Minnesota.
UPs23	Southern Mesic Prairie	Grass-dominated but forb-rich herbaceous communities on somewhat poorly drained to well-drained loam soils mainly formed in unsorted glacial till, sometimes in a thin loess layer over till, and locally in lacustrine sediments and outwash deposits. Drought stress is irregular in occurrence and usually not severe.

4.b. Restoration Objectives

The overall management goals for Veterans Memorial Park are to balance the recreational use of the space with ecological and environmental needs. Areas with recreational land use along the park's western border will be excluded from the scope of natural resources management. Veterans Memorial Park natural area fills an important recreational role in the City, offering wooded walking paths and views of the marsh and lake. The park's natural area also provides important water-retention services and contains valuable habitat for a diverse range of wildlife and shoreline plant species. The proposed management recommendations will focus on restoring the eastern portion of Veterans Park to diverse, resilient, sustainable plant communities, while considering the challenges of restoring a disturbed urban landscape. This should continue to be evaluated as environmental conditions change over time. The priority outcome of all restoration areas is diverse, resilient, and sustainable plant communities that provide the desired recreational experience.

Within this context of urbanized natural habitats, there are several areas that group into the following management complexes defined in the unit descriptions in section 3.b.c. The restoration objectives below, and the following proposed activities and timelines for management and maintenance, may overlap between units where the targeted Native Plant Communities are similar.

Recreation Management Area Objectives

- ❖ Transition underutilized areas currently maintained for active use to diverse, resilient, sustainable plant and wildlife communities.
- ❖ Maintain a diversity of views for recreational users.
- ❖ Maintain a shade canopy along the trail in wooded areas.
- ❖ Consider target ecosystem restoration in areas impacted by 2027 trail construction.
- ❖ Remove hazard trees and dead down debris for safety and accessibility of recreational users.
- ❖ Maintain a healthy natural space by removing invasive and encouraging the growth of native plants, particularly in areas of trail removal.
- ❖ Protect stormwater infrastructure.
- ❖ Manage impacts of geese.

Ecological Restoration Objectives

1. Restore and enhance floodplain forest habitat (FFs59/FFs68 Southern Floodplain Forrest)
 - a. Strategies
 - i. Initial removal and continued control of invasive, hazard, and non-suitable trees and shrubs.
 - ii. Maintain a representative age class to allow for regeneration.
 - iii. Establish 50-100% woodland canopy in floodplain restoration units.
 - iv. Enhance understory diversity with deep rooted mesic-woodland grass, forbs, and shrub species native to Minnesota to filter pollutants carried by runoff from the landscape into nearby surface water. See Appendix B for recommended species.
 - v. Historical and existing native vegetation structure should be considered for future habitat enhancement species selection.
2. Convert mowed turf areas to pollinator habitat (UPs23 Southern Mesic Prairie)
 - a. Strategies

- i. Habitat around Veterans memorial will be a short, showy prairie to maintain visibility while southern turf conversion will be tall height.
 - ii. Remove turf grass and restore to functional pollinator habitat to enhance diversity and reduce goose herbivory.
 - iii. Conduct continued mechanical and chemical removal of invasive herbaceous species
 - i. Continue ground layer vegetation restoration with continued establishment maintenance of deep-rooted native prairie grasses, forb, and flowering shrub species to enhance pollinator habitat connectivity.
- 3. Reduction/mitigation of non-native and invasive species introduction
 - a. Strategies
 - i. Management of invasive vegetation prior to seed production is a priority to limit encroachment to areas with active control.
 - ii. Document location, density, and area of invasive populations with GIS.
 - iii. When feasible, use biological control.
 - iv. Where biological control is not available, use chemical and mechanical means to control.
 - v. Monitor infested areas for effectiveness of control.
 - vi. Provide education to community members and adjacent landowners regarding prevention and management.
- 4. Consider impacts to wildlife, habitat management, and visitor use of Veterans Memorial Park
 - a. Strategies
 - i. Install signage of restoration and management activities at entry points that explain restoration activities and their importance to ecosystem health.
 - ii. When possible, remove or stack felled or dead trees away from trails.
 - iii. Provide access that is sensitive to surrounding landscape and minimizes impact on natural resources.

4.c. Habitat Complexes and Management Comments

These habitat complexes are guided by the Minnesota Land Cover Classification System (MLCCS) and Native Plant Communities (NPC), defined by the MNDNR, and have been simplified to streamline the recommended management activities. Following the description of each habitat type per MLCCS, observations and commentary on the specifics of each identified management unit at Veterans Park are discussed.

The following section also contains specific recommendations for the execution of management objectives at each work unit (Fig. 8). In each unit, observations are detailed based on observed conditions as of Fall, 2025. The recommended activities are proposed here generally as a sequential timeline, with high-disturbance activities such as woody debris and major invasive control being first priority, followed by subsequent follow-up measures and vegetation enhancement. Management comments should continue to be evaluated as environmental conditions change over time. A more structured presentation of the proposed activity timeline across the site is detailed in the cost summary table in section 4.d., with the per-unit tasks broken down in the table found in 4.e.. Recommended activities could be phased across a wider time frame, or by specific units per phase, as funding and capacity require, although it should be recognized that alignment of similar management activities chronologically across the entire site will likely provide increased efficiency and lower cost-per-acre, due to efficiency of scale. Long-term maintenance recommendations are broken down into 5-10- and 10-20-year recommendations in section 3.e., however, inflation changes should be considered. Section 4.f. lists recommended specifications related to the associated management actions. Refinement of exact specifications will still be required when any management guidance is translated into a request for proposals or implementation by city staff.

Note: Hazardous and invasive tree removal recommendations are outlined on a high level within the following management comments by unit. Further explanation and detailed mapping for all tree removal can be found in Appendix A.



Veteran's Memorial Park Restoration Work Units



Figure 3. Target restoration ecosystems, by work unit, defined by MN DNR Native Plant Communities recommended for Veterans Park, Richfield, MN.

Target Ecosystem - FFs59/FFs68 Southern Floodplain Forest

Work Unit 1: Floodplain Forest Enhancement

Description: The Veterans Park woodland stretches around the upland perimeter of the project area and contains the majority of the park's paved trail network. Native canopy such as walnut, hackberry, cottonwood, and dogwoods should be referenced as target indicator species for future planting. The woodland edges and trail buffers are extremely dense in canopy with common buckthorn, boxelder, and white mulberry, which should be targeted for invasive removal and thinning of weedy natives. This dense canopy has prevented understory vegetation from being established, resulting in bare, compact soils. In addition to invasive species removal, the north and eastern woodlands contain higher densities of hazard trees and dead standing/down debris than other areas of the park. Maintaining lake visibility from bench views is important.

Management comments:

1. Disposal of existing dead and standing woody debris is suggested to be conducted prior to woody invasive removal to maximize accessibility.
2. Proactive and hazard tree removal should be conducted to prevent trail obstructions and could be done simultaneously with woody invasive control and disposal. Woody debris within a 6-foot buffer of wetland could be slashed and bucked up for erosion control and habitat structure.
3. Woody invasive removal is considered a top priority throughout the woodland unit(s), especially along trails and edges, primarily shrub canopy consisting of common buckthorn, white mulberry, Siberian elm, and invasive honeysuckles.
4. In addition to the recommended tree removal in Appendix A, continued boxelder thinning should be considered for this unit to maintain opportunity for successful native understory establishment. Based on current (2025) densities and high abundance of small saplings, the site could benefit from ~30% removal of boxelders without compromising shoreline stabilization.
5. Understory enhancement with shade tolerant native vegetation is recommended. Snow seeding is recommended to promote effective germination, especially given the compacted soils where disturbance has occurred.



Image 8. Dense woodland adjacent to paved trail in northeast corner of Veterans Park in Fall 2025, Richfield, MN.



6. Where there are natural breaks in the subcanopy and canopy, herbaceous weeds like garlic mustard and purple loosestrife should be treated and replaced with a wet shady seed mix.
7. Trails on the eastern edge of the woodland will be removed in 2027. Bare ground should receive a prep rake, broadcast seed with cover crop and woodland understory mix specified in Appendix B, and erosion control measures such as straw to prevent washout.
8. Avoid seeding within 4 ft buffer of trails, which are mowed for visibility.

Work Unit 1a: Floodplain Forest Restoration

Description: Units 1a will have the same timeline of restoration as the floodplain forest enhancement areas. The western unit 1a is dense with herbaceous native and invasive vegetation and flanked with dense weedy and invasive trees (Image X). Removal and continued control of mulberry and buckthorn is recommended as seedlings will continue to establish as the unit is restored. Once invasive species have been managed, these units would be excellent candidates for volunteer shrub and tree planting to enhance canopy cover. The eastern unit 1a contains turf grass, mowed by the city, and should be considered for woodland restoration to reduce maintenance. Residential properties border the easternmost edge of this unit.



Image 11. Canopy surrounding wet prairie unit at Veterans Memorial Park, Richfield, MN.

1. Initial woody invasive removal of common buckthorn and white mulberry is recommended as a priority to promote accessibility of further restoration tasks.
2. Thinning of native trees like boxelder is recommended to encourage diverse establishment.
3. Following woody removal and control of non-native herbaceous cover, the area should be seeded with native graminoids. Following satisfactory follow-up control of invasive species, native woodland forbs could be added.
4. After the ground layer has received supplemental vegetation, the shrub layer could be enhanced.
5. Continued spot maintenance of woody and herbaceous invasive species is required several years following initial removal to improve establishment of seeded areas.

Target Ecosystem - UPs23 Southern Mesic Prairie

Work Unit 2a & 2b: Turf to Prairie

Description: Both turf conversion units currently dominated by turf grass, transected by paved trails, and mowed by the City of Richfield with the objective of restoring to pollinator habitat. Unit 2a surrounds Veterans Memorial and will be restored to a low height, showy prairie to maintain visibility. Unit 2b will be a tall height pollinator habitat. To maintain space for passive recreation and prevent invasive establishment, diversity should be improved through drill seeding with pollinator species.



Image 10. Turf area surrounding Veterans Memorial to be restored to low height pollinator habitat.

Management Comments:

1. Turf removal via herbicide and/or scalping will be necessary to complete prior to enhancement, for successful native establishment in the southeastern unit.
2. Turf conversion to target restored ecosystem buffer is recommended to minimize mow maintenance, connect habitat for wildlife and pollinators, improve soil structure, increase water infiltration, and improve water quality by filtering runoff.
3. The use of cover crops after turf removal is recommended.
4. Drill seeding of respective prairie species is recommended in this area to achieve successful seed to soil contact.
5. Avoid seeding within 4 feet of trails for mowing maintenance.
6. Continued spot maintenance of herbaceous invasive species is required several years following initial removal to improve establishment of seeded areas.

4.d. Restoration Management Phasing & Cost Estimate Summary

Total management costs* were based on 5-year management plans. Total 5-year costs for all vegetation management are \$XXX,XXX. Cost estimation is based on current 2025 market rates, subcontracting all implementation and necessary oversight, and the assumption that all management units are implemented concurrently. Management unit nuances may influence cost totals and should be considered.

**All prices are estimates based on current market rates at the time of writing. Estimates do not factor in any state dollars being used to perform activities. Due to new language change in statute as of August 1, 2024, any natural resource related projects need to follow state prevailing wage requirements. This change in state statute language will have an increase in actual costs.*

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Applicable Management Units
Woody debris disposal	\$XX,XXX					8
Chip and install on defined trails	\$XX,XXX					8
Dead down woody disposal	\$XX,XXX					1, 2
Hazard tree removal	\$XX,XXX					1,2,3,4,8,10
Dethatch turf	\$XX,XXX					6,7,11,12
Remove turf (spray/till/spray)	\$XX,XXX					6,7,12
Interseed bee lawn forbs	\$XX,XXX					6,7,11,12
Undesirable tree removal	\$XX,XXX	\$XX,XXX	\$XX,XXX			3,8,10
Seed, Blanket, Cover Crop	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		2,6,7,10,12
Woody invasive control	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		1,2,3,4,8,9,10
Establishment maintenance	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	4,6,7,8,11,12
Herbaceous invasive control		\$XX,XXX				8
Non-native grass removal		\$XX,XXX				4
Woody follow up maintenance		\$XX,XXX	\$XX,XXX			8
Reed canary grass control		\$XX,XXX	\$XX,XXX	\$XX,XXX		1
Plant native savanna trees		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	4
Understory seeding		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	1,3,4,8,9
Plant native pollinator shrubs			\$XX,XXX			4
Reseeding			\$XX,XXX			6,7
Shoreline buffer plantings			\$XX,XXX	\$XX,XXX	\$XX,XXX	9
Planting of native trees and shrubs				\$XX,XXX	\$XX,XXX	1,8
Total	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX

4.e. Management Unit Recommendations

Note: Priority index is on a scale from 1 to 5 (1=high priority, 5=low priority).

Existing Land Cover Types	Acres	Target Land Cover	Recommended Actions	Priority Index	Year 1	Year 2	Year 3	Year 4	Year 5	Assumptions and Notes
Management Unit 1										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Woody invasive control	1	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		Cut, treat, pile, burn on site or chip
			Hazard tree removal	2	\$XX,XXX					Haul off or chip for trails
			Dead down woody disposal	1	\$XX,XXX					
			Reed canary grass control	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		Two treatments year 2, Rx burn year 3, final spray and seeding year 4
			Understory seeding	3		\$XX,XXX		\$XX,XXX		Seed understory after BT removal, seed grasslands after RCG removal
			Planting of native trees and shrubs	4				\$XX,XXX	\$XX,XXX	Plant year 4, maintenance year 5
Management Unit 2										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Dead down woody disposal	1	\$XX,XXX					SWWD is conducting management in this area. Chip into walking trail
			Hazard tree removal	1	\$XX,XXX					
			Seed, Blanket, Cover Crop	2			\$XX,XXX			Seeding should be accompanied by some form of erosion control
			Woody invasive control	1	\$XX,XXX	\$XX,XXX				
Management Unit 3										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
Management Unit 4										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes

Management Unit 6										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
Management Unit 7										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
			Seed, Blanket, Cover Crop	3	\$XX,XXX					
			Establishment maintenance	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		
			Reseeding	3			\$XX,XXX			

4.f. Long Term Maintenance Recommendations

While it can be difficult to accurately forecast longer term maintenance needs once the initial restoration phase is complete, provided here are estimates of likely activities that may be necessary to maintain the sites and continue to enhance the diversity and floristic quality of the management units. **Other details as needed.**

Management Units	Activity	Year 5-10 Cost Estimate*	Year 10-20 Cost Estimate*
1, 2, 3, 4, 8, 9, 10	Invasive control	\$XX,XXX	\$XX,XXX
1, 2, 3, 4, 8, 9, 10	Enhancement plantings and maintenance	\$XX,XXX	\$XX,XXX
6,7,11	Prescribed burn or burn alternative	\$XX,XXX	\$XX,XXX
6,7,11	Invasive control	\$XX,XXX	\$XX,XXX
6,7,11	Booster seedings	\$XX,XXX	\$XX,XXX
All	Tree maintenance and replacement	\$XX,XXX	\$XX,XXX
Totals		\$XX,XXX	\$XX,XXX

**Cost estimates here do not reflect inflation, changes to market rates for services, etc., but are intended to provide a relative reference point for longer-term maintenance needs.*

5. TAFT PARK

5.a. Project Site Vegetation and Habitat Assessment



Taft Park and Project Area Overview
Richfield, Minnesota



Figure 5. General location of Taft Park project boundary within the City of Richfield, MN.

Taft Park is a popular 42-acre community park located in the northeast corner of Richfield, directly adjacent to the MSP International airport. The southern half of the park is within city limits and features a soccer/football field, softball fields, a park building, playground, and sports courts, while the northern half is leased from Metro Airports Commission. While partially overlapping Metro Airports Commission property, the City of Richfield manages all areas within the Taft Park boundary. The Nakomis-Minnesota River Regional Trail follows the western edge of the park. Legion Lake, located in Veterans Memorial Park, feeds surface water to Taft Lake, which is directly west of Mother Lake and directly south of Solomon Pak, transected by Highway 77 and 62, respectively. Prior to highway construction, these lakes were once connected and flowed northbound into Lake Nakomis then the Minnehaha Creek. Now culverts and stormwater infrastructure drains connect these waterways under the highway, creating more upland corridors with significant exposures to invasive species pressures.

The northern portion contains a walking trail surrounding Taft Lake, which is part of the DNR's Fishing in the Neighborhood program. The park provides visitors with a variety of lake views from the fishing pier. This section has varying habitat along the shoreline with some understory and ground vegetation established in the wider portions, much of it invasive or non-native. Like Richfield Lake Park, the constructed embankment and paved trail around the lake is raised above the natural water level and provides limited habitat for vegetation. The larger forested area south of the lake is mixed to low tree diversity and quality with a dense understory of buckthorn.

Vegetation maintenance at Taft Park has been challenging for the city due to historical infrastructure issues. The site was once a landfill used for construction disposal and this material is often pushed to the surface from the freeze thaw cycle. The soil structure of the surrounding athletic fields is naturally saturated causing poor drainage, especially after heavy rain events. The wetland habitat on the southeastern shoreline of Taft Lake is 12 feet lower than the highest point on the northwestern edge of the site. The woodland complex surrounding Taft Lake is dominated by native trees like cottonwood, black walnut, ash, basswood, and hackberry, however, urban pressures like invasive species encroachment have significantly degraded the habitat quality. The southern woodland is flanked by approximately 2 acres of turf grass, which has brought undesirable Canada goose herbivory. The City of Richfield aims to restore these areas to functional woodland habitat to encourage diverse wildlife and reduce long-term maintenance.

The following summary of vegetation structure reflects the dominant and notable species identified throughout the 2025 growing season at Taft Park and does not reflect a comprehensive survey of all species within the project site.

Table 11. Terrestrial vegetation observed at Taft5 Lake Park throughout fall, 2025.

	Scientific Name	Common Name	Nativity
Canopy	<i>Fraxinus pennsylvanica</i>	Green Ash	Native
	<i>Ulmus pumila</i>	Siberian Elm	Non-native, Invasive
	<i>Morus alba</i>	White Mulberry	Non-native, Invasive
	<i>Juglans nigra</i>	Black Walnut	Native
	<i>Salix interior</i>	Sandbar Willow	Native
	<i>Acer negundo</i>	Box Elder	Native
	<i>Populus deltoides</i>	Cottonwood	Native
	<i>Populus tremuloides</i>	Quaking Aspen	Native
	<i>Tilia americana</i>	Basswood	Native
	<i>Salix amygdaloides</i>	Peach-Leaved Willow	Native
	<i>Celtis occidentalis</i>	Hackberry	Native
	<i>Acer ginnala</i>	Amur Maple	Non-native, Invasive
Sub-Canopy	<i>Rhamnus cathartica</i>	Common Buckthorn	Non-native, Invasive
	<i>Rhus glabra</i>	Smooth Sumac	Native
	<i>Sambucus canadensis</i>	Common Elder	Native
Ground vegetation	<i>Lythrum salicaria</i>	Purple Loosestrife	Non-native, Invasive
	<i>Asclepias syriaca</i>	Common Milkweed	Native
	<i>Nepeta cataria</i>	Catnip	Non-native, Invasive
	<i>Asclepias incarnata</i>	Swamp Milkweed	Native
	<i>Hesperis matronalis</i>	Dame's Rocket	Non-native, Invasive

<i>Leonurus cardiaca</i>	Common Motherwort	Non-native, Invasive
<i>Phragmites australis</i>	Common Reedgrass	Native
<i>Impatiens capensis</i>	Spotted Touch-Me-Not	Native
<i>Ambrosia trifida</i>	Great Ragweed	Native
<i>Monarda fistulosa</i>	Wild Bergamot	Native
<i>Ageratina altissima</i>	White Snakeroot	Native
<i>Scirpus atrocinctus</i>	Black-Girdled Woolgrass	Native
<i>Cirsium vulgare</i>	Bull Thistle	Non-native, Invasive
<i>Rumex crispus</i>	Curly Dock	Non-native, Invasive
<i>Brassica rapa</i>	Field Mustard	Non-native, Invasive
<i>Ambrosia artemisiifolia</i>	Common Ragweed	Native
<i>Alliaria petiolata</i>	Garlic Mustard	Non-native, Invasive
<i>Melilotus officinalis</i>	Yellow Sweet Clover	Non-native, Invasive
<i>Arctium minus</i>	Common Burdock	Non-native, Invasive
<i>Cirsium arvense</i>	Canada Thistle	Non-native, Invasive
<i>Verbena hastata</i>	Blue Vervain	Native
<i>Oenothera biennis</i>	Common Evening Primrose	Native
<i>Carex vulpinoidea</i>	Fox Sedge	Native
<i>Euphorbia virgata</i>	Leafy Spurge	Non-native, Invasive
<i>Sanicula canadensis</i>	Canadian Black Snakeroot	Native
<i>Zizia aurea</i>	Golden Alexanders	Native
<i>Eupatorium perfoliatum</i>	Common Boneset	Native
<i>Helianthus tuberosus</i>	Jerusalem Artichoke	Native
<i>Ribes americanum</i>	Wild Black Currant	Native
<i>Securigera varia</i>	Crownvetch	Non-native, Invasive
<i>Urtica dioica</i>	Stinging Nettle	Native
<i>Eupatorium maculatum</i>	Spotted Joe pye weed	Native
<i>Solidago canadensis</i>	Canada goldenrod	Native
<i>Lycopus americanus</i>	Cut-leaved bugleweed	Native
<i>Typha x glauca</i>	Hybridized Cattails	Invasive

Minnesota Land Cover Classification System (MLCCS)

The Minnesota land cover classification system (MLCCS) is a mapping system that categorizes areas by land cover composition based on historical inventories of native plant communities and aerial photo interpretation gathered in the mid to late 1990's. ^{Cite} MLCCS cover types for Taft Park are shown in Table X and Figure X. Although this classification system informs our understanding of site composition and habitat complexes, technological limitations of MLCCS and land use changes should be considered to accurately depict current conditions. Due to the rapidly changing nature of urban parks and redundancies amongst code definitions, the MLCCS cover types were condensed and simplified into general land use categories and descriptions for Taft Park.

The MLCCS survey identified eleven different land cover types representing six general land use types within the project boundary (Table X). All terrestrial land use types are classified as altered including the

recreational turf lawns on the southern portion of the park, deciduous woodlands, and seasonally flooded wetland vegetation with urban soils and varying degrees of non-native vegetation encroachment. The decline in topography is evident in the area defined as wetland in Figure X on the eastern side of Taft Lake, dominant with flood tolerant native and non-native vegetation and a relatively open canopy. The transitional land directly south of the wetland complex (Map ID 5 in Fig. X) was previously a construction dump and is currently unmanaged degraded mesic woodland that will be within the scope of restoration. The woodland complexes border most of the trails and wetlands and contain significant hazard trees, high density of woody invasive species, and dead down debris. Aquatic management of Taft Lake is beyond the scope of this report.

Table 12. Minnesota Land Cover Classification System codes throughout Taft Park, Richfield, MN.

Map ID	MLCCS Codes	Category	MLCCS Code Name/Description
1	11249, 42130	Woodlands	Altered/ non-native deciduous woodland exists throughout 14% of the project area.
2	23211	Maintained short grasses	Short grasses on upland soils with various recreational purposes exists throughout 49% of the project area.
4	14122, 14123	Buildings and Pavement	Buildings and pavement exist throughout 3% of the project area.
5	14214	Transitional Land	Other exposed/transitional land with minimal impervious cover exists throughout 3% of the project area.
6	93300	Open Water	Palustrine open water exists throughout 28% of the project area.
7	61730, 61480, 61520, 61620	Wetlands	Seasonally flooded altered/ non-native dominated vegetation exists throughout 3% of the project area.



Minnesota Land Cover Classifications System (MLCCS) Taft Park, Richfield, MN

Figure 6. Minnesota Land Cover Classification System codes throughout Taft Park, Richfield, MN.

Minnesota DNR Native Plant Community Classification (MNDNR NPC)

Native plant community (NPC) types are defined by dominant canopy trees, variation in substrate, or fine-scale differences in environmental factors such as moisture or nutrients, based on vegetation surveys collected between 1995 and 2003. While these NPCs describe remnant habitat structures that existed in this region of Minnesota, significant changes in land use throughout the surrounding metro have caused disturbance and fragmentation. Therefore, the following NPCs help to inform the historical, current, and target vegetation structure rather than define exact conditions. The nature of this site being within a disturbed metro landscape means it is faced with varying levels of habitat degradation, invasive species introduction, hydrologic regime shifts, and the suppressions of natural disturbance regimes required by native ecosystems, which is evident based on the vegetation composition.

Current vegetation throughout the restoration area at Taft Park indicates a mosaic of disturbed mesic woodland and seasonally flooded wetland habitat, scattered with pockets of recreational and transitional land use. Higher topography areas within existing woodlands are dominant with green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), boxelder (*Acer negundo*), resembling that of an altered Southern Wet-Mesic Hardwood Forest (MHs49). Lower topographies of these woodlands are dominant with flood tolerant species including silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), black walnut (*Juglans nigra*), and hackberry (*Celtis occidentalis*), indicating remnant floodplain forest habitat (FFs59). Considering that Taft Lake was once part of Mother Lake, its proximity to the Mississippi – Minnesota river confluence, and current indicator species, it is likely that the park was historically described by MHs49 and FFs59 native plant communities. However, invasive species like buckthorn, white mulberry, and Siberian elm have since degraded the habitat.

As the topography declines along the eastern stretch of the site, the canopy opens and becomes dominant with willows and herbaceous species like purple loosestrife, spotted Joe pye weed, Common boneset, Swamp milkweed, Canada goldenrod, cut-leaved bugleweed, blue vervain, cattails, touch-me-not, and red-osier dogwood. This shift in hydrology and indicator species points toward a wetland ecosystem, specifically resembling that of an altered southern seepage meadow/carr (WMs83). While invasive hybrid cattails and purple loosestrife have encroached this habitat significantly, WMs83 will be a suitable target native plant community for restoration. The mowed turf areas and transitional land along the southern edge of the project area have been utilized for recreational and storage purposes and therefore are not considered as native plant communities currently. They will be restored to the same target NPC as the existing woodlands.

Due to the density and composition of NPC indicator species, FFs59 Southern Floodplain Forrest and Southern Wet-Mesic Hardwood Forest (MHs49) will guide the target restoration plant communities for the woodland, turf and transitional land areas while Southern Seepage Meadow/Carr (WMs83) will guide the wetland area. Descriptions of native plant community types that are indicative of the dominant vegetation throughout Taft Park are provided below.

Table 13. Minnesota DNR Native Plant Communities identified throughout Taft Park, Richfield, MN.

NPC Code	NPC Code Name	Description
FFs59	Southern Terrace Forest	Wet-mesic deciduous forests on silty or sandy alluvium on level, occasionally flooded sites along small streams to large rivers in the

		southern half of Minnesota. Species composition is variable, but American elm, green ash, hackberry, basswood, box elder, silver maple, black ash, and cottonwood are often common. Swamp white oak is important in some stands in southeastern Minnesota. Indicator species present include black walnut, hackberry, common elder, cottonwood.
MHs49	Southern Wet-Mesic Hardwood Forest	Rich, wet-mesic lowland hardwood forests on level silty alluvium in stream valleys and on level glacial till bordering lakes. Sites are protected from fire, and soils remain moist throughout the growing season. Indicator species present include stinging nettle, hackberry, box elder.
WMs83	Southern Seepage Meadow/Carr	Open wetlands dominated by a dense cover of hummock-forming broadleaved sedges or tall shrubs. Present in areas of groundwater seepage along streams and drainage ways, on sloping terraces, and at bases of slopes. Indicator species present include spotted Joe pye weed, Common boneset, Swamp milkweed, Canada goldenrod, cut-leaved bugleweed, blue vervain, cattails, touch-me-not, red-osier dogwood, and various willows.

5.b. Restoration Objectives

The overall management goals for Taft Park are to balance the recreational use of the space with ecological and environmental needs. Taft Park fills an important recreational role in the City as the only fishable and boatable lake in the City. It also provides important water-retention services and contains valuable habitat for a diverse range of wildlife and shoreline plant species. The recreational land use along the southern half of the site will be excluded from the scope of natural resources management. The proposed management recommendations will focus on restoring the northern half of Taft Park to diverse, resilient, sustainable plant communities, while considering the challenges of restoring a disturbed urban landscape. This should continue to be evaluated as environmental conditions change over time.

Within this context of urbanized natural habitats, there are several areas that group into the following management complexes defined in the unit descriptions in section 5.b.c. The restoration objectives below, and the following proposed activities and timelines for management and maintenance, may overlap between units where the targeted Native Plant Communities are similar.

Recreation Management Area Objectives

- ❖ Stabilize shoreline to reduce trail maintenance and shoreline erosion.
- ❖ Maintain a healthy natural space by removing invasive and encouraging the growth of native plants at all forest levels
- ❖ Protect stormwater infrastructure
- ❖ Manage impacts of geese
- ❖ Maintain accessibility of fishing dock and boat access
- ❖ Maintain shoreline fishing opportunities

Ecological Restoration Objectives

2. Enhance existing woodland habitat - Southern Terrace Forest (FFs59) & Southern Wet-Mesic Hardwood Forest (MHs49)
 - a. Strategies
 - i. Maintain and enhance woodland remnants in applicable units.
 - ii. Mechanical and chemical removal of invasive, hazard, and non-suitable species. This will include thinning of native MN species such as buckthorn, mulberry, box elder, willow or other species that have expanded beyond management.
 - iii. Re-establish a tree canopy cover of 50-80% after initial undesirable canopy removal.
 - iv. Maintain a representative age class to allow for regeneration.
 - v. Historical and existing native vegetation structure should be considered for future habitat enhancement species selection.
 - vi. Enhance understory diversity with deep rooted native savanna grasses, forb, and shrub species. Where possible, use local ecotype seed following the Minnesota Board of Water & Soil Resources (BWSR) "Native Vegetation establishment and enhancement guidelines." See Appendix D and G for species lists.
3. Reconstruct turf areas and transitional lands to woodland habitat - Southern Terrace Forest (FFs59) & Southern Wet-Mesic Hardwood Forest (MHs49)
 - i. Remove existing turf grass in units south of Taft Lake.
 - ii. Reconstruct recreational and transitional areas to woodland ecosystem to reduce goose herbivory and enhance wildlife diversity.
 - iii. Remediate soil and remove any hydrology or root altering urban detritus (concrete slab) as required to establish native plant populations.
 - iv. Restore ground layer vegetation with deep rooted native woodland grasses, forb, and flowering shrub species to enhance pollinator habitat connectivity.
4. Restore and enhance wetland habitat and reduce shoreline erosion— Southern Seepage Meadow/Carr (WMs83)
 - a. Strategies
 - i. Remove, mitigate, and monitor populations of woodland and wetland invasive species
 - ii. Encourage native establishment of deep rooted native species to improve water quality, protect storm water infrastructure, and reduce erosion
 - iii. Deep root plant selections to filter pollutants carried by rainfall, improve soil health, and reduce soil erosion into nearby surface water.
 - iv. Re-canopy areas targeted for invasive, hazard, and undesirable woody removal to reduce runoff that carries pollutants from the landscape into nearby surface water.
5. Reduction/mitigation of non-native and invasive species
 - a. Rationale: Due to vectors likely to persist on the site due to its urban setting and relatively small size, non-native species will persist on the site, if left unmanaged. As per recommendations outlined in section 5.c, many management units include an initial removal of the most dominant invasive species, followed by a revegetation plan that can provide competition against re-colonization by invasives.
 - b. Strategies

- i. Document location, density, and area of invasive populations with GIS.
 - ii. When feasible, use biological control.
 - iii. Where biological control is not available, use chemical and mechanical means to control.
 - iv. Monitor infested areas for effectiveness of control.
 - v. Provide education to community members and adjacent landowners regarding prevention and management.
6. Consider impacts to wildlife, habitat management, and visitor use of Taft Park
- a. Strategies
 - i. Install signage of restoration and management activities at entry points that explain restoration activities and their importance to ecosystem health.
 - ii. Maintain and enhance fishing pier access and surrounding shoreline.
 - iii. When possible, remove or stack felled or dead trees away from trails.
 - iv. Provide access that is sensitive to surrounding landscape and minimizes impact on natural resources.
 - v. Review and prioritize tree removal of invasive and potentially hazardous trees throughout the corridor (See Appendix A).

5.c. Habitat Complexes and Management Comments

These habitat complexes are guided by the Minnesota Land Cover Classification System (MLCCS) and Native Plant Communities (NPC), defined by the MNDNR, and have been simplified to streamline the recommended management activities. Following the description of each habitat type per MLCCS, observations and commentary on the specifics of each identified management unit at Taft Park are discussed.

The following section also contains specific recommendations for the execution of management objectives at each work unit (Fig. 11). In each unit, observations are detailed based on observed conditions as of fall 2025 and spring 2026. The recommended activities are proposed here generally as a sequential timeline, with high-disturbance activities such as woody debris and major invasive control being priority, followed by subsequent follow-up measures and vegetation enhancement. Management comments should continue to be evaluated as environmental conditions change over time. A more structured presentation of the proposed activity timeline across the site is detailed in the cost summary table in section 5.c., with the per-unit tasks broken down in the table found in 5.d. Recommended activities could be phased across a wider time frame, or by specific units per phase, as funding and capacity require, although it should be recognized that alignment of similar management activities chronologically across the entire site will likely provide increased efficiency and lower cost-per-acre, due to efficiency of scale. Long-term maintenance recommendations are broken down into 5-10- and 10-20-year recommendations in section 5.e., however, inflation changes should be considered. Section 5.f. lists recommended specifications related to the associated management actions. Refinement of exact specifications will still be required when any management guidance is translated into a request for proposals or implementation by city staff.



Taft Lake Park Restoration Work Units

Figure 7. Target restoration ecosystems, by work unit, defined by MN DNR Native Plant Communities recommended for Taft Park, Richfield, MN.

Target Ecosystem Southern Terrace Forest (FFs59) / MHs49 – Southern Wet-Mesic Hardwood Forest

Work Unit 1a & 1b Woodland Enhancement

Description: The native species dominant in these canopies are green ash, American elm, boxelder, silver maple, cottonwood, black walnut, and hackberry. However, dense stands of common buckthorn, Siberian elm, white mulberry, and Amur maple have formed especially along woodland edges. Removal and continued control is recommended as priority for successful restoration. While native, thinning and treatment of boxelder throughout the woodland and interior sandbar along the shoreline is recommended to improve views of the lake and establishment of understory species. There is almost no understory vegetation in these dense areas, therefore, thinning overabundant boxelders and mulberries will create opportunities for more diversity in



Image 9. View of Unit 1b woodland from Unit 2a turf conversion, facing east. June 2026 Taft Park, Richfield, MN.

the understory vegetation. Hazard trees are scattered throughout the woodland, especially in the eastern half of 1a, and all snags overhanging the trail should be removed. The inner shorelines of this unit transition into the lake with minimally fluctuating water levels with occasional down debris from dead ash and cottonwood. Debris may be scattered in some areas of the shoreline with erosion potentials for stabilization. Avoid removing debris that is providing topsoil stabilization to prevent unnecessary erosion. The recreational turf area located on the northwest west edge of unit 1 will remain in its existing condition (Image X), but proximal work should consider the presence of park-users.

Management comments:

1. Disposal of existing woody debris is suggested to be conducted prior to woody invasive removal to maximize accessibility.
2. Proactive and hazard tree removal should be conducted to prevent trail obstructions and could be done simultaneously with woody invasive control and disposal. Woody debris within a 6-foot buffer of wetland could be slashed and bucked up for erosion control and habitat structure.
3. Woody invasive removal is considered a top priority throughout the woodland units, primarily shrub canopy consisting of common buckthorn, white mulberry, Siberian elm, and Amur maple.
4. Continued boxelder and interior sandbar willow thinning should be considered to maintain views and encourage native understory establishment. Based on current (2026) densities and high abundance of small saplings, the site could benefit from ~30% removal of both without compromising shoreline stabilization.
5. If equipment can be used on frozen soils to minimize disturbance, this is preferred, but if growing season removal occurs, disturbed areas

should be stabilized. This should be completed prior to any habitat enhancement.

6. Following woody removal and control of non-native herbaceous cover, the area should be seeded with native graminoids. Following satisfactory follow-up control of invasive species, native forbs could be added.
7. After the ground layer has received supplemental vegetation, the shrub layer could be enhanced
8. Continued spot maintenance of woody and herbaceous invasive species is required several years following initial removal to improve establishment of seeded areas.
9. Stinging Nettle (*Urtica dioica*) indicates that surplus nutrients may be present and may require multiple activities to prepare the site for reseeding.
10. Where there are natural breaks in the subcanopy and canopy, herbaceous weeds like garlic mustard and purple loosestrife should be treated and replaced with a wet shady seed mix.

Work Unit 2a & 2b Turf to Woodland Conversion

Description: This unit is currently mowed turf grass on upland soils aimed at being restored to a similar woodland habitat to unit 1. A cluster of pin oaks, honey locust, and hackberry were planted along the trail several decades ago in unit 2a. All the oaks are dying (Image 10), and removal is recommended to prevent potential disease transmission. Turf conversion to target restored ecosystem buffer is recommended to minimize mow maintenance, connect habitat for wildlife and pollinators, improve soil structure, increase water infiltration, and improve water quality by filtering runoff.

Management Comments:

1. Turf removal via herbicide and/or scalping will be necessary to complete prior to enhancement, for successful native establishment.
2. Following turf removal, the area should be seeded with a native graminoid mix. Following satisfactory follow-up control of invasive species, native forbs could be added.
3. Drill seeding of competitive shade-tolerant species is recommended in this area to achieve successful seed to soil contact.
4. The use of cover crops after turf removal is recommended.
5. Herbaceous invasive control paired with interseeding is critical during this transitional period.
6. After the ground layer has received supplemental vegetation, the shrub layer could be enhanced. This would be an excellent community opportunity.



Image 10. View of hazard pin oaks and turf grass along trail of unit 2a, facing westbound. Taft Park, Richfield, MN.

7. Continued spot maintenance of woody and herbaceous invasive species is required several years following initial removal to improve establishment of seeded areas.
8. Borders baseball fields.

Work Unit 3 Woodland Reconstruction

Description: The condition of the woodland that lines the perimeter of unit 3 is like unit 1 in terms of canopy and restoration needs (Image11). The interior has been used for storage and lacks any vegetation or soil structure as seen in Figure 5, which could pose challenges with establishment. Topsoil will need to be supplemented and soil amendments like compost or biochar may be helpful to improve nutrients, especially along the eastern access road.



Image 11. East facing view of the woodland and transitional land use in unit 3. Taft Park, Richfield, MN.

Management Comments:

1. Restoration of the perimeter woodland will follow the same recommendations as unit 1.
2. The ground condition of the interior is bare and disturbed and will require topsoil amendment for seed establishment. To progress toward the target ecosystem and prevent invasive establishment, the initial seeding approach defined for unit 2 is recommended.
3. Woodland understory diversity should be improved through broadcast seeding with shade tolerant native species.

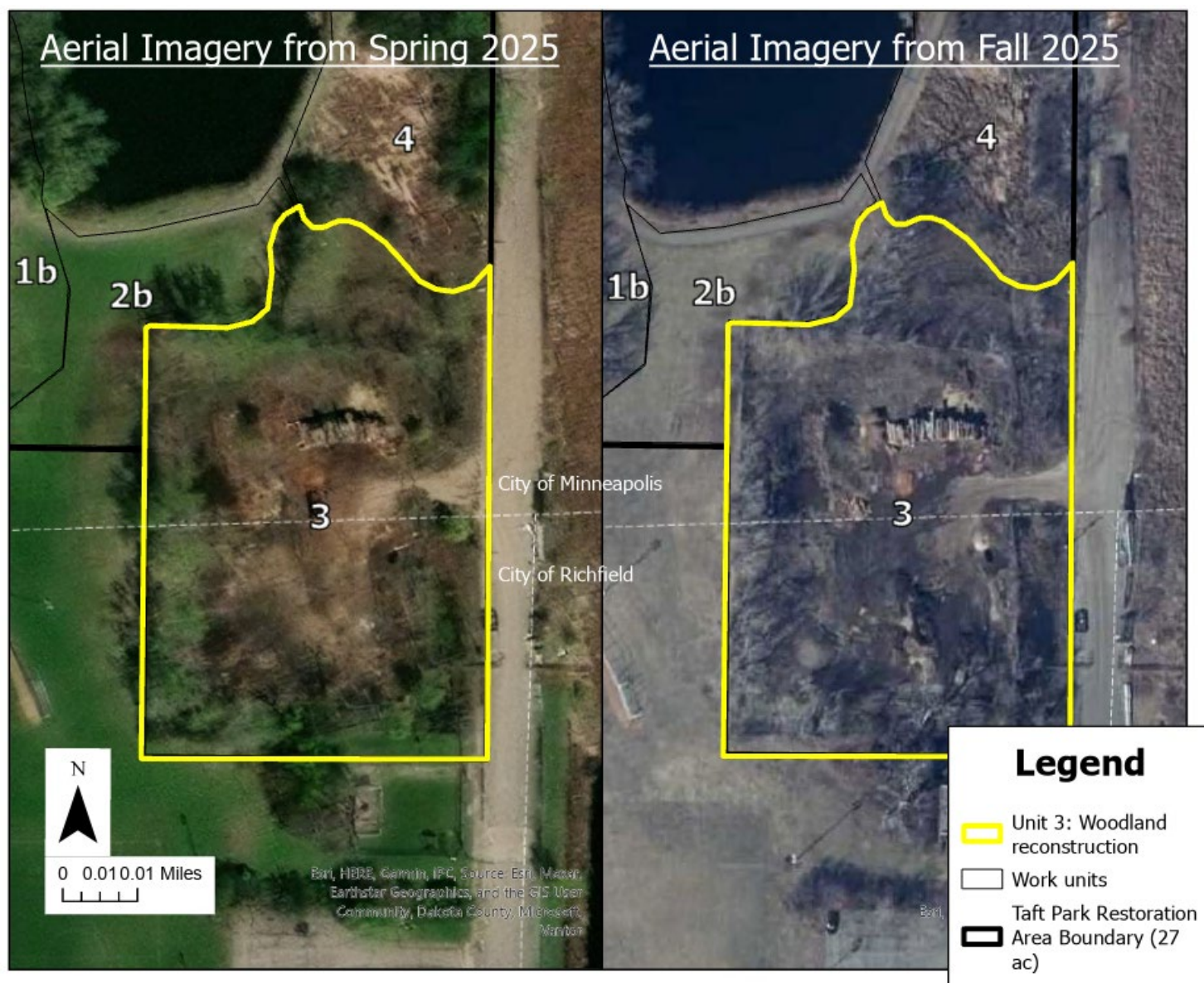


Figure 4. Unit 3 taft park aerial imagery 2025

Target Ecosystem Southern Seepage Meadow/Carr (WMs83)

Work Unit 4 Wetland Enhancement

Description: As the topography declines along the eastern stretch of the site, the canopy opens and becomes dominant with herbaceous species like purple loosestrife, spotted Joe pye weed, Common boneset, Swamp milkweed, Canada goldenrod, cut-leaved bugleweed, blue vervain, cattails, touch-me-not, and red-osier dogwood. Interior sandbar willow dominates the canopy (Image X). Reed canary grass, thistles, and hybrid cattails along habitat edges will require continued monitoring and removal. There are fewer invasive woody species that require management in this unit and the willows are providing significant shoreline stabilization.



Management Comments:

1. The established populations of Reed canary grass (*Phalaris arundinacea*) and Canada thistle (*Cirsium arvense*) will require an aggressive initial roster of activities to effectively remove.
2. Herbicide treatment with Imazapyr as the active ingredient will provide more effective initial and prolonged control over glyphosate. Following the initial Imazapyr treatment, mowing to prevent seed production and repeat applications with glyphosate should bring the populations under control prior to seeding, but careful monitoring should be undertaken to ensure they are effectively eradicated before proceeding with revegetation.
Due to the presence of desirable plants and proximity of surface water, aquatic approved herbicides and surfactants are required for all applications.
3. Seed mix should include species known to be competitive with reed canary grass, such as prairie cordgrass (*Spartina pectinata*) and swamp milkweed (*Asclepias incarnata*).
4. Continue overseeding and planting of native plugs to diversify wetland areas. Native dogwood shrubs or hackberries could be planted if canopy is desired.

5.d. Restoration Management Phasing & Cost Estimate Summary

Total management costs* were based on 5-year management plans. Total 5-year costs for all vegetation management are \$XXX,XXX. Cost estimation is based on current 2025 market rates, subcontracting all implementation and necessary oversight, and the assumption that all management units are implemented concurrently. Management unit nuances may influence cost totals and should be considered.

**All prices are estimates based on current market rates at the time of writing. Estimates do not factor in any state dollars being used to perform activities. Due to new language change in statute as of August 1, 2024, any natural resource related projects need to follow state prevailing wage requirements. This change in state statute language will have an increase in actual costs.*

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Applicable Management Units
Woody debris disposal	\$XX,XXX					8
Chip and install on defined trails	\$XX,XXX					8
Dead down woody disposal	\$XX,XXX					1, 2
Hazard tree removal	\$XX,XXX					1,2,3,4,8,10
Dethatch turf	\$XX,XXX					6,7,11,12
Remove turf (spray/till/spray)	\$XX,XXX					6,7,12
Interseed bee lawn forbs	\$XX,XXX					6,7,11,12
Undesirable tree removal	\$XX,XXX	\$XX,XXX	\$XX,XXX			3,8,10
Seed, Blanket, Cover Crop	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		2,6,7,10,12
Woody invasive control	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		1,2,3,4,8,9,10
Establishment maintenance	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	4,6,7,8,11,12
Herbaceous invasive control		\$XX,XXX				8
Non-native grass removal		\$XX,XXX				4
Woody follow up maintenance		\$XX,XXX	\$XX,XXX			8
Reed canary grass control		\$XX,XXX	\$XX,XXX	\$XX,XXX		1
Plant native savanna trees		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	4
Understory seeding		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	1,3,4,8,9
Plant native pollinator shrubs			\$XX,XXX			4
Reseeding			\$XX,XXX			6,7
Shoreline buffer plantings			\$XX,XXX	\$XX,XXX	\$XX,XXX	9
Planting of native trees and shrubs				\$XX,XXX	\$XX,XXX	1,8
Total	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX

5.e. Management Unit Recommendations

Note: Priority index is on a scale from 1 to 5 (1=high priority, 5=low priority).

Existing Land Cover Types	Acres	Target Land Cover	Recommended Actions	Priority Index	Year 1	Year 2	Year 3	Year 4	Year 5	Assumptions and Notes
Management Unit 1										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Woody invasive control	1	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		Cut, treat, pile, burn on site or chip
			Hazard tree removal	2	\$XX,XXX					Haul off or chip for trails
			Dead down woody disposal	1	\$XX,XXX					
			Reed canary grass control	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		Two treatments year 2, Rx burn year 3, final spray and seeding year 4
			Understory seeding	3		\$XX,XXX		\$XX,XXX		Seed understory after BT removal, seed grasslands after RCG removal
			Planting of native trees and shrubs	4				\$XX,XXX	\$XX,XXX	Plant year 4, maintenance year 5
Management Unit 2										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Dead down woody disposal	1	\$XX,XXX					SWWD is conducting management in this area. Chip into walking trail
			Hazard tree removal	1	\$XX,XXX					
			Seed, Blanket, Cover Crop	2			\$XX,XXX			Seeding should be accompanied by some form of erosion control
			Woody invasive control	1	\$XX,XXX	\$XX,XXX				
Management Unit 3										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
Management Unit 4										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes

Management Unit 5										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
			Seed, Blanket, Cover Crop	3	\$XX,XXX					
			Establishment maintenance	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		
			Reseeding	3			\$XX,XXX			

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5.f. Long Term Maintenance Recommendations

While it can be difficult to accurately forecast longer term maintenance needs once the initial restoration phase is complete, provided here are estimates of likely activities that may be necessary to maintain the sites and continue to enhance the diversity and floristic quality of the management units.

Management Units	Activity	Year 5-10 Cost Estimate*	Year 10-20 Cost Estimate*
1, 2, 3, 4, 8, 9, 10	Invasive control	\$XX,XXX	\$XX,XXX
1, 2, 3, 4, 8, 9, 10	Enhancement plantings and maintenance	\$XX,XXX	\$XX,XXX
6,7,11	Prescribed burn or burn alternative	\$XX,XXX	\$XX,XXX
6,7,11	Invasive control	\$XX,XXX	\$XX,XXX
6,7,11	Booster seedings	\$XX,XXX	\$XX,XXX
All	Tree maintenance and replacement	\$XX,XXX	\$XX,XXX
Totals		\$XX,XXX	\$XX,XXX

**Cost estimates here do not reflect inflation, changes to market rates for services, etc., but are intended to provide a relative reference point for longer-term maintenance needs.*

6.a. Project Site Vegetation and Habitat Assessment



Wood Lake Nature Center and Project Area Overview

Richfield, Minnesota

Figure 12. General location of Richfield Lake Park project boundary within the City of Richfield, MN.

Wood Lake Nature Center (WLNC) is a 150-acre public natural area situated between suburban neighborhoods and the major I-35W highway corridor. This park has over three miles of trails and boardwalks, over two miles of which are accessible, and groomed cross-country ski trails in winters with natural snowfall. The main nature center is being redeveloped in 2026, with complete facilities expected to be open early 2027. Multiple entrances within the surrounding neighborhoods provide local access for foot traffic in the community. Environmental education programs and naturalist-led seasonal activities make this park a destination for tens of thousands of visitors year-round.

Prior to the development of the nature center, Wood Lake was significantly impacted by the construction of I-35W corridor in the late 1950s. Lowered water levels from altered stormwater and

surface water management exposed the lake bottom, creating the shoreline, wetlands, and eventually forested lowland habitat that comprises the accessible habitats today (Figure x). These shallow and poorly drained soils are mainly comprised of Forada sandy loam (D10A) and Duelm loamy sand (D17A) with 0 to 2 percent slopes (Appendix C) sit at or just above the water table. Although the property has some remaining edge habitat that dates before this land use change, the current vegetation is relatively young, developing from pioneer species that colonized or were planted into the expanded land.



Figure 13. Aerial images of Wood Lake in 1956, 1960, and 1971 showing water level reduction and increase in exposed shoreline and vegetated shallow wetlands (CITE MHAPO).

Current vegetation in the non-wetland or open-water portions of the site can loosely be classified into woodland and prairie areas which will be broken into units and discussed further in the following sections. All habitat areas have been and will continue to be impacted by adjacent land use and by the high traffic of public visitors. However, city staff, volunteers and community groups, such as Friends of Wood Lake, manage the non-native plant species encroachment in many areas through invasive species removal and native species establishment, reflected in the more than typical habitat diversity for an urban park. The following description and tables (Tables 14 and 15) represent the dominant and notable species identified throughout the 2025 growing season at Wood Lake Nature and do not reflect a comprehensive survey of all species within the site.

Table 14. Terrestrial vegetation observed in the woodlands at Wood Lake Nature Center throughout summer and fall, 2025.

	Scientific Name	Common Name	Nativity
Canopy	<i>Celtis occidentalis</i>	Hackberry	Native
	<i>Morus alba</i>	White Mulberry	Non-native, Invasive
	<i>Populus deltoides</i>	Cottonwood	Native
	<i>Fraxinus pennsylvanica</i>	Green Ash	Native
	<i>Acer negundo</i>	Box Elder	Native
	<i>Ulmus pumila</i>	Siberian Elm	Non-native, Invasive
	<i>Prunus virginiana</i>	Chokecherry	Native
	<i>Acer saccharinum</i>	Silver Maple	Native
	<i>Ulmus americana</i>	American Elm	Native
	<i>Robinia pseudoacacia</i>	Black Locust	Non-native, Invasive
	<i>Catalpa speciosa</i>	Cigar Tree	Non-native, Invasive
	<i>Juglans nigra</i>	Black Walnut	Native
	<i>Quercus macrocarpa</i>	Bur Oak	Native
	<i>Juniperus virginiana</i>	Eastern Red Cedar	Native
	<i>Acer saccharum</i>	Sugar Maple	Native
	<i>Populus tremuloides</i>	Quaking Aspen	Native, Weedy
	<i>Tilia americana</i>	Basswood	Native
	<i>Populus alba</i>	White Poplar	Non-native, Invasive
	<i>Salix</i> spp.	Willows	Non-native, Invasive
	<i>Acer ginnala</i>	Amur Maple	Non-native, Invasive
	<i>Quercus rubra</i>	Northern Red Oak	Native
Sub-canopy	<i>Prunus virginiana</i>	Cokecherry	Native
	<i>Amelanchier</i> spp.	Juneberries	Native
	<i>Ribes cynosbati</i>	Prickly Gooseberry	Native
	<i>Ribes missouriense</i>	Missouri Gooseberry	Native
	<i>Morus alba</i>	White Mulberry	Non-native, Invasive
	<i>Frangula alnus</i>	Glossy Buckthorn	Non-native, Invasive
	<i>Rhamnus cathartica</i>	Common Buckthorn	Non-native, Invasive
	<i>Sambucus racemosa</i>	Red-Berried Elder	Native
	<i>Prunus serotina</i>	Black Cherry	Native
	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Non-native, Invasive
	<i>Cornus alternifolia</i>	Pagoda Dogwood	Native
Ground vegetation	<i>Ageratina altissima</i>	White Snakeroot	Native
	<i>Leonurus cardiaca</i>	Common Motherwort	Non-native, Invasive
	<i>Vitis riparia</i>	Wild Grape	Native
	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	Native
	<i>Hackelia virginiana</i>	Virginia Stickseed	Native
	<i>Solidago canadensis</i>	Canada Goldenrod	Native
	<i>Nepeta cataria</i>	Catnip	Non-native, Invasive
	<i>Maianthemum racemosum</i>	Common False Solomon's Seal	Native
	<i>Circaea canadensis</i>	Common Enchanter's Nightshade	Native
	<i>Pilea pumila</i>	Dwarf Clearweed	Native
	<i>Sicyos angulatus</i>	Bur Cucumber	Native

Table 15. Terrestrial vegetation observed in the prairies at Wood Lake Nature Center throughout summer and fall, 2025.

	Scientific Name	Common Name	Nativity
Canopy	<i>Populus deltoides</i>	Cottonwood	Native
	<i>Populus tremuloides</i>	Quaking Aspen	Native
	<i>Quercus ellipsoidalis</i>	Northern Pin Oak	Native
Sub-canopy	<i>Frangula alnus</i>	Glossy Buckthorn	Non-native, Invasive
	<i>Rubus</i> spp.	Blackberries	Native
	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	Non-native, Invasive
	<i>Prunus virginiana</i>	Chokecherry	Native
Ground vegetation	<i>Apocynum cannabinum</i>	American Hemp	Native
	<i>Elymus</i> spp.	Wild Ryes and Cheatgrasses	Native
	<i>Calamagrostis canadensis</i>	Bluejoint	Native
	<i>Solidago canadensis</i>	Canada Goldenrod	Native
	<i>Ageratina altissima</i>	White Snakeroot	Native
	<i>Bouteloua curtipendula</i>	Side-Oats Grama	Native
	<i>Euphorbia virgata</i>	Leafy Spurge	Non-native, Invasive
	<i>Euphorbia corollata</i>	Eastern Flowering Spurge	Native
	<i>Andropogon gerardii</i>	Big Bluestem	Native
	<i>Artemisia ludoviciana</i>	White Sage	Native
	<i>Sorghastrum nutans</i>	Indian Grass	Native
	<i>Rosa arkansana</i>	Prairie Rose	Native
	<i>Panicum capillare</i>	Witch Grass	Native
	<i>Agastache foeniculum</i>	Blue Giant Hyssop	Native
	<i>Monarda fistulosa</i>	Wild Bergamot	Native
	<i>Monarda punctata</i>	Spotted Horsemint	Native
	<i>Helianthus pauciflorus</i>	Stiff Sunflower	Native
	<i>Eryngium yuccifolium</i>	Rattlesnake Master	Native
	<i>Asclepias tuberosa</i>	Butterflyweed	Native
	<i>Baptisia lactea</i>	White Wild Indigo	Native
	<i>Silphium perfoliatum</i>	Cup Plant	Native
	<i>Phalaris arundinacea</i>	Reed Canary Grass	Non-native, Invasive
	<i>Lythrum salicaria</i>	Purple Loosestrife	Non-native, Invasive

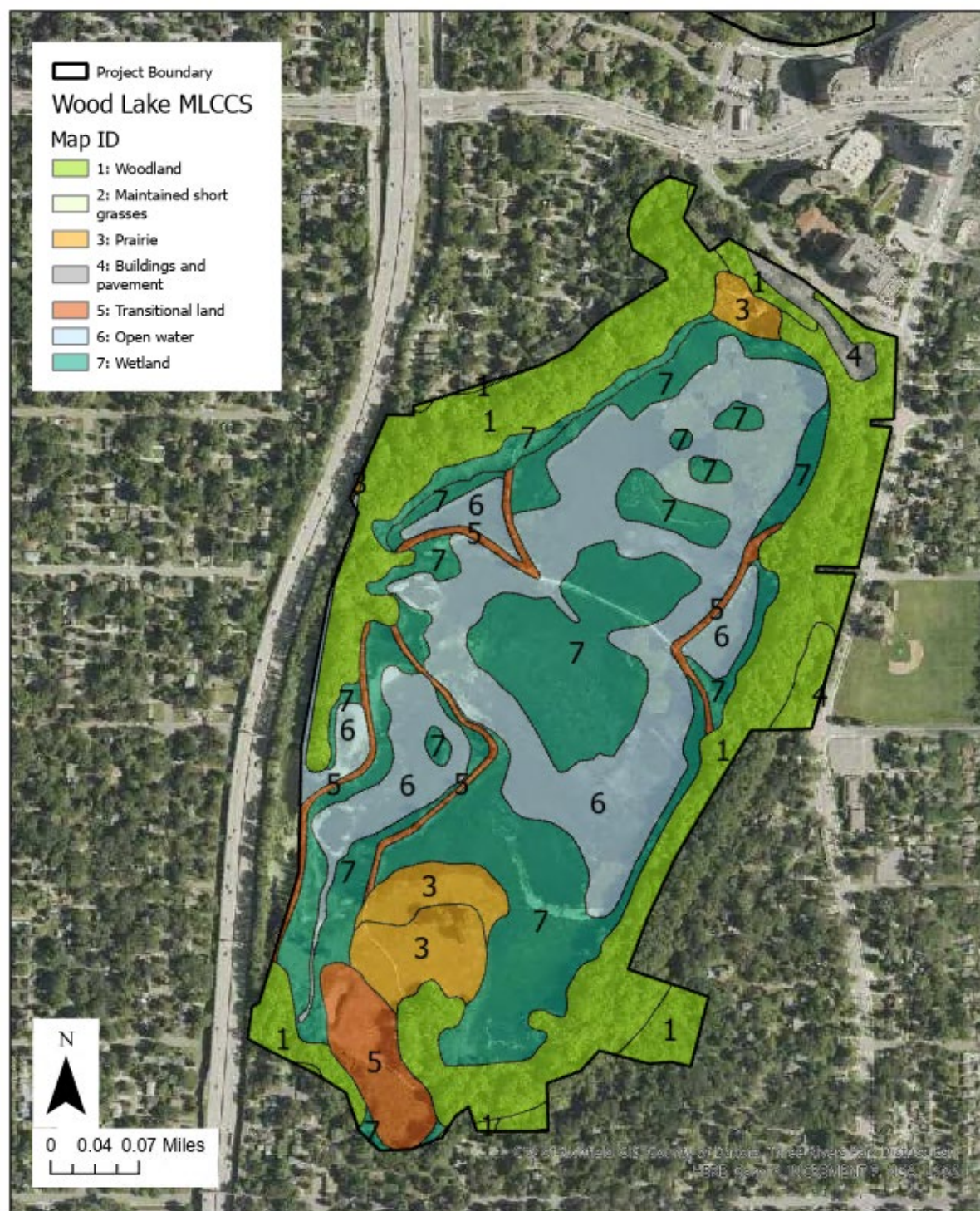
Minnesota Land Cover Classification System (MLCCS)

The Minnesota Land Cover Classification System (MLCCS) cover types for Wood Lake Nature Center are shown in Table 6 and Figure 3. Although this classification system informs our understanding of site composition and habitat complexes, technological limitations of MLCCS and land use changes should be considered to accurately depict current conditions. Due to the rapidly changing nature of urban parks and redundancies amongst code definitions, the MLCCS cover types were condensed and simplified into general land use categories and descriptions for Wood Lake Nature Center.

The Minnesota Land Cover Classification System (MLCCS) cover types for Wood Lake Nature Center are shown in Figure 14. The MLCCS survey identified eighteen different land cover types within the project boundary (Table 16). Wetlands and woodlands dominate the vegetation classes of the site (31% and 30%, respectively). Altered/non-native deciduous woodland covers more than 27% of the mapped area, with small areas of oak forests in the eastern sections and other deciduous trees with a range of impervious cover throughout the site. Prairies and transitional land comprise 11%, largely in the restored savanna habitat in the south with some acres surrounding the nature center campus that will be impacted by the construction of the new building facilities. The remainder (1%) of impervious land use class is represented by the northern parking lot area. Little to no turf, paved spaces or other managed urban land use exists within Wood Lake Nature Center as the playgrounds and multi-use recreational / educational facilities are incorporated within the surrounding natural habitats. These MLCCS codes have been simplified into broad categories to summarize land use types and associated restoration needs below (Table X and Figure X).

Table 16. Minnesota Land Cover Classification System codes throughout Richfield Park, Richfield, MN

Map ID	MLCCS Codes	Category	MLCCS Code Name/Description
1	32112, 11241, 11239, 42130, 42210	Woodlands	Upland deciduous forest with temporary flooding exists throughout 30% of project area. Oaks are particularly dominant throughout edges of the eastern woodland.
2	-	Maintained short grasses	-
3	61110, 61410, 13223, 23212	Prairies	Upland grassland dominated by wet to mesic prairie species with minimal canopy exists throughout 6% of the project area.
4	14122, 14113	Buildings and Pavement	Buildings and pavement make up 1% of the total project area, specifically the northern entrance and parking lot.
5	14214	Transitional Land	Transitional land use with no canopy and mowed turf exists throughout 5% of the project area.
6	92100, 93300	Open Water	Palustrine open water exists throughout 27% of the project area.
7	61830, 61630, 61730, 61480	Wetland	Altered, non-native dominated vegetation ranging from saturated to permanently flooded soils exist throughout 31% of the project area.



Minnesota Land Cover Classifications System (MLCCS) Wood Lake Nature Center, Richfield, MN

Figure 14. Minnesota Land Cover Classification System codes throughout Wood Lake Nature Center, Richfield, MN.

Minnesota DNR Native Plant Community Classification (MNDNR NPC)

The diversity of native species at Wood Lake Nature Center does provide a good basis for the proposed NPCs. While the current plant communities are considered ‘degraded’ versions of the target restoration NPCs due to the history of the site and the continued urban impacts that define this space, they do largely align with the MLCCS classes as well as the proposed management units and goals. Descriptions of approximate native plant community types found throughout Wood Lake Nature Center are provided below (Table 17).

The plant communities break out into three major forest types, two upland savanna / prairie types, and one wetland edge prairie habitat type.

NOTE – The MHs49 NPC is the only NPC that comes up on the DNR habitat shapefile. We will either remove it as proposed NPC (units may lack the rich soil described for the current or proposed species) or reevaluate the fit of the FFs59.

Table 17. Minnesota DNR Native Plant Communities identified throughout Wood Lake Nature Center, Richfield, MN.

NPC Code	NPC Code Name	Description
<u>MHs49</u>	Southern Wet-Mesic Hardwood Forest	Rich, wet-mesic lowland hardwood forests on level silty alluvium in stream valleys and on level glacial till bordering lakes. Sites are protected from fire, and soils remain moist throughout the growing season.
<u>MHs37/MHs38</u>	Southern Dry-Mesic Oak Forest/ Southern Mesic Oak Basswood Forest	Dry-mesic or mesic hardwood forests occurring most often on thin, wind-deposited silt on crests and upper slopes of bedrock bluffs and less often on hummocky stagnation moraines in calcareous, partially sorted drift.
<u>FFs59</u>	Southern Terrace Forest	Wet-mesic deciduous forests on silty or sandy alluvium on level, occasionally flooded sites along small streams to large rivers in the southern half of Minnesota.
<u>UPs14/UPs13</u>	Southern Dry Savanna and Prairie	Sparsely treed communities with grass-dominated herbaceous ground layers on nearly level to steeply sloping sites with droughty soils. Moderate growing-season moisture deficits occur during most years, and severe moisture deficits are frequent, especially during periodic regional droughts. Trees are open grown, typically small and gnarled. Historically, fires probably occurred every few years.
<u>WPs54</u>	Southern Wet Prairie	Grass-dominated but forb-rich herbaceous communities on poorly drained to very poorly drained loam soils formed in lacustrine sediments, unsorted glacial till, or less frequently outwash deposits. Typically in slight depressions, sometimes on very gentle slopes. Flooded for brief periods at most; upper part of rooting zone is not saturated for most of the growing season, but saturation usually persists in lower zone for much of season.

6.b. Restoration Objectives

Wood Lake Nature Center has had staff on site since the construction of the original nature center buildings in 1971. Current and continuing efforts include invasive shrub removal with follow up maintenance, native shrub planting and protection, native seeding, and prairie maintenance. The new nature center campus will also include landscaped or developed natural areas for educational purposes that may utilize similar species and techniques but will not be included in this management plan.

Recreation Management Area Objectives

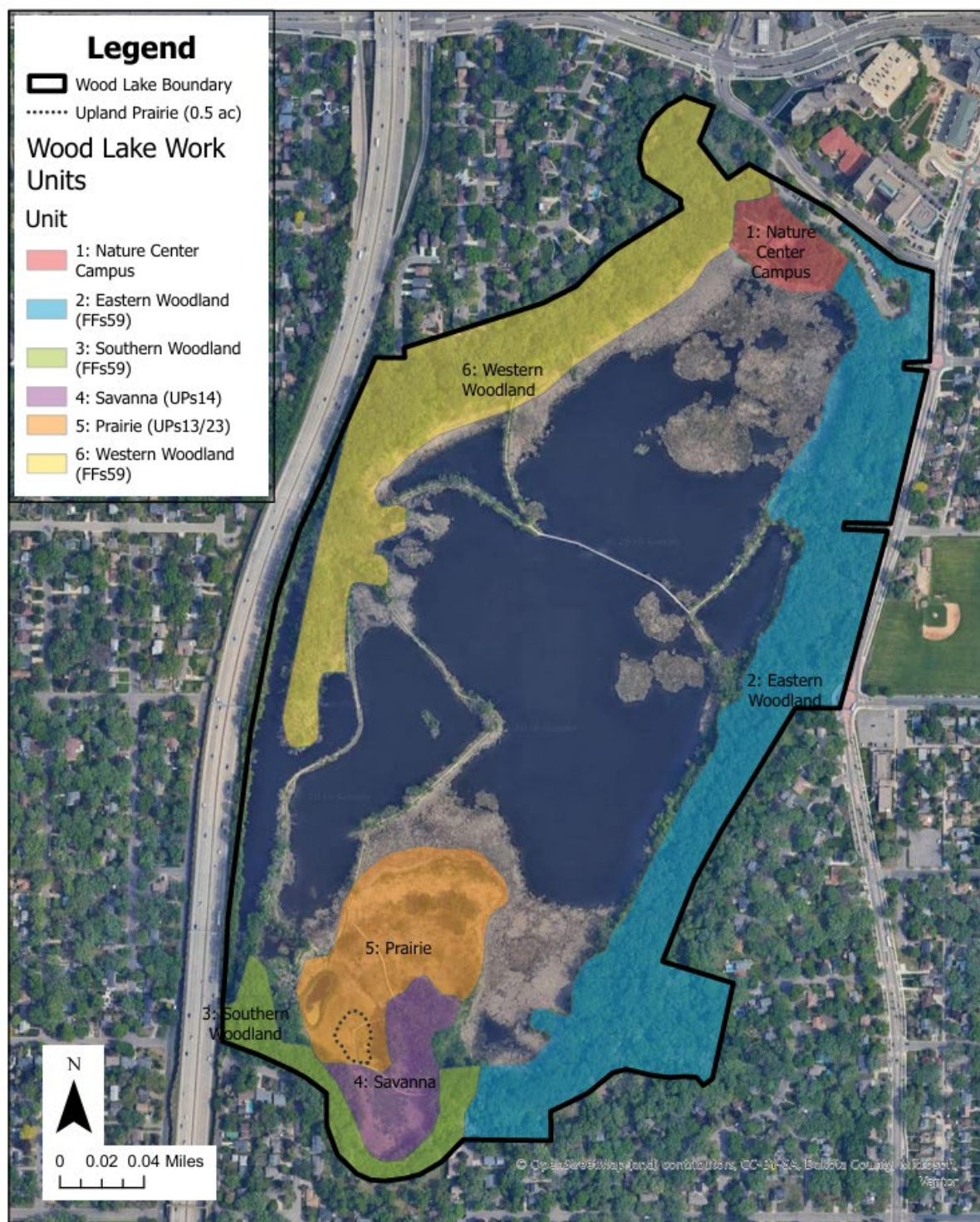
- ❖ Maintain a healthy natural space by removing invasive species and stewarding the growth of native plants at all forest levels.
- ❖ Continue establishing and maintaining the prairie and savanna habitats.
- ❖ Diversify the native shoreline to reduce cattail and reed canary grass expansion and contribute to water quality.
- ❖ Balance the sustainability of wild natural areas with trail use and nature center programs.
- ❖ Maintain a diversity of marsh and lake views along trails and at bird viewing areas.

Ecological Restoration Objectives

Management comments consider the challenges of restoring a disturbed urban landscape and should continue to be evaluated as environmental conditions change over time.

1. **Restore and enhance forest habitats (MHs37/38 and FFs59)**
 - a. Strategies
 - i. Maintain and enhance woodland remnants in Units 2, 3, and 6.
 - ii. Conduct mechanical and chemical removal of invasive, hazard, and non-suitable woody species. This will include thinning or removal of MN native species such as box elder and green ash.
 - iii. Re-establish a tree canopy cover of 50-100% after initial undesirable canopy removal.
 - iv. Maintain a representative age class to allow for regeneration.
 - v. Enhance understory diversity with deep rooted native grasses, forb, and shrub species.
 - (a) Historical and existing native vegetation structure should be considered for future habitat enhancement species selection.
 - (b) Where possible, use local ecotype seed following the Minnesota Board of Water & Soil Resources (BWSR) "Native Vegetation establishment and enhancement guidelines." See Appendices E and G for species lists.
2. **Restore and enhance upland savanna and prairie habitats (Ups14 and 13)**
 - a. Strategies
 - i. Conduct mechanical and chemical removal of invasive, hazard, and non-suitable woody species in Units 4 and 5, as well as the adjacent edges of Unit 3.
 - ii. Establish a tree canopy cover of 5-20% with habitat connectivity to savanna habitats in Units 4 and thin or control aspen expansion in Unit 3.
 - iii. Remove and continue suppression of reed canary grass in Units 3, 4, and 5.

- iv. Continue ground layer vegetation restoration with continued establishment maintenance of deep-rooted native savanna grasses, forb, and flowering shrub species to enhance pollinator habitat connectivity in Units 4 and 5.
- 3. Restore and enhance wetland edge prairie for erosion control and surface water health (WPs54)
 - a. Strategies
 - i. Remove and continue suppression of reed canary grass and invasive cattails in and adjacent to all accessible shorelines.
 - ii. Establish deep rooted plant species to filter pollutants carried by rainfall, improve soil health, and reduce soil erosion into Wood Lake.
- 4. Reduction/mitigation of non-native and invasive species
 - a. Rationale: Due to vectors likely to persist on the site due to its urban setting and relatively small size, non-native species will persist on the site, if left unmanaged. As per recommendations outlined in section 6.c, many management units include an initial removal of the most dominant invasive species, followed by a revegetation plan that can provide competition against re-colonization by invasives.
 - b. Strategies
 - i. Document location, density, and area of invasive populations with GIS.
 - ii. When feasible, use biological control.
 - iii. Where biological control is not available, use chemical and mechanical means to control.
 - iv. Monitor infested areas for effectiveness of control.
 - v. Provide education to community members and adjacent landowners regarding prevention and management.
- 5. Consider impacts to wildlife, habitat management, and visitor use of Wood Lake Nature Center
 - a. Strategies
 - i. Install signage of restoration and management activities at entry points that explain restoration activities and their importance to ecosystem health.
 - ii. When possible, remove or stack felled or dead trees away from trails.
 - iii. Provide access that is sensitive to surrounding landscape and minimizes impact on natural resources.
 - iv. Review and prioritize tree removal of invasive and potentially hazardous trees throughout the corridor (See Appendix A).



Wood Lake Nature Center Restoration Work Units



Figure 15. Target restoration ecosystems, by work unit, defined by MN DNR Native Plant Communities recommended for Wood Lake Nature Center, Richfield, MN.

6.c. Habitat Complexes and Management Comments

These habitat complexes are guided by the Minnesota Land Cover Classification System (MLCCS) and Native Plant Communities (NPC), defined by the MNDNR, and have been simplified to streamline the recommended management activities. Following the description of each habitat type per MLCCS, observations and commentary on the specifics of each identified management unit at Wood Lake Nature Center are discussed.

The following section also contains specific recommendations for the execution of management objectives at each work unit (Fig. 15). In each unit, observations are detailed based on observed conditions as of summer and fall 2025 and spring 2026. The recommended activities are proposed here generally as a sequential timeline, with high-disturbance activities such as woody debris and major invasive control being first priority, followed by subsequent follow-up measures and vegetation enhancement. Management comments should continue to be evaluated as environmental conditions change over time. A more structured presentation of the proposed activity timeline across the site is detailed in the cost summary table in section 6.c., with the per-unit tasks broken down in the table found in 6.d. Recommended activities could be phased across a wider time frame, or by specific units per phase, as funding and capacity require, although it should be recognized that alignment of similar management activities chronologically across the entire site will likely provide increased efficiency and lower cost-per-acre, due to efficiency of scale. Long-term maintenance recommendations are broken down into 5-10- and 10-20-year recommendations in section 6.e., however, inflation changes should be considered. Section 6.f. lists recommended specifications related to the associated management actions. Refinement of exact specifications will still be required when any management guidance is translated into a request for proposals or implementation by city staff.

Note: Hazardous and invasive tree removal recommendations are outlined on a high level within the following management comments by unit. Further explanation and detailed mapping for all tree removal can be found in Appendix A.

Target Ecosystem – Urban Interface with Nature Center Campus

Work Unit 1: Nature Center Campus

Description: Urban infrastructure with native planting areas.

Management comments:

1. Refer to the campus design for the newly constructed nature center facility for plans that will be instituted after the building construction in 2026/27.
2. Replanting of canopy trees lost to the construction should prioritize diverse native species that are applicable to the habitat such as bur oaks, basswood, hackberry, or maples.
3. Any turf grass required by the nature center can incorporate bee lawn enhancements to create pollinator resources but maintain pedestrian use with minimal disturbance.
 - a. Recommended installation of at least three forb species, with associated relaxation of mowing intervals, especially during establishment. Mower deck height minimum of 4" is recommended for optimum results of flowering species.
 - b. Low mow fescue grasses can be introduced along with the bee lawn forbs for better drought tolerance, reduced mowing frequency, and a more rustic aesthetic.

Target Ecosystems – FFs59 – Southern Terrace Forest

Work Units 2 and 6: Eastern and Western Woodlands

Description: Cottonwood trees (*Populus deltoides*) dominate the canopy throughout the woodland. These fast-growing natives establish quickly and mature in 50-70 years along shallow lakeshores. Other dominant native tree species include silver and sugar maples (*Acer saccharinum* and *A. saccharum*), American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*) and basswood (*Tilia americana*). Weedy or invasive green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), black locust (*Robinia pseudoacacia*), Siberian elm (*Ulmus pumila*), white poplar (*Populus alba*) and white mulberry (*Morus alba*) can be found throughout the site, with dense patches of young growth expanding in many areas.



Image 15. Walking trail along the east side of Wood Lake showing an established understory and canopy trees, Richfield, MN.

The shrub layer is reasonably diverse with a wide range of native species. Invasives such as glossy and common buckthorn (*Frangula alnus* and *Rhamnus cathartica*) do dominate patches of the understory. However, natives including black cherry and chokecherry (*Prunus serotina* and *P. virginiana*), prickly and Missouri gooseberry (*Ribes cynosbati* and *R. missouriense*), red-berried elder (*Sambucus racemosa*), prickly ash (*Zanthoxylum americanum*) and black raspberry (*Rubus occidentalis*) are widespread, providing pollinator and wildlife forage throughout the year.

Common motherwort (*Leonurus cardiaca*), purple loosestrife, thistles (*Cirsium spp.*), leafy spurge (*Euphorbia virgata*), sweet clover (*Melilotus alba*), ground-ivy (*Glechoma hederacea*), garlic mustard (*Alliaria petiolata*) and common burdock (*Arcium minus*) can be found densely outcompeting natives in many areas but again the understory is dominated by native vegetation.

The ground vegetation is very sparse in sections, with sandy open soil supporting little to no vegetation in large patches. White snakeroot (*Ageratina altissima*), common jewelweed (*Impatiens capensis*), Virginia stickseed (*Hackelia virginiana*), ostrich fern (*Matteuccia struthiopteris*) dwarf clearweed (*Pilea pumila*) and multiple other nettles in the *Urticaceae* family widely cover the ground. Wild grape (*Vitis riparia*) and Virginia creeper (*Parthenocissus quinquefolia*) vine both up tree trunks as well as cover large areas of the woodland floor. Multiple Solomon's seal species (*Maianthemum racemosum*, *M. trifolium* and *Polygonatum biflorum*), Jack-in-the-pulpit (*Arisaema triphyllum*) and common and smooth yellow violet (*Viola sororia* and *V. eriocarpa*) are also widely found.

Management Comments:

1. Proactive and hazard tree removal should be conducted to prevent trail obstructions and could be done simultaneously with woody invasive control and disposal.
2. Invasive and weedy trees, like boxelder, silver maple, mulberries, as well as their resprouts and clonal shoots, should be removed and controlled over multiple years.
3. Continue buckthorn and invasive shrub removal with follow up treatments in all areas. Seedlings may still establish after initial population removal due to the seedbank deposited by older "mother" berry producing plants that have since been removed.
4. Herbaceous invasive and weedy species should be monitored and controlled after buckthorn removal with timed herbicide spot treatments.
5. Understory seeding is recommended to promote native species, deter invasive establishment and enhance habitat.
6. Native trees and shrubs should be planted in individual cages or small, protectively fenced pods, to continue understory diversification especially in areas of invasive tree or shrub removal.
7. Targeted pockets of open areas should be planted with native forb and fern plugs, especially of species that do not establish well from seeds

Work Unit 2: Eastern Woodland and SE Neighborhood Edge

Description: Bur oak and other oak species (*Quercus macrocarpa* and *Quercus spp.*) are found predominantly on the eastern and southern edges of this unit. Invasive woody is minimal, however, this unit should still be swept as there is a large Siberian elm along the trail of this unit that will continue to seed. There is a large established patch in the SE access area that extends into the neighborhood by W. 71st St. and Bryant Ave S. This



Image 16. A deer browsing between downed woody debris along the fenceline of the oak-filled neighborhood east of Wood Lake, Richfield,

eastern edge rises in topography up into the remnant oak grove that dominates the private property along Oak Grove Blvd.

Management Comments:

1. Disposal of existing woody debris is suggested to be conducted prior to woody invasive removal to maximize accessibility.
2. Invasive trees and shrubs should be managed along with the rest of this unit.
3. Bur oak seedlings that are naturally propagating should be found, marked, and caged to prevent wildlife damage or mortality during other management activities.
4. Garlic mustard and other herbaceous species should be monitored and removed as restoration continues.
5. Understory enhancement with shade tolerant native vegetation is recommended. Snow seeding is recommended to promote effective germination, especially given the compacted soils where disturbance has occurred.

Work Units 2 and 6: Upland Forests Near Fencelines and Nature Center

Description: While there isn't a hard designation between these three ecosystem types within Units 2 and 6, there are pockets of slightly higher (and potentially previous shoreline woodlands) at the edges of these units.

Management Comments:

1. Tasks will be like the other woodlands but refer to Appendices D and G for applicable native species lists.

Work Unit 3: Southern Woodland

Description: Condition is very similar to Unit 2 with more altered shoreline due to stormwater drainage outlets, ditches, and constructed walkways. The canopy contains walnut, ash, silver maple, cottonwood, elm, and boxelder. The habitats are similar in composition but considerably less accessible in the SW corner.

Management Comments:

1. Priority will be for invasive species removal, specifically for those that produce seeds, berries, or otherwise may spread prolifically to adjacent areas.
2. Trail-adjacent habitat will benefit from native species establishment and hazard tree removal.
3. The eastern portion of this unit may be transitioned to savanna depending on the management goals of Units 4 and 5.

Target Ecosystem – UPs13/14/23 – Southern Dry Prairie and Savanna

Work Units 4 and 5: Native Prairie and Savanna

Description: The prairie section of open and relatively higher ground in the southern section of the park is unique in that not only does it date prior to the lowering of the lake levels, potentially retaining a seedbank or at least land use history that supports native grassland vegetation, the city has also replanted this habitat in recent decades. A stand of quaking aspen (*Populus tremuloides*) and cottonwoods contribute to the savanna portion adjacent to the establishing prairie.



Image 17. Establishing prairie at Wood Lake Nature Center, Richfield, MN.

Reed canary grass (*Phalaris arundinacea*) and other non-native grass species threaten to dominate if left unmanaged. However, the native grasses big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), side-oats grama (*Bouteloua curtipendula*), canada bluejoint (*Calamagrostis canadensis*), witch grass (*Panicum capillare*), and various native rye species (*Elymus* spp.) currently dominate.

Similarly, while many weedy or invasive forb species can be found such as leafy spurge (*Euphorbia virgata*), field penny-cress (*Thlaspi arvense*), common burdock (*Arctium minus*), velvetleaf (*Abutilon theophrasti*), bird's-foot trefoil (*Lotus corniculatus*) and great mullein (*Verbascum thapsus*), a wide variety of native wildflowers have also established well. These include leadplant (*Amorpha canescens*), prairie rose (*Rosa arkansana*), common and butterfly milkweed (*Asclepias syriaca* and *A. tuberosa*), rattlesnake master (*Eryngium yuccifolium*), wild bergamot and spotted horsemint (*Monarda fistulosa* and *M. punctata*), white wild indigo (*Baptisia lactea*) and several aster and sunflower species.

Management Comments:

1. Invasive grasses and weedy or invasive herbaceous species should be mapped, spot mowed and treated and monitored over multiple seasons.
2. Prescribed fire may be a potential management tool to remove thatch and stimulate native growth in very defined or partial acreage of Units 4 and 5. Wetland edges and savanna sections with native shrubs or tree species that do not tolerate fire should be avoided.
3. Mowing may also promote native grasses and suppress “weedy agricultural forbs” such as pennycress, bird's-foot trefoil, and velvetleaf.
4. Burdock should be managed depending on the stage of life being treated (chemical or mechanical treatments differ for first or second year plants) with multiple years of control to address this biennial weed.
5. Continue overseeding and planting of native plugs to diversify prairie and savanna areas.

6. The area indicated as Upland Prairie in unit 5 will require a dryer seed mix indicated in Appendix B.
7. Unit 4 is a gradual transition between the upland prairie and southern woodland. Glossy and common buckthorn removal is a priority. A quaking aspen stand is encroaching this unit and may require thinning in the long-term to encourage understory establishment.
8. Plant bur oak trees into the savanna areas within caged pods or individual caging.

Target Ecosystem – WPs54 – Southern Wet Prairie

All Work Units – Marsh Edge Habitat

Description: The expanded lakeshore caused by lowered water levels created an exposed habitat between the wooded upland and the open water of the lake. Some sections filled in with marsh species such as cattail, both the invasive narrow-leaved *Typha angustifolia* and potentially the hybridized *T. x glauca*. Other sections are shallow with sandbar willow (*Salix interior*), dogbane (*Apocynum cannabinum*) and purple loosestrife (*Lythrum salicaria*) which line the shore in occasionally dense patches. Bullrushes, sedges and native wildflowers like swamp milkweed (*Asclepias incarnata*) provide diverse habitat in this transitional ecosystem.

Management Comments:

1. Removal of reed canary grass may not be an option in these areas, and especially not throughout the entire habitat. However, it could be controlled in small areas to establish patches of native diversity.
2. A weedy yet native wet prairie mix is recommended for trail edges along the network of raised trails throughout Wood Lake.
3. Tightly mow the edge habitat that will be planted with follow up herbicide applications multiple seasons prior to planting.
4. Plant native plugs in the fall with fencing for protection as well as continued maintenance.



Image 18. Swamp milkweed and other wetland edge ground cover adjacent to Wood Lake, MN.

6.d. Restoration Management Phasing & Cost Estimate Summary

Total management costs* were based on 5-year management plans. Total 5-year costs for all vegetation management are \$XXX,XXX. Cost estimation is based on current 2026 market rates, subcontracting all implementation and necessary oversight, and the assumption that all management units are implemented concurrently. Management unit nuances may influence cost totals and should be considered.

**All prices are estimates based on current market rates at the time of writing. Estimates do not factor in any state dollars being used to perform activities. Due to new language change in statute as of August 1, 2024, any natural resource related projects need to follow state prevailing wage requirements. This change in state statute language will have an increase in actual costs.*

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Applicable Management Units
Hazard tree removal	\$XX,XXX					2, 3, 6
Undesirable and invasive tree removal	\$XX,XXX	\$XX,XXX	\$XX,XXX			2, 3, 4, 6
Woody debris disposal	\$XX,XXX					2, 3, 4, 6
Dead down woody disposal	\$XX,XXX					2, 6
Woody invasive control	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		2, 3, 4, 6
Herbaceous invasive control		\$XX,XXX				1, 2, 3, 4, 5, 6
Reed canary grass control		\$XX,XXX	\$XX,XXX	\$XX,XXX		1, 4, 5
Understory seeding		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	2, 3, 6
Woody invasive follow up control		\$XX,XXX	\$XX,XXX			2, 3, 4, 6
Native pollinator shrubs planting with fencing			\$XX,XXX			2, 4, 6
Prairie diversity reseeding			\$XX,XXX			4, 5
Shoreline habitat plantings			\$XX,XXX	\$XX,XXX	\$XX,XXX	1, 2, 6
Oaks and native tree plantings with fencing		\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	1, 2, 3, 4, 6
Native species establishment maintenance	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	1, 2, 3, 4, 5, 6
Total	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX

6.e. Management Unit Recommendations

Note: Priority index is on a scale from 1 to 5 (1=high priority, 5=low priority).

Existing Land Cover Types	Acres	Target Land Cover	Recommended Actions	Priority Index	Year 1	Year 2	Year 3	Year 4	Year 5	Assumptions and Notes
Management Unit 1										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Woody invasive control	1	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX		Cut, treat, pile, burn on site or chip
			Hazard tree removal	2	\$XX,XXX					Haul off or chip for trails
			Dead down woody disposal	1	\$XX,XXX					
			Reed canary grass control	3		\$XX,XXX	\$XX,XXX	\$XX,XXX		Two treatments year 2, Rx burn year 3, final spray and seeding year 4
			Understory seeding	3		\$XX,XXX		\$XX,XXX		Seed understory after BT removal, seed grasslands after RCG removal
			Planting of native trees and shrubs	4				\$XX,XXX	\$XX,XXX	Plant year 4, maintenance year 5
Management Unit 2										
Altered/non-native mesic hardwood	X	Enhanced mesic hardwood	Dead down woody disposal	1	\$XX,XXX					SWWD is conducting management in this area. Chip into walking trail
			Hazard tree removal	1	\$XX,XXX					
			Seed, Blanket, Cover Crop	2			\$XX,XXX			Seeding should be accompanied by some form of erosion control
			Woody invasive control	1	\$XX,XXX	\$XX,XXX				
Management Unit 3										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes
Management Unit 4										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX				Notes

Management Unit 5										
Existing	X	Target	Task	Priority	\$X,XXX	\$XXX	I	I	I	Notes

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6.f. Long Term Maintenance Recommendations

While it can be difficult to accurately forecast longer term maintenance needs once the initial restoration phase is complete, provided here are estimates of likely activities that may be necessary to maintain the sites and continue to enhance the diversity and floristic quality of the management units. **Other details as needed.**

Management Units	Activity	Year 5-10 Cost Estimate*	Year 10-20 Cost Estimate*
2, 3, 6	Woody invasive control	\$XX,XXX	\$XX,XXX
1, 2, 3, 4, 5, 6	Enhancement plugs and shrub plantings with fencing	\$XX,XXX	\$XX,XXX
4, 5	Prescribed burn or burn alternative	\$XX,XXX	\$XX,XXX
2, 3, 4, 5, 6	Herbaceous invasive control	\$XX,XXX	\$XX,XXX
2, 4	Fencing maintenance	\$XX,XXX	\$XX,XXX
All	Tree maintenance and replacement	\$XX,XXX	\$XX,XXX
Totals		\$XX,XXX	\$XX,XXX

**Cost estimates here do not reflect inflation, changes to market rates for services, etc., but are intended to provide a relative reference point for longer-term maintenance needs.*

Appendix A: Specifications

[Further edits will be made to this section to indicate relevant sites and units and site specific modifications]

1. Target species for removal

- a. Woody target species: 95% removal and 90% continued control of invasive brush species: Common buckthorn (*Rhamnus cathartica*), Glossy buckthorn (*Frangula alnus*), Amur maple (*Acer ginnala*), exotic honeysuckles (*Lonicera tartarica*, *L. morrowii*, *L. maackii*, *L. x bella*) Russian olive (*Elaeagnus angustifolia*), Black locust (*Robinia pseudoacacia*), and Siberian elm (*Ulmus pumila*), Oriental bittersweet, (*Celastrus orbiculatus*), Japanese barberry (*Berberis thunbergii*), black locust (*Robinia pseudoacacia*), and Siberian pea shrub (*Caragana arborescens*), Norway maple (*Acer platanoides*), tree of heaven (*Ailanthus altissima*), white mulberry (*Morus alba*), winged euonymus (*Euonymus alatus*), white/European poplar (*Populus alba*), multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*)
- b. Allowable incidental take of native weedy shrub species (no % control goal, no herbicide treatment): Boxelder (*Acer negundo*), Silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), cottonwood (*Populus deltoides*), American elm (*Ulmus americana*).
- c. Herbaceous invasive target species: 90% control of the following species: Kentucky bluegrass/ turf grass (*Poa pretensis*) in all turf conversion units, Garlic Mustard (*Alliaria petiolata*), Burdock (*Arctium* spp), bittersweet nightshade (*Solanum dulcamara*), butter and eggs (*Linaria vulgaris*), Motherwort (*Leonurus cardiaca*) Dame's Rocket (*Hesperis matronalis*), Japanese hedge parsley (*Torilis japonica*), Invasive thistles (*Cirsium* spp), Bird's-foot Trefoil (*Lotus corniculatus*), Sweet Clover (*Melilotus* spp.), spotted knapweed (*Centaurea stoebe*), Crownvetch (*Securigera varia*), and Reed canary grass (*Phalaris arundinacea*)**.
 - i. Spot treatments of reed canary grass where it is interspersed with desirable vegetation are required throughout all work units (i.e. where populations do not exceed 1000 square feet in size or are not the dominant cover).
- d. This project is not concerned with the following invasive herbaceous species and are beyond its scope as targets: Cattail, narrow leaf or hybrid (*Typha* spp.), Creeping Charlie (*Glechoma hederacea*), and Smooth brome (*Bromus inermis*).

2. Cut and stump treatment

- a. Cut surface and treat ALL target species $\geq 1/2$ " DRC (diameter at root collar).
- b. Material smaller than $1/2$ " DRC must be followed up with a foliar treatment.
- c. Stumps and stems must be cut flat (not shredded or left with angled top) within 2" of ground using chainsaws, brush saws, or hand tools.
- d. Herbicide must be spot-applied to cut stumps/stems with a dauber, backpack, or handheld sprayer fitted with nozzles adjusted for a cone-shaped, coarse mist.
- e. For ≥ 4 " diameter - apply herbicide to the cambium (growth area along outer ring) of the stump surface. For less < 4 " diameter stem/stump – herbicide must be applied to all cut surfaces. Avoid non-target damage.
- f. No spraying from motorized vehicle is allowed, including an ATV or UTV.
- g. All cut material from target species must be treated with approved herbicide:
- h. Triclopyr amine (Garlon 3A® or approved equivalent) mixed with water or a water-based adjuvant must be applied immediately after cutting. This cannot be applied during periods of heavy sap flow or when temperatures are below 40° F. Concentration must be between 50-100% v/v.

- i. Triclopyr ester (Garlon® 4 Ultra or approved equivalent) must be applied with both an oil-based carrier (e.g., Bark Oil Blue ®) and additional dye immediately following cutting. The use of petroleum products as a carrier is not allowed.
- j. Glyphosate must be applied immediately following cut during late spring, summer, or fall. Do not apply herbicides during times of heavy sap flow (early spring). Follow herbicide label instructions.
- k. For herbicide treatment near wetlands, surface water, or seeps, only aquatic-rated herbicides and oil carriers containing active ingredient Triclopyr are approved. Wetland edges will be identified by Project Manager.

3. Foliar Application

- a. Kill rate for foliar application is ≥95%.
- b. Active chemical, formulation, and timing must be agreed upon by the Project Manager and subcontractor.
- c. Target plants < 3ft in height. Whips >3 ft tall must be cut first and allowed to regrow prior to spraying.
- d. Spray must cover entire leaf surface area of each plant to the point of wet but not dripping.
- e. Care at minimizing overspray is critical.
- f. Triclopyr formulations
 - i. Must be applied in fall between when nighttime temps drop below 50, prior to senescence of target species (typically prior to first hard frost).
 - ii. Ester formulations (e.g., Garlon 4 Ultra) cannot be applied in June, July, and August
- g. Glyphosate formulations
 - i. Must be applied in late spring and summer, after heavy sap run has ended
- h. Water-soluble Triclopyr formulations (e.g. Garlon 3a) are preferred for summer foliar applications to limit the potential for volatilization and off target impact of the chemical, whereas oil-soluble Triclopyr formulations (e.g., Garlon 4 Ultra) are preferred for late fall applications.
- i. No foliar herbicide applications using an ester formulation (e.g. Garlon 4) shall be made during the months of June, July, or August.
- j. No foliar herbicide applications (regardless of formulation) shall be performed when the daily temperature is predicted to be >85 degrees F with a corresponding relative humidity of <45% at any time during the day (not just at the time of application).
- k. Reapplication cannot occur until the target species has resprouted and leafed out.
- l. In addition to spray applications, foliar wicking is also an acceptable form of foliar application.

4. Wicking applications

- a. Below are species recommended for wicking techniques – EDIT BY SITE
 - i. Hybrid cattail (*Typha x glauca*)
 - ii. Poison ivy (*Toxicodendron rydbergii and radicans*)
 - iii. Glossy buckthorn (*Frangula alnus*) Phragmites
 - iv. Particularly effective for conifers, large Norway maple, other large trees not known prone to suckering.
- b. Herbicide application will occur in fall, around the first hard frost and prior to the senescence of target species.
- c. Herbicide will be applied with the use of a wick or hand pump type applicator to the leaves and stems of target plants in areas where dense native species are present. Herbicide will be applied with a foliar spray in areas with dense target species and low native species presence.
- d. Wicking strategy will use a cloth glove fitted over a chemical resistant rubber glove (or fully saturated sponge or rope), allowing the applicator to directly apply herbicide to just the leaf surface by soaking the cloth glove and wiping the chemical along the leaf surface.
- e. Wicking application to cover all of leaf surface area on each individual plant. Care at minimizing non-target damage must be used during all herbicide application
- f. Triclopyr ester (Garlon 4 ultra or approved equivalent) is preferred for all winter, early spring, and late fall applications, unless otherwise stated. An oil-based, carrier must be a product

specifically designed for herbicide use (e.g. Diluent Blue™); use of diesel fuel as a carrier is not allowed.

- g. Amine formulations (e.g. Garlon® 3a) are intended for use in aquatic proximity and are preferred for summer applications (June, July, August) to limit the potential for volatilization and off target impact of the chemical.
- h. Label directions must be followed. Active ingredient must be sufficient concentration to be effective.

5. Basal Bark

- a. Timing
 - i. Preferred timing of basal bark application is winter (**Nov 1 – Feb 15th**).
 - ii. Herbicide should not be applied to stems during periods of heavy sap flow.
 - iii. For **non-root suckering** species, basal barking can be conducted year round for non-root suckering species.
 - iv. For **root-suckering** species – timing should be limited to treatment from late summer through fall, before freeze-up.
- b. Maximum diameter for treatment of target species is 6" DBH.
- c. For dense thickets of small stems (<6cm), the herbicide can be applied to one side.
- d. Herbicide must be spot-applied to basal stems with backpack sprayer or handheld sprayer.
- e. Spray must saturate the lower 18 inches of trunk, crown buds, and exposed roots around the base of the trees or brush to optimize control.
- f. Applicators must use oil-soluble triclopyr herbicide with an oil-based carrier with dye (e.g., Garlon 4 Ultra® with Bark Oil Blue®). Petroleum products are not an approved carrier.
- g. For herbicide treatment near wetlands, surface water, or seeps, only aquatic-rated herbicides and oil carriers containing active ingredient Triclopyr are approved. Wetland edges will be identified by Project Manager.
- h. Where snow depth inhibits the ability to spray all the way to the ground, treatment of this type should be avoided.
- i. Basal bark will be repeated until all target species have been removed.
- j. Stems can be cut after 12 months have passed following basal bark treatment to allow for full uptake of herbicide.



6. Forestry mowing

- a. Forestry mowing must occur when soils are frozen to a depth of **6 inches** to minimize soil damage and compaction.
- b. Areas receiving forestry mowing as a treatment are required to have follow up foliar spray in the first fall following initial removal. See foliar application for further specifications.
- c. Care should be taken when forestry mowing as to not injure or mow any non-target vegetation.
- d. Forestry mowing will be allowed on the edges with hand cutting (e.g. chain saw or brush saw) within 20 feet of trails on the interior unless stated otherwise in the work unit activity descriptions.
- e. Trails must be closed to public when mowing adjacent. Spotter required.
- f. Forestry mowing near trails should direct debris away from trails, or the material along the trail corridor may be cut by brush saws or other methods that minimize debris on the trails.
- g. Any mowing head is set low and never exceeds 3' high off the ground.
- h. The mowed vegetation should be shattered by the mower and left in place to decompose. Areas of excessive mowed debris will be dispersed to ensure the **depth does not exceed 6 inches**.
- i. Brush near standing non-target trees needs to be cut by hand-held tools (e.g. chain saws or brush saw).

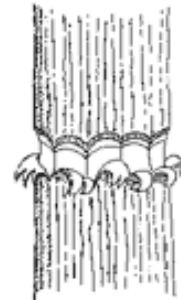
- j. In areas where high quality native trees are dominant, hand cutting is required. In all forestry mow areas the following species are allowable for incidental take:
 - i. Boxelder (*Acer negundo*), Silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), cottonwood (*Populus deltoides*), American elm (*Ulmus americana*).
 - k. Provider will be held accountable for any damage to desirable non-target trees through operator negligence (including but not limited to scalping trees with cutter head).
 - l. Oak wilt: Extreme care should be taken to avoid damage to save trees to prevent the spread of oak wilt. Wounds on oaks intended as save trees should be brought to the attention of the project manager to determine if they need to be removed or painted with pruning paint.
 - m. No debris will be ejected off site and no private property will be in danger during this activity.
- 7. Critical high cut**
- a. Target species is common buckthorn (*Rhamnus cathartica*).
 - b. Critical high cut will target vegetation >2" DBH. Additional removal technique is required to target <2" DBH.
 - c. Year 1 (late May or early June):
 - i. Subcontractor will cut the main stem at a height of 3-5 feet above ground level, using a hand saw, chain saw, or brush cutter. All side branches and growth on the remaining stump is removed using loppers or pruners.
 - d. Year 1 (mid-September):
 - i. Subcontractor will cut off, or "re-strip," any branches and new growth from the sides of the target stumps.
 - e. Year 2 (May or early Jun):
 - i. Subcontractor will remove new growth again after the initial leaf-out in the spring.
 - f. Year 2 (early to mid-September):
 - i. All target stumps will be re-stripped in mid-September or before senescence.
 - ii. Stumps will be removed by pushing them over once target plants die.
 - g. Cut material can be bucked up in pieces no longer than 4', with no branches coming off the ground at >45degrees, and dispersed in wooded areas not more than a single layer of material in depth and otherwise not impeding access and mobility; and/or piled and burned.
 - h. Critical high cut will be repeated until all target species have been removed.
- 8. Summer Critical Cut after initial removal**
- a. Summer critical cut will be conducted within the first summer following initial removal.
 - b. Critical cut will be conducted using hand tools (brush cutters or saws) to remove all resprouts resulting from initial removal.
 - c. Cut/slash material will need to be bucked up and dispersed so it makes ground contact.
 - d. Cut material can be bucked up in pieces no longer than 4', with no branches coming off the ground at >45 degrees and dispersed in wooded areas not more than a single layer of material in depth and otherwise not impeding access and mobility; and/or piled and burned.
 - e. Critical cut is to happen in late July – Mid August.
- 9. Girdling/ Frill Cutting/ Hack & Squirt**

- a. Girdling will target woody vegetation >2" DBH.
- b. Service provider will conduct two girdle cuts, separated by 6-8".
- c. Cut lines must extend around the circumference and fully meet (no gaps).
- d. Girdles must be made below the lowest branch or else remove branches and treat cut branch areas.
- e. Chainsaw girdles must penetrate all the way through the cambium layer (depth from bark edge may vary by species), typically $\frac{3}{4}$ ".
- f. Make sure each girdle receives enough herbicide to fully coat the cambium ring exposed by the girdle.
- g. Take care not to cut deeper than necessary on small, pole sized trees or they are prone to snapping off prior to dying/making a mess/hazard.



- h. The following water-soluble systemic herbicides and approaches are acceptable (EDIT BY SITE):
 - i. 2,4-D:
 - i. Target: root-suckering species
 - ii. Any time of year; best between May 15 and October 15
 - iii. Create continuous frill or girdle at base of tree. Apply 1-2 ml/injection in cuts spaced every 1-2" at root collar.
 - ii. Aminopyralid:
 - i. Target: Robinia pseudoacacia (Black Locust), Gleditsia triacanthos (Honey Locust)
 - ii. 10% solution in water, Any season, except for periods of heavy sap flow in spring.
 - iii. Create continuous frill or girdle, apply 1 ml/injection spaced 3-4" between wound centers.
 - iii. Clopyralid:
 - i. Target: legumes and locust species
 - ii. Undiluted or diluted 1:1 with water, Periods of active growth.
 - iv. Frill cut every 3-4" or girdle. Apply 0.5 ml undiluted or 1 ml diluted/injection spaced 3-4" between wound centers. Dicamba:
 - i. Target: Buckthorns (Rhamnus spp.)
 - ii. 25 to 50% solution in water, Any season, except during heavy sap flow in spring.
 - iii. Create continuous frill or gridle, apply to continuous cut.
 - v. Glyphosate:
 - i. Target: Buckthorns (Rhamnus spp.), Amur maple (Acer ginnala), Amur Honeysuckle (Lonicera maackii), Tree of Heaven (Ailanthus altissima), Robinia pseudoacacia (Black Locust).
 - ii. 25 to 100% (undiluted) solution in water, During active growth after full leaf expansion; avoid peak sap flow in spring.
 - iii. Create continuous frill, apply 1-2 ml per 2-3 inches in diameter BELOW all live branches
 - vi. Triclopyr (amine):
 - i. Target: Black locust (Robinia pseudoacacia), boxelder (Acer negundo), Buckthorns (Rhamnus spp.), Honeysuckles (Lonicera spp.)
 - ii. Undiluted or diluted 1:1 in water, Any season, except during periods of heavy sap flow.
 - iii. Create frill cut at 3-4" intervals between wound centers, apply 0.5 undiluted or 1 ml diluted per cut
- i. Hack and squirt
 - i. A hatchet or similar device will be used to create frill cuts (downward-angled incisions) along the stem/trunk, below the last live branch.

- ii. Frill cuts must be approximately 2 inches long and evenly spaced 1-2 inches apart (two cuts minimum).
- iii. Bark must be penetrated such that living tissue is exposed, creating a cupping effect to hold herbicide.
- iv. Herbicide is applied into the cuts using a spray bottle or gunjet attached to backpack sprayer.
- v. Take caution to prevent overfilling "cup" to minimize nontarget impacts.
- vi. An oil-based carrier with dye (e.g., Bark Oil Blue™) specifically designed for herbicide use must be used. The use of petroleum products as a carrier is not expressly prohibited.
- j. Frill cutting:
 - i. Frill cutting is a variation of girdling in which a series of downward angled cuts are made completely around the tree, leaving the partially severed bark and wood anchored at the bottom (see diagram). Frilling is done with an ax or hatchet.
 - ii. Trees that are frill cut can be left standing dead and do not need to be cut and hauled off site.
 - iii. Areas receiving frill cutting as a treatment are required to have follow up foliar spray in the first fall following initial removal. See foliar application for further specifications.
- k. Aspen and conifer girdling (No Herbicide):
 - i. Effective girdling will remove outer bark and cambium while taking care to not damage sapwood.
 - ii. Girdle to be installed at chest height.
 - iii. Girdle must be at least 6 inches in length.
 - iv. Service provider may use draw knives, chisel, bow saw and/or similar hand tools only.
 - v. Outer bark within the 6-inch girdle should be completely peeled and removed from the trunk of the tree.



10. Herbaceous Invasive Control

- a. Service Provider is responsible for 90% removal of the following species by mechanical or chemical methods (**EDIT AS NEEDED**):
- b. Treatment will be conducted during industry accepted best management timeframes and will be specified by the Project Manager on a species basis.
- c. Contractor is responsible for 90% removal of the target herbaceous species by chemical and/or mechanical methods.
- d. Herbicide application and timing
 - i. Service Provider is responsible for applying chemical at the appropriate growth stage for effective control.
 - ii. Reed canary grass (*Phalaris arundinacea*) herbicide with glyphosate in Mar-May and Aug – Oct before it produces seed.
 - iii. Cool Season Grasses: April-June (spring) or September – October (early fall) with (choose: clethodim, sethoxydim, or glyphosate)
 - iv. Warm Season Grasses: June – September with (choose: clethodim, sethoxydim, or glyphosate).
 - v. Kentucky bluegrass/ turf grass (*Poa pretensis*) herbicide with sethoxydim or clethodim Apr – May, Sept – Oct.
 - vi. Clopyralid formulations (e.g. Transline) are preferred for application to non-native invasive thistles, knapweeds, vetches, and other species to be specified by the Project Manager, to limit herbicide residence time in soil.
- e. Initial turf removal
 - i. The service provider will control/clear >95% of existing turf, and other invasive species from applicable units.

- ii. In areas of dense turf, the use of a vertical cutter is recommended to dethatch in preparation for seeding.
- iii. The contractor will apply up to two herbicide treatments with interspersed mow or till as needed.
- iv. Herbicide will be broad spectrum (preferably glyphosate) that is formulated for use near water. Use of other herbicides must be approved by the Project Manager.
- v. The service provider may use boom sprayers for initial herbicide application with approval from Project Manager.
- vi. Approved methods for spot spraying will include backpack sprayer and/or other hand sprayer application equipment.
- vii. Ensure a 15-20 ft turf buffer adjacent to all roads to maintain sightlines.
- f. Continued herbaceous invasive control
 - i. The service provider is responsible for continued herbaceous invasive control via spot mowing/treating.
 - ii. Appropriate mowing equipment (e.g. weed whips, brush cutters, brush hogs) will be used to mow target species.
 - iii. Avoid collateral damage to non-target plants.
 - iv. Approved methods for spot spraying will include backpack sprayer and/or other hand sprayer application equipment.
 - v. Invasive forbs that follow a biennial or annual life cycle will be mowed and treated at the appropriate times to inhibit/ prevent seed production.
 - vi. Target plants should be mowed to soil level/growth point if feasible without damage to non-target species.

11. Seeding

- a. Purchasing (choose one):
 - i. GRG Project Manager will order plant material and coordinate delivery with Subcontractor
 - ii. Subcontractor is responsible for supplying GRG with a seed tag and/or plant list for all seed and plants introduced into the project area.
 - iii. Plants should be purchased from the following list of growers who are confirmed to not be using pesticides on their plants. (List pending)
- b. Seeding immediately follows site preparation.
- c. Seed is broadcast or drill seeded with equipment modified to plant native seed.
- d. Seed is not planted deeper than **(0.25 inches or seed diameter)** deep.
- e. Small seed is broadcast directly onto the surface, distributed at the rate indicated in recommended seed mix (Appendix XX).
- f.
- g. The specified areas have compact and/or bare soil conditions and require stabilization measures to improve seed soil contact.
 - i. Insert specific type of stabilization
- h.
- i. An inert carrier such will be allowed to facilitate seed distribution.
- j. Initial seeding in turf conversion units
 - i. A prep mow is required prior to seeding to improve seed-soil contact.
 - ii. In areas of compacted soil, the topsoil may be raked to prepare the area for seeding.
 - iii. Drill or broadcast seeding is acceptable for initial seeding.
- k. Understory seeding in stream buffer units
 - i. Seeding will be conducted in the winter following the second woody foliar treatment.
 - ii. Initial 'Graminoid Dominant Woodland seed mix' will be hand broadcast, evenly distributed, targeting areas of open canopy. The enhanced 'Forb Enhanced Woodland mix' will be seeded in the following year.
 - iii. Avoid seeding areas where woody invasives or dead down debris are dense.
- l. Cover crop seeding:

- i. The entire site will receive a cover-crop of (specify spp, e.g. oats (spring), winter wheat)
- ii. Service provider is responsible for purchasing, delivering, and seeding the cover-crop

12. Biochar

- a. Biochar – Kilns to be provided by GRG
 - a. Oregon Kiln ($\leq 3' 0''$ to $3' 6''$ long, up to 4" DBH)
 - b. Ring of Fire Kiln ($\leq 5' - 6'$ long, up to 4" DBH)
 - c. Big Box Kiln ($\leq 9'$ long, up to 8-10" DBH)
- b. Stacking and Sorting
 - a. Material must be stacked in brush piles with cut ends all facing the same direction
 - b. Piles are to have a chainsaw cut through them at an interval that will fit in the desired kiln.
 - i. Feedstock length is dependent on kiln being used.
 - c. Material larger than the largest kiln being used should be bucked up and piled or left lay or moved outside treatment unit, depending.
 - d. Feedstock piles should be staged across unit, figure 3-4 Oregon Kilns or 2 Ring of Fire kilns per acre.

Kiln Operations

- a. Documentation and Reporting
 - i. Keep track of data on biochar burn log
 - ii. Service Provider will submit to Great River Greening a follow up report that will include weather conditions during the burn, burn results, unexpected events, deviations from the plan etc.
 - iii. Report will be submitted as soon as possible or within one week of the burn.
- b. Permitting and Notifications
 - i. Service Provider is responsible for securing all necessary state and local permits including compiling necessary burn plan(s). Copies of permits and burn plan(s) must be provided to Great River Greening prior to conducting any burns.
 - ii. Intent to burn needs to be communicated with Great River Greening and landowner a minimum of 48 hours in advance.
 - iii. Any required notification of adjacent landowner contacts day of burn is responsibility of Service Provider.
- c. Safety
 - i. It is the Service Provider's responsibility to provide qualified personnel.
 - ii. Have one or more designated burn bosses on site at all times during the firing process.
 - iii. Provide evidence that burn boss has led burns of similar complexity with similar fuel types.
 - iv. Have members of the burn crew with a minimum training in S-130/S-190 or equivalent.
 - v. All crew members and burn boss complete an annual safety refresher and passed an annual physical fitness test prior to conducting the burn (RT130 or equivalent).
- d. Personal Protective Equipment
 - i. All participants need to have leather gloves.
 - ii. All clothing must be natural fibers, cotton or wool. Absolutely no synthetic clothing will be allowed during the firing process.
 1. Due to the intense heat during the firing process, synthetic materials pose a safety hazard to the individual wearing them with the possibility of melting.
 - iii. Onsite drinking water needs to be available to all participants. This can be supplied in personal water jugs or shared 5-gallon water coolers.
 - iv. All participants need to know the signs of heat exhaustion and heat stroke and monitor all individuals participating in the firing process throughout its duration. Any signs of heat-related illness need to be treated immediately.

- v. Service Provider is responsible for providing water and all necessary resources per burn plan.
- e. Feedstock Moisture
 - i. Ideal feedstock moisture should be between 10-20%.
 - 1. Take several readings from various piles.
 - 2. Record moisture readings.
 - ii. Wet wood should be stacked to the side. Wet wood will cool the burn process down and impact the quality of the biochar production.
- f. Filling the Kiln
 - i. Place kiln(s) in an area where flames will not ignite any overhead canopy.
 - ii. Prior to filling, make sure all air gaps are sealed.
 - 1. Oregon Kilns – make sure plug is in place in drainpipe.
 - 2. Ring of Fire – make sure the bottom edge is sealed completely with soil.
 - 3. Big Box Kiln – make sure dog door is securely closed.
 - iii. Initial rick for lighting should be with medium sized material < 2".
 - iv. Stack should be open and loose on the bottom to allow air draft.
 - v. Rick should fill the kiln up to about a foot above the top of the kiln.
 - vi. Place a densely packed pile of kindling on top of the rick.
 - vii. No treated lumber or engineered lumber material (LVLs, plywood, etc.) should be used as feedstock at any point in the firing process.
 - viii. If treated lumber material is encountered separate out and dispose of appropriately.
- g. Ignition
 - i. Prior to ignition - Fire breaks must be sufficient to contain the fire and escape possibilities during mop-up. Must meet DNR and local permitting requirements.
 - ii. Fire must be conducted within state and local permitting guidelines, and neighbor relations.
 - 1. This includes but is not limited to smoke management, weather prescription, drought, red flag, burn restrictions, and burn bans.
 - iii. Ignite the kindling on top of the rick and make sure the flame is evenly dispersed
 - 1. Ignition – Propane weed dragon type torch or drip torches
 - 2. Do not use accelerants to assist in ignition process
- h. Tending
 - i. Add a new layer of feedstock when white ash starts to form
 - ii. Try to keep each layer of feedstock the same diameter class
 - iii. Larger stock should be added towards the beginning to middle of the firing process
- i. Finishing
 - i. As the kiln fills up - Finish the burn with medium size stock 1"-2" allowing larger material to process
 - ii. Charring is complete when there are no more flames
- j. Quenching
 - i. Minimum water requirements are provided as a guide – Service provider is responsible for providing enough water to fully quench and extinguish char
 - 1. Oregon Kilns require 50 gallons,
 - 2. Ring of Fires require 250 gallons (6 panel setup)
 - 3. Big Box Kiln requires 350 gallons.
 - ii. Snow can also be used during winter burning when snow depths are sufficient
 - iii. When flames are gone and white ash starts to form, start adding water with a gentle spray to the top of the kiln
 - iv. Do not use too strong of a spray to avoid driving air into the biochar and forcing out black particulates in the steam
 - v. Stir the biochar up to mix in the water.
 - vi. Kilns may need to be dumped or opened up to complete quenching process
 - vii. Make sure all biochar is extinguished. *Biochar should be cool to the touch*
- k. Spreading

- i. Prior to spreading, grab a two or five-gallon pail for testing. If using more than one kiln grab a mixed sampling.
- ii. Spread cooled biochar out across the site no deeper than one inch.
- I. Additional Terms and Conditions of GRG Biochar Kiln Rental
 - i. This equipment is rented for use in burning woody biomass to create biochar. Any other use is not authorized. Do not burn plastics, waste liquids, fabrics, synthetics, composite wood or any other materials other than wood. Remove all nails, screws, or other fasteners from wood to be burned.
 - ii. Kiln rental includes just the kiln. Associated equipment for safe operation of kilns is the responsibility of the renter. Minimum recommended equipment includes: 300 gallons of water per big box kiln firing, loader, hard tine rake, square shovel, pitchfork, propane torch for lighting, garden trailer for site transport of kiln. Renter is responsible for picking up and returning kilns. Each big box kiln weighs around 1800 lbs so renters should have adequate help or equipment to load and unload kilns and a safe transport in a truck or trailer with adequate tie down capability.
 - iii. Wear fireproof gloves, eye protection, and any other safety equipment to prevent injury from burning material. Renter is responsible to know and follow all federal, state and local regulations on burning, and obtain needed burning permits as required. GRG recommends filling out a burn plan and submitting to appropriate agencies for permits.
 - iv. Refer to best practices factsheet for most productive use of kilns to produce biochar.
 - v. Kiln rentals is for ____ days. Any damage to the Kiln(s) upon return will be assessed to the renter. The equipment is not deemed to be “returned” until inspected by a GRG representative. Rental fees are due upon receipt of invoice. Late fees will apply.
 - vi. Equipment care, operation, and cleaning instructions have been reviewed with me, and I agree to all terms and conditions of this rental agreement including rental fees due for the equipment rented.

Appendix B: Seed Mixes

Seed mixes below are intended for guidance in selecting appropriate species for revegetation of restoration units. The Minnesota Board of Soil and Water Resources (BWSR). Given the future scenario of more degree days and prolonged drought periods due to climate change, some sites may trend more toward prolonged periods of either dry or wet conditions and require adjustment and supplementation to continue to deliver high quality, diverse habitat. Where possible, use local ecotype seed following the Minnesota Board of Water & Soil Resources (BWSR) “Native Vegetation establishment and enhancement guidelines.”

Early Successional Floodplain General 34-161

Applicable Sites: **Park (units), Park (units)**

This mix has been designed for areas with floodplains of rivers and streams and full to partial sun. This seed mix is commonly used where land is being converted from other uses such as agriculture or non-native grasses. The seed mix has relatively low diversity and low cost as it is designed for projects where natural colonization of grasses, sedges, forbs and woody vegetation is expected following flooding.

Partners also include collaboration among Non-profits, Seed vendors, SWCD, Tribal Governments, Consultants, County and Cities. (See partner list on [website](#))

34-161 Early Successional Floodplain General Mix

Code	Common Name	Scientific Name	PLS lb/ac	% by PLS lb/ac	Seeds/ft ²	% by Seeds/ft ²
elyrip	Riverbank Wild Rye	Elymus riparius	0.28	0.84%	0.30	0.53%
elyvil	Silky Wild Rye	Elymus villosus	0.30	0.90%	0.61	1.08%
elytra	Slender Wheatgrass	Elymus trachycaulus	1.78	5.36%	4.51	8.04%
elyvir	Virginia Wild Rye	Elymus virginicus	3.24	9.76%	5.00	8.91%
panvir	Switchgrass	Panicum virgatum	1.95	5.87%	10.03	17.87%
poapal	Fowl Bluegrass	Poa palustris	0.25	0.75%	11.94	21.28%
		Grasses Subtotal	7.80	23.49%	32.38	57.71%
ascinc	Swamp Milkweed	Asclepias incarnata	0.06	0.18%	0.11	0.19%
helaut	Sneezeweed	Helenium autumnale	0.06	0.18%	2.87	5.11%
lobsip	Great Blue Lobelia	Lobelia siphilitica	0.02	0.06%	3.67	6.55%
rudlac	Cutleaf Coneflower	Rudbeckia laciniata	0.04	0.12%	0.21	0.37%
verhas	Blue Vervain	Verbena hastata	0.15	0.45%	5.12	9.13%
verfas	Common Ironweed	Vernonia fasciculata	0.07	0.21%	0.62	1.10%
		Forbs Subtotal	0.40	1.20%	12.59	22.44%
cover	Oats/Winter Wheat	Avena sativa/Triticum aestivum	25.00	75.30%	11.14	19.85%
		Cover Crop Subtotal	25.00	75.30%	11.14	19.85%
		Total	33.20	100.00%	56.11	100.00%

Wet Meadow South and West 34-272

Applicable Sites: **Park (units), Park (units)**

This mix has been designed for areas with soil saturation within a foot of the surface during a majority of the growing season and full to partial sun where land is being converted from other uses such as agriculture or non-native grasses to a wetland restoration.

Partners also include collaboration among Non-profits, Seed vendors, SWCD, Tribal Governments, Consultants, County and Cities. (See partner list on [website](#))

34-272

Wet Meadow South & West Mix

Code	Common Name	Scientific Name	PLS lb/ac	% by PLS lb/ac	Seeds/ft2	% by Seeds/ft2
brocil	Fringed Brome	<i>Bromus ciliatus</i>	0.25	0.85%	1.01	0.52%
calcan	Bluejoint Grass	<i>Calamagrostis canadensis</i>	0.05	0.17%	5.14	2.66%
elyvir	Virginia Wild Rye	<i>Elymus virginicus</i>	0.86	2.91%	1.33	0.69%
glygra	American Manna Grass	<i>Glyceria grandis</i>	0.12	0.41%	3.09	1.60%
glystr	Fowl Manna Grass	<i>Glyceria striata</i>	0.09	0.30%	2.98	1.54%
leeory	Rice Cut Grass	<i>Leersia oryzoides</i>	0.20	0.68%	2.50	1.29%
poopal	Fowl Bluegrass	<i>Poa palustris</i>	0.35	1.18%	16.71	8.65%
spapac	Prairie Cord Grass	<i>Spartina pectinata</i>	0.33	1.12%	0.80	0.41%
		Grasses Subtotal	2.25	7.61%	33.55	17.36%
carcom	Bottlebrush Sedge	<i>Carex comosa</i>	0.09	0.30%	0.99	0.51%
carhys	Porcupine Sedge	<i>Carex hystericina</i>	0.09	0.30%	0.99	0.51%
carpel	Woolly Sedge	<i>Carex pellita</i>	0.02	0.07%	0.21	0.11%
carsco	Pointed-broom Sedge	<i>Carex scoparia</i>	0.13	0.44%	4.01	2.07%
carsti	Common Fox Sedge	<i>Carex stipata</i>	0.07	0.24%	0.87	0.45%
carstr	Tussock Sedge	<i>Carex stricta</i>	0.01	0.03%	0.19	0.10%
carvul	Brown Fox Sedge	<i>Carex vulpinoidea</i>	0.16	0.54%	5.88	3.04%
jundud	Dudley's Rush	<i>Juncus dudleyi</i>	0.02	0.07%	23.51	12.16%
junten	Path Rush	<i>Juncus tenuis</i>	0.01	0.03%	3.67	1.90%
sciatr	Dark Green Bulrush	<i>Scirpus atrovirens</i>	0.17	0.58%	28.72	14.86%
scicyp	Woolgrass	<i>Scirpus cyperinus</i>	0.03	0.10%	18.73	9.69%
		Sedges & Rushes Subtotal	0.80	2.71%	87.78	45.41%
ascinc	Swamp Milkweed	<i>Asclepias incarnata</i>	0.26	0.88%	0.46	0.24%
bidcer	Nodding Bur Marigold	<i>Bidens cernua</i>	0.04	0.14%	0.31	0.16%
doeumb	Flat-topped Aster	<i>Doellingeria umbellata</i>	0.02	0.07%	0.49	0.25%
eupper	Boneset	<i>Eupatorium perfoliatum</i>	0.03	0.10%	1.76	0.91%
eutgra	Grass-leaved Goldenrod	<i>Euthamia graminifolia</i>	0.01	0.03%	1.29	0.67%
eutmac	Joe Pye Weed	<i>Eutrochium maculatum</i>	0.06	0.20%	2.09	1.08%
helaut	Sneezeweed	<i>Helenium autumnale</i>	0.08	0.27%	3.82	1.98%
helgro	Sawtooth Sunflower	<i>Helianthus grosseserratus</i>	0.05	0.17%	0.28	0.14%
lobsip	Great Blue Lobelia	<i>Lobelia siphilitica</i>	0.03	0.10%	5.51	2.85%
lycame	Water Horehound	<i>Lycopus americanus</i>	0.06	0.20%	4.17	2.16%
lytala	Winged Loosestrife	<i>Lythrum alatum</i>	0.02	0.07%	2.20	1.14%
mimrin	Monkey Flower	<i>Mimulus ringens</i>	0.02	0.07%	16.90	8.74%

pedlan	Marsh Betony	Pedicularis lanceolata	0.07	0.24%	1.00	0.52%
phyvir	Obedient Plant	Physostegia virginiana	0.02	0.07%	0.08	0.04%
pycvir	Virginia Mountain Mint	Pycnanthemum virginianum	0.04	0.14%	3.23	1.67%
solrid	Riddell's Goldenrod	Solidago riddellii	0.03	0.10%	1.02	0.53%
symlan	Panicled Aster	Symphotrichum lanceolatum	0.03	0.10%	1.72	0.89%
symnov	New England Aster	Symphotrichum novae-angliae	0.04	0.14%	0.96	0.49%
sympun	Swamp Aster	Symphotrichum puniceum	0.03	0.10%	0.88	0.46%
thadas	Purple Meadow Rue	Thalictrum dasycarpum	0.03	0.10%	0.08	0.04%
verhas	Blue Vervain	Verbena hastata	0.14	0.47%	4.78	2.47%
verfas	Common Ironweed	Vernonia fasciculata	0.09	0.30%	0.79	0.41%
vervir	Culver's Root	Veronicastrum virginicum	0.02	0.07%	5.88	3.04%
zizaur	Golden Alexanders	Zizia aurea	0.28	0.95%	1.13	0.59%
		Forbs Subtotal	1.50	5.08%	60.83	31.47%
cover	Oats/Winter Wheat	Avena sativa/Triticum aestivum	25.00	84.60%	11.14	5.76%
		Cover Crop Subtotal	25.00	84.60%	11.14	5.76%
		Total	29.55	100.00%	193.31	100.00%

Wet Prairie 34-266

Applicable Sites: **Park (units), Park (units)**

This mix has been designed for areas with soil saturation within a foot of the surface during most of the growing season and full to partial sun where land is being converted from other uses such as agriculture or non-native grasses to a wetland restoration. This mix is most often used as part of prairie pothole restoration projects.



Partners also include collaboration among Non-profits, Seed vendors, SWCD, Tribal Governments, Consultants, County and Cities. (See partner list on [website](#))

34-266

Wet Prairie Mix

Code	Common Name	Scientific Name	PLS lb/ac	% by PLS lb/ac	Seeds/ft2	% by Seeds/ft2
andger	Big Bluestem	Andropogon gerardii	1.09	3.35%	4.00	2.91%
brocil	Fringed Brome	Bromus ciliatus	0.74	2.28%	2.99	2.17%
calcan	Bluejoint Grass	Calamagrostis canadensis	0.04	0.12%	4.11	2.99%
elyvir	Virginia Wild Rye	Elymus virginicus	1.62	4.98%	2.50	1.82%
glygra	American Manna Grass	Glyceria grandis	0.08	0.25%	2.06	1.50%
glystr	Fowl Manna Grass	Glyceria striata	0.11	0.34%	3.64	2.65%
panvir	Switchgrass	Panicum virgatum	0.58	1.78%	2.98	2.17%
poopal	Fowl Bluegrass	Poa palustris	0.10	0.31%	4.78	3.47%
sornut	Indiangrass	Sorghastrum nutans	0.45	1.38%	1.98	1.44%
spapec	Prairie Cord Grass	Spartina pectinata	0.84	2.58%	2.04	1.48%
		Grasses Subtotal	5.65	17.38%	31.08	22.61%
carpel	Woolly Sedge	Carex pellita	0.04	0.12%	0.41	0.30%
carsco	Pointed-broom Sedge	Carex scoparia	0.08	0.25%	2.47	1.80%
carvul	Brown Fox Sedge	Carex vulpinoidea	0.16	0.49%	5.88	4.28%
jundud	Dudley's Rush	Juncus dudleyi	0.01	0.03%	11.75	8.55%
sciatr	Dark Green Bulrush	Scirpus atrovirens	0.09	0.28%	15.21	11.06%
scicyp	Woolgrass	Scirpus cyperinus	0.02	0.06%	12.49	9.08%
		Sedges & Rushes Subtotal	0.40	1.23%	48.21	35.07%
achmil	Common Yarrow	Achillea millefolium	0.01	0.03%	0.65	0.48%
anecan	Canada Anemone	Anemone canadensis	0.02	0.06%	0.06	0.04%
ascinc	Swamp Milkweed	Asclepias incarnata	0.17	0.52%	0.30	0.22%
descan	Showy Tick Trefoil	Desmodium canadense	0.10	0.31%	0.20	0.15%
doeumb	Flat-topped Aster	Doellingeria umbellata	0.02	0.06%	0.49	0.36%

eupper	Boneset	Eupatorium perfoliatum	0.03	0.09%	1.76	1.28%
eutgra	Grass-leaved Goldenrod	Euthamia graminifolia	0.01	0.03%	1.29	0.94%
eutmac	Joe Pye Weed	Eutrochium maculatum	0.03	0.09%	1.05	0.76%
genand	Bottle Gentian	Gentiana andrewsii	0.01	0.03%	1.03	0.75%
helaut	Sneezeweed	Helenium autumnale	0.06	0.18%	2.87	2.08%
helgro	Sawtooth Sunflower	Helianthus grosseserratus	0.04	0.12%	0.22	0.16%
lialig	Meadow Blazing Star	Liatris ligulistylis	0.03	0.09%	0.11	0.08%
liapyc	Prairie Blazing Star	Liatris pycnostachya	0.11	0.34%	0.44	0.32%
lobsip	Great Blue Lobelia	Lobelia siphilitica	0.02	0.06%	3.67	2.67%
lycame	Water Horehound	Lycopus americanus	0.03	0.09%	2.08	1.52%
lytala	Winged Loosestrife	Lythrum alatum	0.01	0.03%	1.10	0.80%
mimrin	Monkey Flower	Mimulus ringens	0.01	0.03%	8.45	6.15%
solrig	Stiff Goldenrod	Solidago rigida	0.03	0.09%	0.45	0.33%
pedlan	Marsh Betony	Pedicularis lanceolata	0.06	0.18%	0.86	0.63%
phlpil	Prairie Phlox	Phlox pilosa	0.01	0.03%	0.07	0.05%
pycvir	Virginia Mountain Mint	Pycnanthemum virginianum	0.03	0.09%	2.42	1.76%
rudhir	Black-eyed Susan	Rudbeckia hirta	0.03	0.09%	1.01	0.74%
solrid	Riddell's Goldenrod	Solidago riddellii	0.04	0.12%	1.37	0.99%
symeri	Heath Aster	Symphyotrichum ericoides	0.01	0.03%	0.73	0.53%
symlan	Panicled Aster	Symphyotrichum lanceolatum	0.01	0.03%	0.57	0.42%
symnov	New England Aster	Symphyotrichum novae-angliae	0.04	0.12%	0.96	0.69%
sympun	Swamp Aster	Symphyotrichum puniceum	0.02	0.06%	0.59	0.43%
thadas	Purple Meadow Rue	Thalictrum dasycarpum	0.06	0.18%	0.16	0.12%
verhas	Blue Vervain	Verbena hastata	0.15	0.46%	5.12	3.73%
verfas	Common Ironweed	Vernonia fasciculata	0.03	0.09%	0.26	0.19%
vervir	Culver's Root	Veronicastrum virginicum	0.02	0.06%	5.88	4.28%
zizaur	Golden Alexanders	Zizia aurea	0.20	0.62%	0.81	0.59%
		Forbs Subtotal	1.45	4.46%	47.05	34.22%
cover	Oats/Winter Wheat	Avena sativa/Triticum aestivum	25.00	76.92%	11.14	8.10%
		Cover Crop Subtotal	25.00	76.92%	11.14	8.10%
		Total	32.50	100.00%	137.47	100.00%

Woodland Edge South & West 36-212

Applicable Sites: **Park (units), Park (units)**

This woodland edge mix has been designed for southern and western parts of Minnesota in areas with dry to mesic soils and part sun for at least 50% of the day where land is being converted from other uses such as lawn, or agricultural fields like row crops or pasture.



Partners also include collaboration among Non-profits, Seed vendors, SWCD, Tribal Governments, Consultants, County and Cities. (See partners list on [website](#))

36-212

Woodland Edge South & West Mix

Code	Common Name	Scientific Name	PLS lb/ac	% by PLS lb/ac	Seeds/ft2	% by Seeds/ft2
andger	Big Bluestem	Andropogon gerardii	1.00	2.93%	3.67	6.11%
boucur	Sideoats Grama	Bouteloua curtipendula	1.00	2.93%	2.20	3.67%
brokal	Prairie Brome	Bromus kalmii	1.19	3.48%	3.50	5.82%
elycan	Canada Wild Rye	Elymus canadensis	1.00	2.93%	1.91	3.18%
elyhys	Bottlebrush Grass	Elymus hystrix	0.32	0.94%	0.89	1.49%
elytra	Slender Wheatgrass	Elymus trachycaulus	0.90	2.64%	2.28	3.79%
elyvil	Silky Wild Rye	Elymus villosus	0.65	1.90%	1.31	2.18%
panvir	Switchgrass	Panicum virgatum	0.07	0.20%	0.36	0.60%
schsco	Little Bluestem	Schizachyrium scoparium	0.62	1.82%	3.42	5.68%
sornut	Indiangrass	Sorghastrum nutans	1.00	2.93%	4.41	7.33%
		Grasses Subtotal	7.75	22.69%	23.95	39.85%
achmil	Common Yarrow	Achillea millefolium	0.03	0.09%	1.96	3.27%
agafoe	Anise Hyssop	Agastache foeniculum	0.10	0.29%	3.31	5.50%
agealt	White Snakeroot	Ageratina altissima	0.03	0.09%	1.65	2.75%
aqucan	Wild Columbine	Aquilegia canadensis	0.05	0.15%	0.70	1.16%
dalcen	White Prairie Clover	Dalea candida	0.17	0.50%	1.19	1.97%
descan	Showy Tick Trefoil	Desmodium canadense	0.14	0.41%	0.28	0.47%
helhel	Ox-eye Sunflower	Heliopsis helianthoides	0.15	0.44%	0.35	0.58%
monfis	Wild Bergamot	Monarda fistulosa	0.06	0.18%	1.54	2.57%
osmcla	Sweet Cicely	Osmorhiza claytonii	0.05	0.15%	0.05	0.08%
rosbla	Smooth Wild Rose	Rosa blanda	0.06	0.18%	0.06	0.10%

rudhir	Black-eyed Susan	Rudbeckia hirta	0.18	0.53%	6.08	10.12%
solfle	Zig Zag Goldenrod	Solidago flexicaulis	0.02	0.06%	0.62	1.03%
solrig	Stiff Goldenrod	Solidago rigida	0.06	0.18%	0.90	1.50%
solspe	Showy Goldenrod	Solidago speciosa	0.06	0.18%	1.76	2.93%
symlae	Smooth Blue Aster	Symphyotrichum laeve	0.06	0.18%	1.21	2.02%
symlat	Calico Aster	Symphyotrichum lateriflorum	0.03	0.09%	2.75	4.58%
zizaur	Golden Alexanders	Zizia aurea	0.15	0.44%	0.61	1.01%
		Forbs Subtotal	1.40	4.10%	25.02	41.62%
cover	Oats/Winter Wheat	Avena sativa/Triticum aestivum	25.00	73.21%	11.14	18.53%
		Cover Crop Subtotal	25.00	73.21%	11.14	18.53%
		Total	34.15	100.00%	60.12	100.00%

General Bee Lawn Mix

Applicable Sites: Veterans Park (Unit X) and Taft Park (Unit X)

* Bee lawn mixes typically include species that are non-native to Minnesota.

Species	Scientific name	PLS %
Boreal Creeping Red Fescue	<i>Festuca rubra</i>	94.92
Shadow III Chewings Fescue	<i>Festuca rubra</i> subsp. <i>commutata</i>	89.97
Tenacious Hard fescue	<i>Festuca trachyphylla</i>	77.92
Sierra vista sheep fescue	<i>Festuca ovina</i>	80.75
Dutch white clover	<i>Trifolium repens</i>	98.08
Yaak yarrow	<i>Achillea millefolium</i> var. 'yaak'	86.96
Self-heal	<i>Prunella vulgaris</i>	93.97

Seeding Dates

Forb-dominated pollinator seed mixes can be installed in the spring or fall but fall dormant plantings allow seeds to naturally stratify and settle into the soil through periods of freezing and thawing over the winter. Spring seedings should be done on or around May 1-July 1 when soil temperatures are at least 60 degrees Fahrenheit or higher. Fall seeding should occur when soil temperatures fall below 50 degrees Fahrenheit for a consistent period of time (usually around October 15 in the northern half of the state and November 1 in the southern half of the state). Fall dormant seedings can help reduce weed pressure during the first year of growth because native cool-season grasses and forbs germinate earlier and start competing with weed species right away. Frost seedings are also an option if the snow cover is shallow, ice-free, and winds are calm. For a frost seeding, seeding rates may need to be increased by 25 -50 percent due to lower germination rates and loss of seed that is consumed by wildlife over the winter months.

Seedbed Preparation

Methods that are used to prepare a seedbed can vary depending on the type of seeding equipment to be used. If a traditional native seed drill will be used, a smooth, firm seedbed is required. Soybean fields usually are sufficiently prepared for a native seed drill. Corn fields should be raked and bailed if possible or light tillage should be used to remove leftover corn residue that would prevent sufficient seed to soil contact. Sites that were recently tilled will require additional soil treatment such as field cultivation, harrowing and rolling to prepare a firm seedbed and prevent seed from being buried too deep. Native seeds will have difficulty germinating if they are buried more than ¼" deep. Broadcast seeding can be conducted on soybean or corn fields; fields that have been disked, should be cultipacked or allowed to settle before seeding. Some practitioners have found that broadcast seeding on a smooth surface (not tilled or disked) leads to the establishment of higher diversity. It is important that the soil surface is not too hard packed, so cultipacking or light harrowing of crop fields before broadcast seeding may be needed. Seed can be lost on smooth surfaces, so it is recommended to seed into temporary cover crops or to roll sites after broadcast seeding. BWSR has seedbed preparation guidance based on current site conditions on our website: <https://bwsr.state.mn.us/habitat-establishment-management-resources>

Temporary Cover Crops and Mulch

Short-lived temporary cover crops can help stabilize project sites in preparation for planting native seed mixes. Cover crops such as oats (the most commonly used species) should be mowed to 10-12 inches before seeds mature (or harvested upon maturity) to prevent re-seeding. Other cover crops typically used in agricultural fields, such as buckwheat, winter wheat, sorghum sudangrass, and radishes, can help stabilize soil, build soil health, or provide weed competition as part of restoration projects. Residues from temporary covers should be minimized prior to seeding to increase seed to soil contact.

Seeding Methods

A variety of seeding equipment is used for upland pollinator plantings including broadcast seeders, no-till native seed drills, Brillion seeders and Trillion seeders. Specialized native seed drills can handle a wide variety of seed (fluffy, smooth, large and small) and low seeding rates. Conventional grain drills are not capable of handling diverse seed sizes and will not provide satisfactory results. Broadcast seeding is common for planting pollinator mixes. Broadcast seeding equipment should be used that is designed to spread mixes with different sized seeds (e.g., Vicon Seeders). NRCS recommends broadcast seeding at a rate of 1.5 times the normal seeding rate and cultipacking after seeding (based on Agronomy Tech Note 31).

Appendix C: Target Native Plant Communities of Minnesota Species Lists

FFs59: Southern Terrace Forest

FFs59 Southern Terrace Forest – Species Frequency & Cover

	freq%	cover		freq%	cover				
Forbs, Ferns & Fern Allies									
Wood nettle (<i>Laportea canadensis</i>)	98	••••	Ambiguous sedge (<i>Carex amphibola</i>)	30	•				
Touch-me-not (<i>Impatiens</i> spp.)	77	•	Bland sedge (<i>Carex blanda</i>)	30	•				
Virginia waterleaf (<i>Hydrophyllum virginianum</i>)	70	•••	Nodding fescue (<i>Festuca subverticillata</i>)	28	•				
Tall coneflower (<i>Rudbeckia laciniata</i>)	67	••	White grass (<i>Leersia virginica</i>)	23	•				
Stinging nettle (<i>Urtica dioica</i>)	58	•	Starry sedge (<i>Carex rosea</i>)	14	•				
Cleavers (<i>Galium aparine</i>)	51	•••	Gray's sedge (<i>Carex grayi</i>)	12	•				
Honewort (<i>Cryptotaenia canadensis</i>)	49	••	Woody Vines						
White avens (<i>Geum canadense</i>)	40	•	Virginia creeper (<i>Parthenocissus</i> spp.)	53	•				
Aniseroot (<i>Osmorhiza longistylis</i>)	37	••	Wild grape (<i>Vitis riparia</i>)	53	•				
Blue phlox (<i>Phlox divaricata</i>)	37	•	Greenbrier (<i>Smilax tamnoides</i>)	47	•				
Virginia knotweed (<i>Polygonum virginianum</i>)	35	••	Canada moonseed (<i>Menispermum canadense</i>)	33	•				
Stemless blue violets*	35	•	Shrubs						
Erect, Smooth, or Illinois carrion-flower**	35	•	Missouri gooseberry (<i>Ribes missouriense</i>)	53	•				
Jack-in-the-pulpit (<i>Arisaema triphyllum</i>)	33	•	Prickly ash (<i>Zanthoxylum americanum</i>)	33	••				
Rugulose or Yellow violet (<i>Viola canadensis</i> or <i>V. pubescens</i>)	30	•	Common elder (<i>Sambucus canadensis</i>)	33	•				
False rue anemone (<i>Enemion biternatum</i>)	30	••	Chokecherry (<i>Prunus virginiana</i>)	33	•••				
Clearweed (<i>Pilea</i> spp.)	28	••	Poison ivy (<i>Toxicodendron rydbergii</i>)	23	••				
Hispid buttercup (<i>Ranunculus hispidus</i>)	28	••	Nannyberry (<i>Viburnum lentago</i>)	16	••				
Common chanter's nightshade (<i>Circaea lutetiana</i>)	26	•	Prickly gooseberry (<i>Ribes cynosbati</i>)	16	•				
Ontario aster (<i>Aster ontariensis</i>)	26	•	Hawthorn (<i>Crataegus</i> spp.)	14	••				
Gregarious black snakeroot (<i>Sanicula gregaria</i>)	23	•	Trees						
Maryland black snakeroot (<i>Sanicula marilandica</i>)	23	•		Canopy	Subcanopy	Shrub Layer			
Cow parsnip (<i>Heracleum lanatum</i>)	23	••		freq% cover	freq% cover	freq% cover			
Sweet-scented bedstraw (<i>Galium triflorum</i>)	21	•	American elm	65	•••	67	•••	44	•
Clayton's sweet cicely (<i>Osmorhiza claytonii</i>)	19	•••	Box elder	56	•••	53	•••	26	•
Hog peanut (<i>Amphicarpaea bracteata</i>)	19	•	Silver maple	51	•••	21	••	9	•
Woodmint (<i>Blephilia hirsuta</i>)	16	•	Green ash	44	••	40	••	30	•
Early meadow-rue (<i>Thalictrum dioicum</i>)	16	•	Hackberry	40	•••	58	••	33	•
Starry false Solomon's seal (<i>Smilacina stellata</i>)	16	•	Basswood	37	•••	26	•	12	•
Virginia bluebells (<i>Mertensia virginica</i>)	16	•••	Cottonwood	30	••••	-	-	-	-
Ostrich fern (<i>Matteuccia struthiopteris</i>)	16	•••	Black ash	28	•••	19	••	19	•
Wild geranium (<i>Geranium maculatum</i>)	16	•	Red elm	26	•••	12	•••	-	-
Grasses & Sedges			Swamp white oak	19	••••	9	••	16	•
Virginia wild rye (<i>Elymus virginicus</i>)	44	•	Bitternut hickory	14	•••	9	•••	14	•
			Black walnut	14	••••	-	-	-	-

*Stemless blue violets (*Viola sororia* and similar *Viola* spp.) **Erect, Smooth, or Illinois carrion-flower (*Smilax ecirrata*, *S. herbacea*, or *S. illinoensis*)

FFs68: Southern Floodplain Forest

FFs68 Southern Floodplain Forest – Species Frequency & Cover

	freq%	cover		freq%	cover				
Forbs, Ferns & Fern Allies									
Wood nettle (<i>Laportea canadensis</i>)	93	••••	Southern blue flag (<i>Iris virginica</i>)	11	•				
Ontario aster (<i>Aster ontariensis</i>)	56	•	Grasses & Sedges						
Mad dog skullcap (<i>Scutellaria lateriflora</i>)	56	•	Virginia wild rye (<i>Elymus virginicus</i>)	52	••				
Clearweed (<i>Pilea</i> spp.)	52	•••	White grass (<i>Leersia virginica</i>)	44	•••				
Bur marigold and Beggarticks (<i>Bidens</i> spp.)	44	•	Rice cut grass (<i>Leersia oryzoides</i>)	30	••				
Touch-me-not (<i>Impatiens</i> spp.)	41	•	Hop umbrella sedge (<i>Carex lupulina</i>)	22	••				
Tall coneflower (<i>Rudbeckia laciniata</i>)	41	••	Cattail sedge (<i>Carex typhina</i>)	15	•••				
Stinging nettle (<i>Urtica dioica</i>)	37	•	Ambiguous sedge (<i>Carex amphibola</i>)	15	••				
Kidney-leaved buttercup (<i>Ranunculus abortivus</i>)	33	•	Bladder sedge (<i>Carex intumescens</i>)	11	•				
Narrow-leaved hedge nettle (<i>Stachys tenuifolia</i>)	33	•	Stout woodreed (<i>Cinna arundinacea</i>)	11	•				
Honewort (<i>Cryptotaenia canadensis</i>)	26	•	Gray's sedge (<i>Carex grayi</i>)	11	••				
False nettle (<i>Boehmeria cylindrica</i>)	26	••	Climbing Plants						
Wild cucumber (<i>Echinocystis lobata</i>)	19	•	Wild grape (<i>Vitis riparia</i>)	81	•				
Nodding or Virginia stickseed (<i>Hackelia deflexa</i> or <i>H. virginiana</i>)	19	•	Canada moonseed (<i>Menispermum canadense</i>)	56	•				
Northern bugleweed (<i>Lycopus uniflorus</i>)	19	•	Greenbrier (<i>Smilax tamnoides</i>)	33	•				
Side-flowering aster (<i>Aster lateriflorus</i>)	15	•	Virginia creeper (<i>Parthenocissus</i> spp.)	26	•				
Dodder (<i>Cuscuta</i> spp.)	15	•	Climbing poison ivy (<i>Toxicodendron rydbergii</i>)	--	--				
Tall bellflower (<i>Campanula americana</i>)	15	•	Shrubs						
Virginia knotweed (<i>Polygonum virginianum</i>)	15	••	Climbing poison ivy (<i>Toxicodendron rydbergii</i>)	33	••				
Germander (<i>Teucrium canadense</i>)	15	•	Black willow (<i>Salix nigra</i>)	11	••••				
Bur cucumber (<i>Sicyos angulatus</i>)	15	••							
Woundwort (<i>Stachys palustris</i>)	15	•	Trees						
Cut-leaved bugleweed (<i>Lycopus americanus</i>)	15	•		Canopy	Subcanopy	Shrub Layer			
Eastern panicled aster (<i>Aster lanceolatus</i>)	11	••••		freq% cover	freq% cover	freq% cover			
Green dragon (<i>Arisaema dracontium</i>)	11	•	Silver maple	96	•••••	56	•••	63	•••
White snakeroot (<i>Eupatorium rugosum</i>)	11	•	Green ash	67	•••	48	••	74	•
Stemless blue violets (<i>Viola sororia</i> and similar <i>Viola</i> spp.)	11	•	American elm	41	••	56	•••	56	•
Erect, Smooth, or Illinois carrion-flower*	11	•	Cottonwood	30	••••	-	-	-	-
Common mint (<i>Mentha arvensis</i>)	11	•	Hackberry	22	•	19	••	33	•
Three-seeded mercury (<i>Acalypha rhomboidea</i>)	11	•	Box elder	11	•••	22	••	22	•
			Swamp white oak	11	•••	-	-	-	-
			Red elm	-	-	-	-	26	•

*Erect, Smooth, or Illinois carrion-flower (*Smilax ecirrata*, *S. herbacea*, or *S. illinoensis*) **Climbing poison ivy is important in both the shrub and climbing plant layers, but all records from plot samples were universally assigned to the shrub layer.

WPs54: Southern Wet Prairie

WPs54 Southern Wet Prairie — Species Frequency & Cover

	freq%	cover		freq%	cover
Forbs, Ferns & Fern Allies					
Canada goldenrod (<i>Solidago canadensis</i>)	78	•••	Grass-leaved goldenrod (<i>Euthamia graminifolia</i>)	22	••
Tall meadow-rue (<i>Thalictrum dasycarpum</i>)	69	•	New England aster (<i>Aster novae-angliae</i>)	22	•
Heath aster (<i>Aster ericoides</i>)	67	•	Canada tick trefoil (<i>Desmodium canadense</i>)	22	•
Eastern panicled aster (<i>Aster lanceolatus</i>)	61	•	Skyblue aster (<i>Aster oolentangiensis</i>)	22	•
Clasping dogbane (<i>Apocynum sibiricum</i>)	61	•	Swamp thistle (<i>Cirsium muticum</i>)	22	•
Virginia mountain mint (<i>Pycnanthemum virginianum</i>)	57	••	Bottle gentian (<i>Gentiana andrewsii</i>)	20	•
Common strawberry (<i>Fragaria virginiana</i>)	55	•	Rough bugleweed (<i>Lycopus asper</i>)	18	•
Great blazing star (<i>Liatris pycnostachya</i>)	53	•	Veiny pea (<i>Lathyrus venosus</i>)	18	•
Giant, Sawtooth, or Nuttall's sunflower*	51	•••	Swamp lousewort (<i>Pedicularis lanceolata</i>)	16	•
Golden alexanders (<i>Zizia aurea</i>)	49	•	Culver's root (<i>Veronicastrum virginicum</i>)	14	••
Giant goldenrod (<i>Solidago gigantea</i>)	45	••	Flat-topped aster (<i>Aster umbellatus</i>)	14	••
Golden or False golden ragwort (<i>Senecio aureus</i> or <i>S. pseudoreus</i>)	43	••	Great lobelia (<i>Lobelia siphilitica</i>)	12	•
Riddell's goldenrod (<i>Solidago riddellii</i>)	41	•	Yellow stargrass (<i>Hypoxis hirsuta</i>)	12	•
Northern bog violet (<i>Viola nephrophylla</i>)	41	•	Cup plant (<i>Silphium perfoliatum</i>)	12	•
Northern plains blazing star (<i>Liatris ligulistylis</i>)	41	•	Wood lily (<i>Lilium philadelphicum</i>)	12	•
Heart-leaved alexanders (<i>Zizia aptera</i>)	39	•	Grasses & Sedges		
Autumn sneezeweed (<i>Helenium autumnale</i>)	37	•	Prairie cordgrass (<i>Spartina pectinata</i>)	86	•••
Spotted water hemlock (<i>Cicuta maculata</i>)	35	•	Big bluestem (<i>Andropogon gerardii</i>)	80	•••
Stiff goldenrod (<i>Solidago rigida</i>)	35	•	Indian grass (<i>Sorghastrum nutans</i>)	51	•••
Prairie loosestrife (<i>Lysimachia quadriflora</i>)	33	•	Switchgrass (<i>Panicum virgatum</i>)	47	•••
Prairie phlox (<i>Phlox pilosa</i>)	33	•	Woolly sedge (<i>Carex pellita</i>)	41	•••
Swamp milkweed (<i>Asclepias incarnata</i>)	33	•	Rigid sedge (<i>Carex tetanica</i>)	39	•
White camas (<i>Zigadenus elegans</i>)	33	•	Flattened spikerush (<i>Eleocharis compressa</i>)	39	•
Northern bedstraw (<i>Galium boreale</i>)	29	•	Mat muhly grass (<i>Muhlenbergia richardsonis</i>)	33	•••
Purple prairie clover (<i>Dalea purpurea</i>)	29	•	Bluejoint (<i>Calamagrostis canadensis</i>)	25	••
Yarrow (<i>Achillea millefolium</i>)	29	•	Baltic rush (<i>Juncus arcticus</i>)	25	••
Pale-spiked lobelia (<i>Lobelia spicata</i>)	29	•	Tussock sedge (<i>Carex stricta</i>)	24	•••
Canada anemone (<i>Anemone canadensis</i>)	27	••	Prairie dropseed (<i>Sporobolus heterolepis</i>)	24	••
Gray-headed coneflower (<i>Ratibida pinnata</i>)	27	•	Narrow reedgrass (<i>Calamagrostis stricta</i>)	24	•
Marsh vetchling (<i>Lathyrus palustris</i>)	27	•	Fowl manna grass (<i>Glyceria striata</i>)	20	••
Smooth scouring rush (<i>Equisetum laevigatum</i>)	25	•	Semi-Shrubs		
Cut-leaved bugleweed (<i>Lycopus americanus</i>)	25	•	Prairie rose (<i>Rosa arkansana</i>)	29	••
Maximilian's sunflower (<i>Helianthus maximiliani</i>)	24	••	Shrubs		
Field horsetail (<i>Equisetum arvense</i>)	24	•	Red-osier dogwood (<i>Cornus sericea</i>)	18	•
			Pussy willow (<i>Salix discolor</i>)	16	•

*Giant, Sawtooth, or Nuttall's sunflower (*Helianthus giganteus*, *H. grosseserratus*, or *H. nuttallii*)

MHs49: Southern Wet-Mesic Hardwood Forest

MHs49 Southern Wet-Mesic Hardwood Forest — Species Frequency and Cover

	freq%	cover		freq%	cover		
Forbs, Ferns & Fern Allies			Grasses & Sedges				
Virginia waterleaf (<i>Hydrophyllum virginianum</i>)	90	•••	Bottlebrush grass (<i>Elymus hystrix</i>)	38	••		
Cleavers (<i>Galium aparine</i>)	85	•••	Hairy-leaved sedge (<i>Carex hirtifolia</i>)	36	•		
Wood nettle (<i>Laportea canadensis</i>)	82	•••	Sprengel's sedge (<i>Carex sprengelii</i>)	36	••		
Blue phlox (<i>Phlox divaricata</i>)	69	•	White bear sedge (<i>Carex albursina</i>)	36	•		
Blue cohosh (<i>Caulophyllum thalictroides</i>)	64	•	Bland sedge (<i>Carex blanda</i>)	31	•		
White avens (<i>Geum canadense</i>)	64	•	Ambiguous sedge (<i>Carex amphibola</i>)	28	•		
Wild geranium (<i>Geranium maculatum</i>)	64	••	Woody Vines				
False rue anemone (<i>Enemion biternatum</i>)	59	•••	Virginia creeper (<i>Parthenocissus</i> spp.)	36	•		
Wild ginger (<i>Asarum canadense</i>)	56	•	Shrubs				
Wild leek (<i>Allium tricoccum</i>)	56	••	Chokecherry (<i>Prunus virginiana</i>)	72	•		
Sternless blue violets*	56	•	Missouri gooseberry (<i>Ribes missouriense</i>)	67	••		
Clayton's sweet cicely (<i>Osmorhiza claytonii</i>)	54	••	Prickly ash (<i>Zanthoxylum americanum</i>)	38	••		
Yellow violet (<i>Viola pubescens</i>)	51	•	Nannyberry (<i>Viburnum lentago</i>)	36	•		
Honewort (<i>Cryptotaenia canadensis</i>)	49	••	Prickly gooseberry (<i>Ribes cynosbati</i>)	36	••		
Jack-in-the-pulpit (<i>Arisaema triphyllum</i>)	49	•	Hawthorn (<i>Crataegus</i> spp.)	33	•		
Dutchman's breeches (<i>Dicentra cucullaria</i>)	46	•	Pagoda dogwood (<i>Cornus alternifolia</i>)	33	•		
Bloodroot (<i>Sanguinaria canadensis</i>)	46	•	Red-berried elder (<i>Sambucus racemosa</i>)	28	••		
Stinging nettle (<i>Urtica dioica</i>)	46	•	Trees				
Common false Solomon's seal (<i>Smilacina racemosa</i>)	46	•	Canopy		Subcanopy	Shrub Layer	
Zigzag goldenrod (<i>Solidago flexicaulis</i>)	46	•	freq%	cover	freq%	cover	
White trout lily (<i>Erythronium albidum</i>)	44	••	Basswood	87	•••	56	••
Aniseroot (<i>Osmorhiza longistylis</i>)	44	••	Black ash	64	•••	46	••
Erect, Smooth, or Illinois carrion-flower**	41	•	Sugar maple	62	•••	64	•••
Hispid buttercup (<i>Ranunculus hispidus</i>)	41	••	American elm	59	•••	54	••
Tall coneflower (<i>Rudbeckia laciniata</i>)	38	•	Hackberry	51	••	56	••
Virginia spring beauty (<i>Claytonia virginica</i>)	38	•	Red elm	46	•••	41	•••
Sharp-lobed hepatica (<i>Anemone acutiloba</i>)	36	•	Green ash	33	•	18	•
Large-flowered bellwort (<i>Uvularia grandiflora</i>)	36	•	Box elder	31	•••	36	••
Touch-me-not (<i>Impatiens</i> spp.)	33	•	Bur oak	23	•••	15	•
Mayapple (<i>Podophyllum peltatum</i>)	31	•	Rock elm	21	•••	23	•
Common enchanter's nightshade (<i>Circaea lutetiana</i>)	31	•	Ironwood	21	•	51	••
Cut-leaved toothwort (<i>Cardamine concatenata</i>)	26	•	Butternut	18	••	10	•
Drooping trillium (<i>Trillium flexipes</i>)	26	•	Bitternut hickory	18	•••	41	•
Appendaged waterleaf (<i>Hydrophyllum appendiculatum</i>)	21	••	Blue beech	15	•	26	••

*Sternless blue violets (*Viola sororia* and similar *Viola* spp.) **Erect, Smooth, or Illinois carrion-flower (*Smilax ecirrata*, *S. herbacea*, or *S. illinoensis*)

MHs37: Southern Dry-Mesic Oak Forest

MHs37 Southern Dry-Mesic Oak Forest – Species Frequency & Cover

Forbs, Ferns & Fern Allies			Climbing Plants						
Lady fern (<i>Athyrium filix-femina</i>)	91	••	Virginia creeper (<i>Parthenocissus</i> spp.)	86	••				
Pointed-leaved tick trefoil (<i>Desmodium glutinosum</i>)	88	••	Wild grape (<i>Vitis riparia</i>)	79	•				
Clayton's sweet cicely (<i>Osmorhiza claytonii</i>)	86	•	• Low Shrubs						
Common enchanter's nightshade (<i>Circaea lutetiana</i>)	81	•	Red raspberry (<i>Rubus idaeus</i>)	42	•				
Wild geranium (<i>Geranium maculatum</i>)	79	•	Black raspberry (<i>Rubus occidentalis</i>)	30	•				
Honewort (<i>Cryptotaenia canadensis</i>)	72	•	Tall blackberries (<i>Rubus allegheniensis</i> and similar <i>Rubus</i> spp.)	28	••				
White avens (<i>Geum canadense</i>)	72	•	• Shrubs						
Lopseed (<i>Phryma leptostachya</i>)	72	•	Chokecherry (<i>Prunus virginiana</i>)	79	••				
Hog peanut (<i>Amphicarpaea bracteata</i>)	70	••	American hazelnut (<i>Corylus americana</i>)	72	••				
White snakeroot (<i>Eupatorium rugosum</i>)	65	•	Missouri gooseberry (<i>Ribes missouriense</i>)	63	••				
Common false Solomon's seal (<i>Smilacina racemosa</i>)	65	•	Poison ivy (<i>Toxicodendron rydbergii</i>)	63	•				
Large-flowered bellwort (<i>Uvularia grandiflora</i>)	63	•	Pagoda dogwood (<i>Cornus alternifolia</i>)	58	••				
Gregarious black snakeroot (<i>Sanicula gregaria</i>)	58	•	Prickly gooseberry (<i>Ribes cynosbati</i>)	51	•••				
Maidenhair fern (<i>Adiantum pedatum</i>)	56	•	Gray dogwood (<i>Cornus racemosa</i>)	42	•				
Wild sarsaparilla (<i>Aralia nudicaulis</i>)	56	•	Round-leaved dogwood (<i>Cornus rugosa</i>)	30	••				
Jack-in-the-pulpit (<i>Arisaema triphyllum</i>)	56	•	Nannyberry (<i>Viburnum lentago</i>)	26	•				
Sweet-scented bedstraw (<i>Galium triflorum</i>)	53	•							
Rattlesnake fern (<i>Botrychium virginianum</i>)	51	•	• Trees						
Spreading Jacob's ladder (<i>Polemonium reptans</i>)	47	•	Canopy		Subcanopy				
Blue cohosh (<i>Caulophyllum thalictroides</i>)	47	•	freq% cover	freq% cover	Shrub Layer				
Erect, Smooth, or Illinois carrion-flower*	44	•	Northern red oak	91	••••	35	•	72	•
Wood anemone (<i>Anemone quinquefolia</i>)	42	•	White oak	67	••••	30	••	28	•
Red baneberry (<i>Actaea rubra</i>)	42	•	Basswood	51	••	74	••	60	•
Bracken (<i>Pteridium aquilinum</i>)	40	•	American elm	40	••	51	•••	40	•
Cleavers (<i>Galium aparine</i>)	40	•	Sugar maple	35	••	49	•	28	•
Bloodroot (<i>Sanguinaria canadensis</i>)	40	•	Black cherry	33	•	67	•	70	•
Early meadow-rue (<i>Thalictrum dioicum</i>)	35	•	Ironwood	30	••	56	••	35	•
Maryland black snakeroot (<i>Sanicula marilandica</i>)	35	•	Bur oak	30	•••	12	•	12	•
Zigzag goldenrod (<i>Solidago flexicaulis</i>)	33	•	Red elm	30	•••	51	•••	51	••
Clearweed (<i>Pilea</i> spp.)	28	•	Shagbark hickory	28	•	30	••	28	•
			Northern pin oak	23	••••	-	-	-	-
			Hackberry	23	•	47	•	37	•
			Paper birch	21	••	-	-	-	-
			Bitternut hickory	19	•	37	•••	56	•
			Box elder	14	•	56	••	67	•
• Grasses & Sedges									
Starry sedge (<i>Carex rosea</i>)	37	•							
Pennsylvania sedge (<i>Carex pensylvanica</i>)	35	•							
Bland sedge (<i>Carex blanda</i>)	23	•							

* Erect, Smooth, or Illinois carrion-flower (*Smilax ecirrata*, *S. herbacea*, or *S. illinoensis*)

UPs23: Southern Mesic Prairie

UPs23 Southern Mesic Prairie — Species Frequency & Cover

	freq%	cover		freq%	cover
Forbs, Ferns & Fern Allies			Grasses & Sedges		
Heart-leaved alexanders (<i>Zizia aptera</i>)	78	•	White camas (<i>Zigadenus elegans</i>)	27	•
Heath aster (<i>Aster ericoides</i>)	77	••	Common strawberry (<i>Fragaria virginiana</i>)	26	•
Stiff goldenrod (<i>Solidago rigida</i>)	74	•	Bastard toadflax (<i>Comandra umbellata</i>)	25	•
Canada goldenrod (<i>Solidago canadensis</i>)	69	••	Virginia mountain mint (<i>Pycnanthemum virginianum</i>)	25	•
Purple prairie clover (<i>Dalea purpurea</i>)	68	•	Pale-spiked lobelia (<i>Lobelia spicata</i>)	25	•
Yarrow (<i>Achillea millefolium</i>)	65	•	American vetch (<i>Vicia americana</i>)	23	•
Rough blazing star (<i>Liatris aspera</i>)	59	•	Ground plum (<i>Astragalus crassicaupus</i>)	23	•
Prairie phlox (<i>Phlox pilosa</i>)	55	•	Canada anemone (<i>Anemone canadensis</i>)	22	•
White prairie clover (<i>Dalea candida</i>)	55	•	Clasping dogbane (<i>Apocynum sibiricum</i>)	22	•
Hoary puccoon (<i>Lithospermum canescens</i>)	53	•	Virginia ground cherry (<i>Physalis virginiana</i>)	22	•
Stiff sunflower (<i>Helianthus pauciflorus</i>)	50	•	Toothed evening primrose (<i>Calylophus serrulatus</i>)	21	•
Prairie wild onion (<i>Allium stellatum</i>)	49	•	Wood betony (<i>Pedicularis canadensis</i>)	20	•
Missouri goldenrod (<i>Solidago missouriensis</i>)	47	••	Northern plains blazing star (<i>Liatris ligulistylis</i>)	20	•
Long-headed thimbleweed (<i>Anemone cylindrica</i>)	46	•	Wild bergamot (<i>Monarda fistulosa</i>)	19	•
Bearded birdfoot violet (<i>Viola palmata</i>)	45	•	Skyblue aster (<i>Aster oolentangiensis</i>)	18	••
Flodman's thistle (<i>Cirsium flodmanii</i>)	45	•	Canada tick trefoil (<i>Desmodium canadense</i>)	17	•
Tall meadow-rue (<i>Thalictrum dasycarpum</i>)	44	•	Smooth rattlesnakeroot (<i>Prenanthes racemosa</i>)	15	•
Daisy fleabane (<i>Erigeron strigosus</i>)	44	•	Wood lily (<i>Lilium philadelphicum</i>)	13	•
Silverleaf scurpea (<i>Pedimelum argophyllum</i>)	43	•	Rattlesnake master (<i>Eryngium yuccifolium</i>)	12	•
White sage (<i>Artemisia ludoviciana</i>)	43	•	Semi-Shrubs		
Northern bedstraw (<i>Galium boreale</i>)	39	••	Big bluestem (<i>Andropogon gerardii</i>)	94	••••
Smooth blue aster (<i>Aster laevis</i>)	37	•	Indian grass (<i>Sorghastrum nutans</i>)	80	••••
Gray-headed coneflower (<i>Ratibida pinnata</i>)	36	••	Little bluestem (<i>Schizachyrium scoparium</i>)	67	•••
Silky aster (<i>Aster sericeus</i>)	34	•	Prairie dropseed (<i>Sporobolus heterolepis</i>)	66	•••
Maximilian's sunflower (<i>Helianthus maximiliani</i>)	31	••	Porcupine grass (<i>Stipa spartea</i>)	58	•••
Gray goldenrod (<i>Solidago nemoralis</i>)	31	••	Side-oats grama (<i>Bouteloua curtipendula</i>)	46	•••
Ox-eye (<i>Heliopsis helianthoides</i>)	31	•	Switchgrass (<i>Panicum virgatum</i>)	44	••
Tall cinquefoil (<i>Potentilla arguta</i>)	31	•	Leiberg's panic grass (<i>Panicum leibergii</i>)	43	••
Common milkweed (<i>Asclepias syriaca</i>)	31	•	Slender wheatgrass (<i>Elymus trachycaulis</i>)	32	•
Bird's foot coreopsis (<i>Coreopsis palmata</i>)	30	••	Prairie cordgrass (<i>Spartina pectinata</i>)	30	••
Narrow-leaved purple coneflower (<i>Echinacea pallida</i>)	30	•	Shrubs		
Prairie tumip (<i>Pedimelum esculentum</i>)	30	•	Leadplant (<i>Amorpha canescens</i>)	74	••
Alumroot (<i>Heuchera richardsonii</i>)	28	•	Prairie rose (<i>Rosa arkansana</i>)	70	•
Great blazing star (<i>Liatris pycnostachya</i>)	27	••	Wolfberry (<i>Symphoricarpos occidentalis</i>)		
				17	••

WMs83: Southern Seepage Meadow/Carr

WMs83 Southern Seepage Meadow/Carr — Species Frequency & Cover

	freq%	cover		freq%	cover
Grasses & Sedges					
Tussock sedge (<i>Carex stricta</i>)	58	****	Linear-leaved, Marsh, or Downy willow-herb*	34	•
Bluejoint (<i>Calamagrostis canadensis</i>)	45	***	Northern bog violet (<i>Viola nephrophylla</i>)	33	•
Fowl bluegrass (<i>Poa palustris</i>)	36	•	Tall meadow-rue (<i>Thalictrum dasycarpum</i>)	33	•
Lake sedge (<i>Carex lacustris</i>)	33	•	Canada goldenrod (<i>Solidago canadensis</i>)	33	•
Prairie sedge (<i>Carex prairiea</i>)	33	•	Tufted loosestrife (<i>Lysimachia thyrsiflora</i>)	31	•
Fowl manna grass (<i>Glyceria striata</i>)	31	•	Bog aster (<i>Aster borealis</i>)	31	•
Woolly sedge (<i>Carex pellita</i>)	28	•	Flat-topped aster (<i>Aster umbellatus</i>)	31	•
Aquatic sedge (<i>Carex aquatilis</i>)	25	****	Virginia mountain mint (<i>Pycnanthemum virginianum</i>)	30	•
Porcupine sedge (<i>Carex hystericina</i>)	25	•	Northern marsh fern (<i>Thelypteris palustris</i>)	30	•
Redtop (<i>Agrostis stolonifera</i>)	23	•	Common mint (<i>Mentha arvensis</i>)	28	•
Fringed brome (<i>Bromus ciliatus</i>)	23	•	Marsh skullcap (<i>Scutellaria galericulata</i>)	27	•
Red-stalked spikerush (<i>Eleocharis palustris</i>)	22	•	Dwarf raspberry (<i>Rubus pubescens</i>)	27	***
Interior sedge (<i>Carex interior</i>)	22	•	Swamp thistle (<i>Cirsium muticum</i>)	25	•
Dark green or Pale bulrush (<i>Scirpus atrovirens</i> or <i>S. pallidus</i>)	19	•	Eastern panicled aster (<i>Aster lanceolatus</i>)	23	•
Sartwell's sedge (<i>Carex sartwellii</i>)	17	•	Water smartweed (<i>Polygonum amphibium</i>)	22	•
Prairie cordgrass (<i>Spartina pectinata</i>)	17	•	Spotted water hemlock (<i>Cicuta maculata</i>)	20	•
Clustered muhly grass (<i>Muhlenbergia glomerata</i>)	16	•	American, Purple-leaved, or Northern willow-herb**	20	•
Awl-fruited sedge (<i>Carex stipata</i>)	16	•	Labrador bedstraw (<i>Galium labradoricum</i>)	20	•
Narrow reedgrass (<i>Calamagrostis stricta</i>)	16	•	Clearweed (<i>Pilea</i> spp.)	20	•
Forbs, Ferns & Fern Allies					
Spotted Joe pye weed (<i>Eupatorium maculatum</i>)	83	•	Swamp lousewort (<i>Pedicularis lanceolata</i>)	20	•
Great water dock (<i>Rumex orbiculatus</i>)	59	•	White turtlehead (<i>Chelone glabra</i>)	19	•
Marsh bellflower (<i>Campanula aparinoides</i>)	56	•	Woundwort (<i>Stachys palustris</i>)	19	•
Red-stemmed aster (<i>Aster puniceus</i>)	50	•	Rough bugleweed (<i>Lycopus asper</i>)	17	•
Common boneset (<i>Eupatorium perfoliatum</i>)	50	•	Bulb-bearing water hemlock (<i>Cicuta bulbifera</i>)	16	•
Swamp milkweed (<i>Asclepias incarnata</i>)	48	•	Blue vervain (<i>Verbena hastata</i>)	14	•
Giant goldenrod (<i>Solidago gigantea</i>)	47	•	Starry false Solomon's seal (<i>Smilacina stellata</i>)	14	•
Northern bugleweed (<i>Lycopus uniflorus</i>)	44	•	Sensitive fern (<i>Onoclea sensibilis</i>)	14	•
Touch-me-not (<i>Impatiens</i> spp.)	42	•	Shrubs		
Common marsh marigold (<i>Caltha palustris</i>)	41	•	Red-osier dogwood (<i>Cornus sericea</i>)	48	•
Sunflower (<i>Helianthus giganteus</i> , <i>H. grosseserratus</i> , or <i>H. nuttallii</i>)	39	•	Pussy willow (<i>Salix discolor</i>)	39	•
Cut-leaved bugleweed (<i>Lycopus americanus</i>)	38	•	Slender willow (<i>Salix petiolaris</i>)	27	•
Marsh vetchling (<i>Lathyrus palustris</i>)	38	•	Bebb's willow (<i>Salix bebbiana</i>)	19	•
Broad-leaved cattail (<i>Typha latifolia</i>)	36	•	Sage-leaved willow (<i>Salix candida</i>)	17	•
			Bog birch (<i>Betula pumila</i>)	16	•
			Heart-leaved willow (<i>Salix eriocephala</i>)	14	•

*Linear-leaved, Marsh, or Downy willow-herb (*Epilobium leptophyllum*, *E. palustre*, or *E. strictum*) **American, Purple-leaved, or Northern willow-herb (*Epilobium ciliatum*, *E. coloratum*, or *E. glandulosum*)

WMp73: Prairie Wet Meadow/Carr

WMp73 Prairie Wet Meadow/Carr — Species Frequency and Cover

	freq%	cover		freq%	cover
Forbs, Ferns & Fern Allies					
Eastern panicled aster (<i>Aster lanceolatus</i>)	69	•	Marsh bellflower (<i>Campanula aparinoides</i>)	12	•
Rough bugleweed (<i>Lycopus asper</i>)	58	•	Seaside arrowgrass (<i>Triglochin maritima</i>)	12	•
Swamp milkweed (<i>Asclepias incarnata</i>)	54	•	Water parsnip (<i>Sium suave</i>)	12	•
Water smartweed (<i>Polygonum amphibium</i>)	54	•	Common false Solomon's seal (<i>Smilacina racemosa</i>)	8	•
Common mint (<i>Mentha arvensis</i>)	46	•	Common boneset (<i>Eupatorium perfoliatum</i>)	8	•
Spotted water hemlock (<i>Cicuta maculata</i>)	42	•	Riddell's goldenrod (<i>Solidago riddellii</i>)	8	•
Giant, Sawtooth, or Nuttall's sunflower*	42	•	Germander (<i>Teucrium canadense</i>)	8	•
Cut-leaved bugleweed (<i>Lycopus americanus</i>)	42	•	Grasses & Sedges		
Spotted Joe pye weed (<i>Eupatorium maculatum</i>)	38	•	Prairie cordgrass (<i>Spartina pectinata</i>)	85	•
Marsh vetchling (<i>Lathyrus palustris</i>)	38	•	Narrow reedgrass (<i>Calamagrostis stricta</i>)	81	•
Stemless blue violets**	38	•	Woolly sedge (<i>Carex pellita</i>)	69	•
Prairie loosestrife (<i>Lysimachia quadriflora</i>)	38	•	Sartwell's sedge (<i>Carex sartwellii</i>)	69	•
Clasping dogbane (<i>Apocynum sibiricum</i>)	38	•	Baltic rush (<i>Juncus arcticus</i>)	62	•
Grass-leaved goldenrod (<i>Euthamia graminifolia</i>)	31	•	Bluejoint (<i>Calamagrostis canadensis</i>)	46	•
Silverweed (<i>Potentilla anserina</i>)	31	•	Dark green or Pale bulrush (<i>Scirpus atrovirens</i> or <i>S. pallidus</i>)	35	•
Linear-leaved, Marsh, or Downy willow-herb***	27	•	Buxbaum's sedge (<i>Carex buxbaumii</i>)	35	•
Canada goldenrod (<i>Solidago canadensis</i>)	23	•	Flattened spikerush (<i>Eleocharis compressa</i>)	31	•
Giant goldenrod (<i>Solidago gigantea</i>)	23	•	Foxtail barley (<i>Hordeum jubatum</i>)	23	•
Swamp lousewort (<i>Pedicularis lanceolata</i>)	19	•	Red-stalked spikerush (<i>Eleocharis palustris</i>)	23	•
Woundwort (<i>Stachys palustris</i>)	19	•	Clustered muhly grass (<i>Muhlenbergia glomerata</i>)	19	•
Tall meadow-rue (<i>Thalictrum dasycarpum</i>)	19	•	Tussock sedge (<i>Carex stricta</i>)	19	•
Bog aster (<i>Aster borealis</i>)	19	•	Rigid sedge (<i>Carex tetanica</i>)	15	•
Autumn sneezeweed (<i>Helenium autumnale</i>)	19	•	Fowl manna grass (<i>Glyceria striata</i>)	15	•
Virginia mountain mint (<i>Pycnanthemum virginianum</i>)	15	•	Very slender sedge (<i>Carex praegracilis</i>)	12	•
Golden or False golden ragwort (<i>Senecio aureus</i> or <i>S. pseudoreus</i>)	15	•	Sweet grass (<i>Hierochloa odorata</i>)	12	•
Field horsetail (<i>Equisetum arvense</i>)	15	•	Slough sedge (<i>Carex atherodes</i>)	12	•
Red-stemmed aster (<i>Aster puniceus</i>)	15	•	Emory's sedge (<i>Carex emoryi</i>)	8	•
Golden alexanders (<i>Zizia aurea</i>)	15	•	Hayden's sedge (<i>Carex haydenii</i>)	8	•
Kalm's lobelia (<i>Lobelia kalmii</i>)	12	•	Shrubs		
Veiny pea (<i>Lathyrus venosus</i>)	12	•	Slender willow (<i>Salix petiolaris</i>)	31	•
Northern bugleweed (<i>Lycopus uniflorus</i>)	12	•	Pussy willow (<i>Salix discolor</i>)	19	•
Tufted loosestrife (<i>Lysimachia thyrsiflora</i>)	12	•	Meadowsweet (<i>Spiraea alba</i>)	12	•
Maximilian's sunflower (<i>Helianthus maximiliani</i>)	12	•	Sandbar willow (<i>Salix exigua</i>)	12	•
Flat-topped aster (<i>Aster umbellatus</i>)	12	•	Bebb's willow (<i>Salix bebbiana</i>)	12	•
			Red-osier dogwood (<i>Cornus sericea</i>)	12	•

*Giant, Sawtooth, or Nuttall's sunflower (*Helianthus giganteus*, *H. grosseserratus*, or *H. nuttallii*) **Stemless blue violets (*Viola nephrophylla* and similar *Viola* spp.)

***Linear-leaved, Marsh, or Downy willow-herb (*Epilobium leptophyllum*, *E. palustre*, or *E. strictum*)

Appendix D: Invasive and Noxious Terrestrial Plant Management

Burn	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Garlic mustard									
Burdock									
Canada thistle									
Crown vetch									
Leafy spurge									
Motherwort									
Birds-foot trefoil									
Sweet clover									
Smooth brome									
Reed canary grass									
Narrow-leaf cattail									
Honeysuckle									
Buckthorn									
Siberian elm									
Russian olive									

Foliar Herbicide	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Garlic mustard									
Burdock									
Canada thistle									
Bull thistle									

Crown vetch										
Leafy spurge										
Motherwort										
Birds-foot trefoil										
Purple loosestrife										
Sweet clover										
Garden heliotrope										
Smooth brome										
Reed canary grass										
Narrow-leaf cattail										
Oriental bittersweet										
Honeysuckle										
Buckthorn										
Siberian elm										
Russian olive										

Basal Bark Herbicide	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Buckthorn									
Siberian elm									
Russian olive									

Cut Stem Herbicide	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Canada thistle									
Oriental bittersweet									
Japanese barberry									

Honeysuckle									
Buckthorn									
Siberian elm									
Russian olive									

Mow	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Garlic mustard									
Burdock									
Canada thistle									
Bull thistle									
Crown vetch									
Leafy spurge									
Motherwort									
Birds-foot trefoil									
Sweet clover									
Smooth brome									
Reed canary grass									
Narrow-leaf cattail									
Oriental bittersweet									

Don't Mow	April	May	June	July	Aug	Sept	Oct	Nov	Dec-Mar
Garlic mustard									
Canada thistle									
Leafy spurge									
Birds-foot trefoil									
Sweet clover									

Garden heliotrope									
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Appendix E: Conservation Planning Report

[ConservationPlanningReport_Richfield_NRMP_UPDATED](#)

DRAFT

Appendix F: Tree and shrub species recommendations

The following shrub and tree recommendations serve as site-based guidance for habitat enhancement after invasive shrub and hazard tree removal takes place. Reconnecting the canopy will improve shoreline stabilization, water infiltration, soil quality, and wildlife habitat. Within each site, selection is dictated by suitable species within the respective target ecosystems. Density per work unit is influenced by the unit acreage combined with the extent of recommended hazard tree and woody invasive removal.

Park: Code – Name units

	Common name	Scientific name
Shrubs	Chokecherry	<i>Prunus virginiana</i>
	Prickly ash	<i>Zanthoxylum americanum</i>
	Pagoda dogwood	<i>Cornus alternifolia</i>
	Missouri gooseberry	<i>Ribes missouriense</i>
	Nannyberry	<i>Viburnum lentago</i>
	Downy arrowwood	<i>Viburnum rafinesquianum</i>
	American hazelnut	<i>Corylus americana</i>
Trees	Basswood	<i>Tilia americana</i>
	Northern red oak	<i>Quercus rubra</i>
	Sugar maple	<i>Acer saccharum</i>
	Ironwood	<i>Ostrya virginiana</i>
	Bur oak	<i>Quercus macrocarpa</i>
	White oak	<i>Quercus alba</i>
	American elm	<i>Ulmus americana</i>
	Paper birch	<i>Betula papyrifera</i>
	Bitternut hickory	<i>Carya cordiformis</i>
	White pine	<i>Pinus strobus</i>
	Black cherry	<i>Prunus serotina</i>
	Blue beech	<i>Carpinus caroliniana</i>

Appendix G: Summary of Rare Features within Project Areas

A Conservation Planning Report was conducted for all project areas for the purpose of identifying ecologically significant areas and critical habitats documented within the defined area of interest. Below is a summary of findings. Full report results can be found in Appendix Y.

Rare Features and Impacts on Vegetation Management

A USFWS IPaC report and MN DNR NHIS (Natural Heritage Information System) assessment was completed for all four Richfield sites and determined that the 4-park region does overlap with the following species in Table 1. Management recommendations comply with state and federal regulations and aim to improve the overall quality of these habitats. Rare feature impacts on vegetation management are further outlined in Appendix E: Specifications for Restoration. MN DNR rare species management considerations are outlined below.

Table 1. Minnesota DNR rare species overlapping 4-park project areas, Richfield, MN.

Common Name	Scientific Name	Status in MN	Category
Rusty Patched Bumble Bee	<i>Bombus affinis</i>	Endangered - Federal	Invertebrate animal
Bell's Vireo	<i>Verio bellii</i>	Special Concern	Vertebrate animal
Blanding's Turtle	<i>Emydoidea blandingii</i>	Threatened	Vertebrate animal
Common Gallinule	<i>Gallinula galeata</i>	Special Concern	Vertebrate animal
Forster's Tern	<i>Sterna forsteri</i>	Special Concern	Vertebrate animal
Peregrine Falcon	<i>Falco peregrinus</i>	Special Concern	Vertebrate animal
Trumpeter Swan	<i>Cygnus buccinator</i>	Special Concern	Vertebrate animal

The rusty patched bumble bee (RPBB) (*Bombus affinis*), federally listed as endangered, is likely to be present in suitable habitat within the high potential zones. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The RPBB may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, , herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. Management protocols for RPBB high potential zones and all other features can be found in the specification appendix E.

Blanding's Turtle habitat overlaps with the Richfield Lake Park and Wood Lake Nature Center. Wetlands are a critical nesting habitat in these two parks, especially in the spring and summer. Wetlands should be protected from pollution; use of chemicals should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes. Vegetation management in infrequently mowed areas, such as in ditches, along utility access roads, and under power lines, should be done mechanically (chemicals should not be used). Work should occur from fall through spring (after October 1st and before June 1st).

The Forster's tern is vulnerable to human disturbance, water level fluctuation, chemical contamination, nest predation, and habitat destruction. Water fluctuation caused by storms, boat waves, or high tides can destroy eggs, young, or nesting habitat. Forster's terns can benefit from preservation and restoration of marsh habitats. The species has been shown to colonize restored areas, and to use wooden platforms for nesting (McNicholl et al. 2001).

About 40% of Minnesota's Trumpeter Swan fatalities are caused by lead poisoning. Collisions with power lines is another major threat leading to Trumpeter Swan losses. Human activity like boating in Trumpeter Swan habitat may also disrupt breeding pairs of swans. The management recommendations in this plan will improve habitat quality for Trumpeter Swans.

Grassland and shrub habitats in areas where Bell's Vireo is known to occur should be maintained with several important considerations. Invasive species that may compromise the bird's habitat, particularly reed-canary grass (*Phalaris arundinacea*), hybrid/narrow-leaved cattail (*Typha X glauca*), purple loosestrife (*Lythrum salicaria*), and buckthorn (*Rhamnus cathartica*) should be controlled. At known Bell's Vireo sites, provision must be made for maintaining shrub patches in native prairies otherwise managed to control or eliminate woody cover. Shrubby ecotones between forests and open grasslands/wetlands need to be maintained or enhanced.

Wetland protection is vital to maintaining Common Gallinule populations. This species requires marshes with a nearly equal interspersed of emergent vegetation and open water (Greij 1994). Many marshes in Minnesota lack the necessary open water component and therefore are currently unsuitable for Common Gallinules. Possible threats to this species include human disturbance and development, wetland drainage and degradation, predation, pollution, and non-native plant invasions.

Continued threats to Peregrine Falcon populations include collisions with buildings, disease, environmental pollutants, predation, and potential loss or disturbance of natural cliff nesting sites. Proposed restoration will improve peregrine falcon habitat quality.

Sites of Biodiversity Significance

Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are areas with varying levels of native biodiversity that may contain high quality native plant communities, rare plants, rare animals, and/or animal aggregations. A Biodiversity Significance Rank is assigned based on the number of rare species, the quality of the native plant communities, size of the site, and context within the landscape (Outstanding, High, or Moderate).

The following MBS Sites of Biodiversity Significance are within the search area:

Table 2. Minnesota Biological Survey (MBS) sites of biodiversity significance identified by NHIS within 4-park project areas in Richfield, MN.

MBS Site Name	Biodiversity Significance
Wood Lake Nature Center	Moderate: Sites containing occurrences of rare species, moderately disturbed NPCs, and/or landscapes that have strong potential for recovery.

DNR Native Plant Communities

Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes. DNR Native Plant Community types and subtypes are given a Conservation Status Rank that reflects the relative rarity and endangerment of the community type in Minnesota. Conservation Status Ranks range from S1 (critically imperiled) to S5 (secure, common, widespread, and abundant). Native plant communities with a Conservation Status Rank of S1 through S3 are considered rare in the state. The DNR recommends avoidance of rare native plant communities. This NPC classification informs the target restoration ecosystem for several areas of the surrounding parks and are further outlined in the restoration objective sections for each park.

Table 3. MN DNR native plant communities identified by NHIS within 4-park project areas in Richfield, MN.

Location	NPC	Conservation Status Rank	Number of communities
Wood Lake Nature Center	MHs49a	S3	2

Lakes of Biological Significance

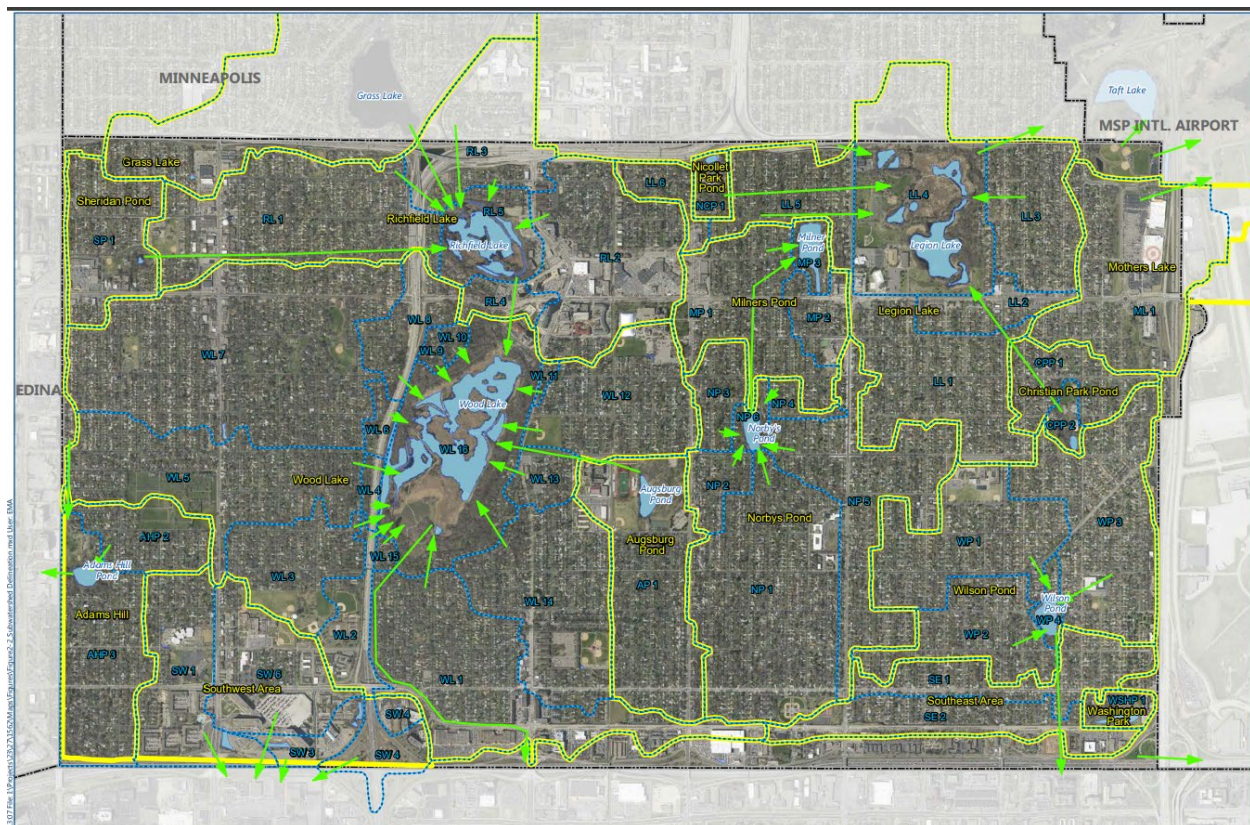
Lakes of Biological Significance are high quality lakes as determined by the aquatic plant, fish, bird, or amphibian communities present within the lake. To be included in this layer, a lake only needs to meet the criteria for one of these four community types. The lake is assigned a biological significance of Outstanding, High, or Moderate based on the community with the highest quality. The following Lakes of Biological Significance are within the search area, however, all restoration within the project scope is limited to terrestrial habitat, upland from the ordinary high water mark.

Table 4. Lakes of biological significance identified by NHIS within 4-park project areas in Richfield, MN.

Public Water Basin Name	Biological Significance	Bird Rank
Legion Lake (Veterans Park)	High	2
Wood Lake	High	2

Appendix H: Water Resources

[More to be expanded upon here about concurrent stormwater management efforts by city or other funding]



Appendix I: Soil Terminology

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained, or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Soil moisture status is an estimate of the fluctuating water content in a soil. It greatly influences vegetation type and plant growth; physical properties of soils, such as permeability, workability, strength, linear extensibility, and frost action; and chemical interactions and transport. Many other properties, qualities, and interpretations also are affected. Soil moisture status is important in the classification of soils, wetland, and habitat. This table gives estimates of soil moisture for the components of a map unit at various depths for every month of the year. The depths displayed are representative values that are statistical estimates indicative of conditions that occur in normal years.

- i. *Dry* indicates a moisture condition under which most plants (especially crops) cannot extract water for growth.
- ii. *Moist* indicates a moisture condition under which soil water is most readily available for plant growth.
- iii. *Wet* indicates a condition under which water will stand in an unlined hole or at least a condition under which the soil is too wet for the growth of most agricultural species. A moisture status of 4.0-6.7 (wet) indicates that most of the time the soil is saturated between the depths of 4.0 feet and 6.7 feet during the month designated.

In some years the soil may be saturated at a higher or lower depth; however, field observations indicate that the soil will be saturated between the depths of 4.0 feet and 6.7 feet in normal years. In the summer, the soil may show the effects of drying plus intermittent rains that result in a moist or wet layer over a dry layer that gets moist or wet again.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding. This table gives estimates of the frequency and duration of flooding for every month of the year. *Flooding frequency* is the annual probability of flooding expressed as a class. *None* indicates no reasonable possibility of flooding (the chance of flooding is nearly 0 percent in any year, or flooding is likely less than once in 500 years). *Very rare* indicates that flooding is very

unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year, or flooding is likely less than once in 100 years but more than once in 500 years).

Rare indicates that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year, or flooding is likely 1 to 5 times in 100 years). *Occasional* indicates that flooding occurs infrequently under usual weather conditions (the chance of flooding is 5 to 50 percent in any year, or flooding is likely 5 to 50 times in 100 years). *Frequent* indicates that flooding is likely to occur often under usual weather conditions (the chance of flooding is more than 50 percent in any year, or flooding is likely more than 50 times in 100 years; but the chance of flooding is less than 50 percent in all months in any year). *Very frequent* indicates that flooding is likely to occur very often under usual weather conditions (the chance of flooding is more than 50 percent in all months in any year).

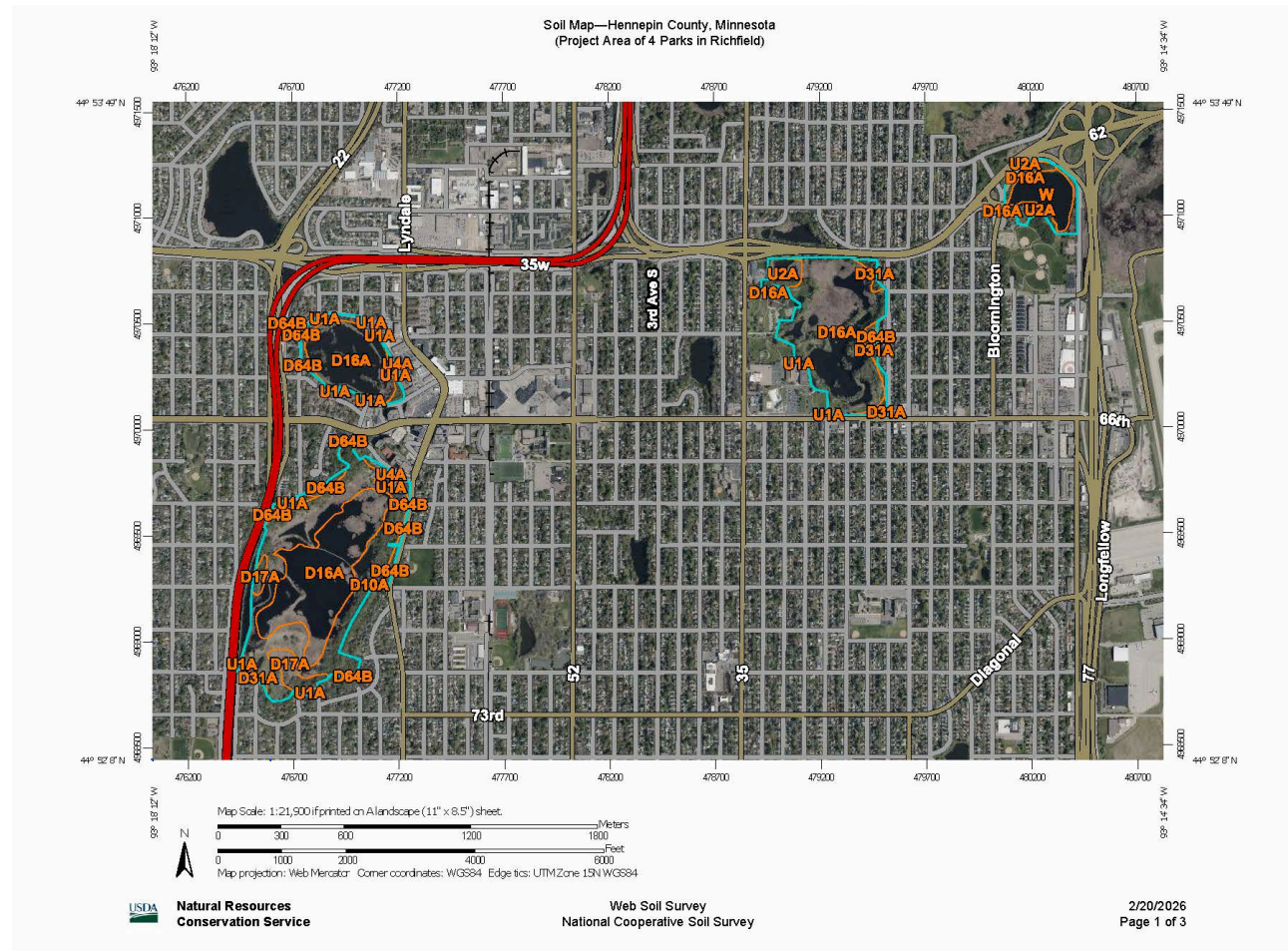
Flooding duration is the average duration of inundation per flood occurrence expressed as a class. *Extremely brief* is 0.1 hour to 4.0 hours, *very brief* is 4 to 48 hours, *brief* is 2 to 7 days, *long* is 7 to 30 days, and *very long* is more than 30 days. About two-thirds to three-fourths of all flooding occur during the stated period. The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development. Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Moist Loamy Lowland: The Moist Loamy Lowland ecological site is found throughout MLRA 90A, located in depressions, drainageways, and flats on till plains, moraines, valley trains, lake plains, and sometimes outwash plains and stream terraces. These sites are characterized by very deep, somewhat poorly drained soils that formed in loamy deposits including lacustrine, eolian, glacial till and outwash, alluvium, and residuum. Precipitation, runoff from adjacent uplands, and groundwater discharge are the primary sources of water. Soils range from very strongly acid to slightly alkaline.

Moist Loamy Lowland is distinguished from other ecological sites by its deep loamy deposits and somewhat poorly drained soils. This site lacks the elevated percentage of free carbonates found in Moist Loamy Lowland with Carbonates. Other somewhat poorly drained sites have sandy or clayey deposits. The loamy material often has a higher pH and available water capacity than sandy material, but less than clayey material.

DRAFT

Appendix J: Soil Results



Soil Map—Hennepin County, Minnesota
(ProjectArea)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hennepin County, Minnesota

Survey Area Data: Version 21, Sep 10, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
D10A	Forada sandy loam, 0 to 2 percent slopes	69.6	25.0%
D16A	Seelyville and Markey soils, ponded, 0 to 1 percent slopes	152.7	54.9%
D17A	Duelm loamy sand, 0 to 2 percent slopes	9.1	3.3%
D31A	Urban land-Duelm complex, 0 to 2 percent slopes	5.8	2.1%
D64B	Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes	4.6	1.6%
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	11.6	4.2%
U2A	Udorthents, wet substratum, 0 to 2 percent slopes	9.9	3.5%
U4A	Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes	2.0	0.7%
W	Water	12.8	4.6%
Totals for Area of Interest		278.1	100.0%

Citations – (Will be fully edited prior to final draft)

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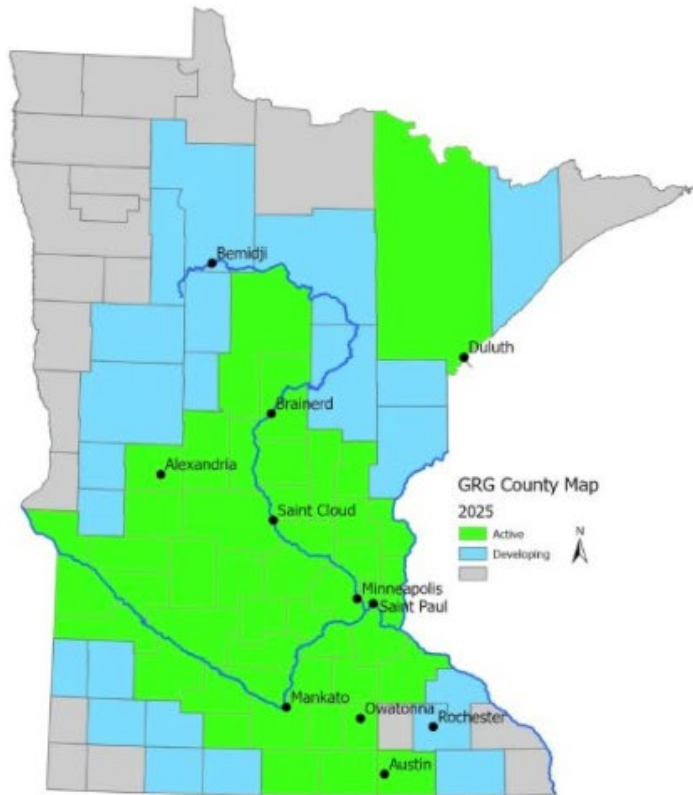
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Natural Resources Management Plan



GRG Overview



We address Minnesota's most pressing conservation issues, from disappearing pollinator habitat to declining water quality. Our work spans from the Mississippi Headwaters through the Twin Cities and into south-central Minnesota. Guided by science, we advance restoration, helping to find new and better ways of solving Minnesota's environmental challenges through partnerships.

- Transforming degraded urban natural areas
- Expanding wildlife and pollinator habitat
- Building community-based models for sustainable agriculture

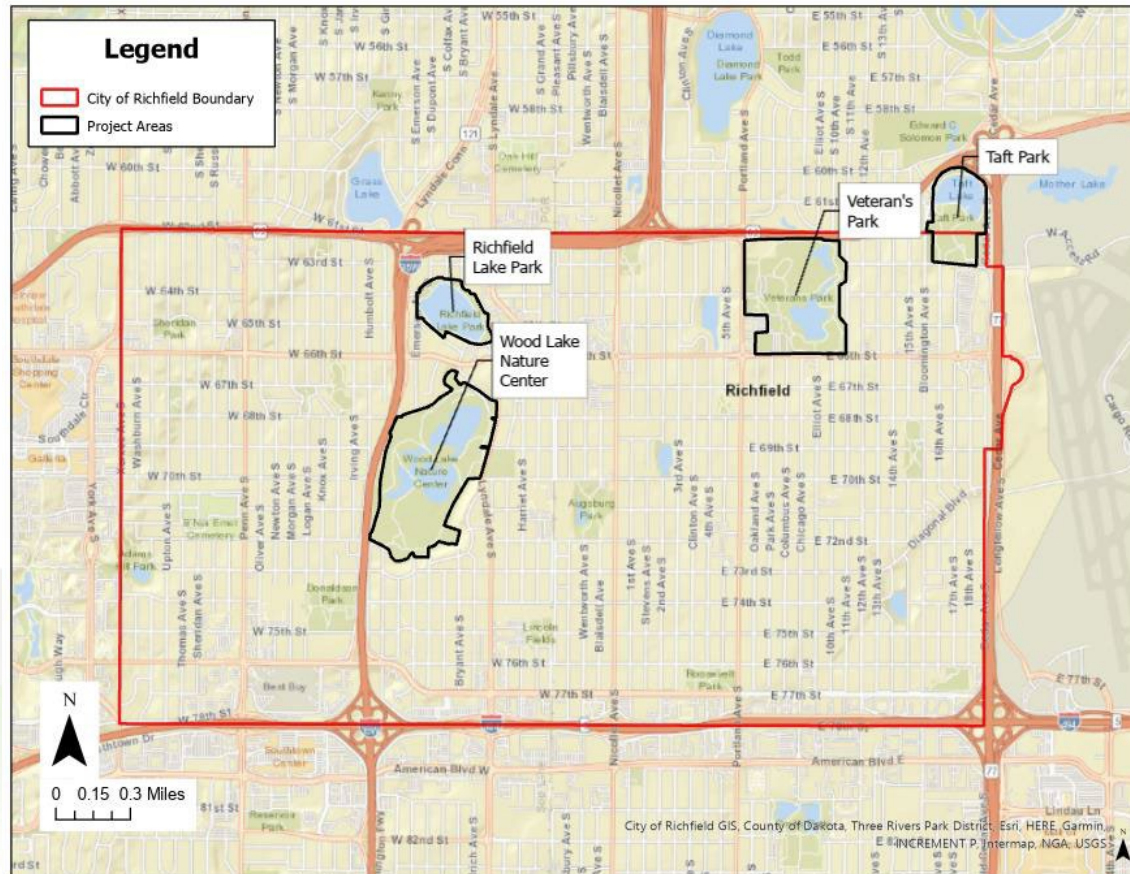
What is a NRM Plan?

- Policy and Planning Document
 - Identifies Goals
 - Inventories Current Resources
 - Identifies Path Forward
 - Outline General Costs

Why a NRM Plan?

- Goals Never Defined
- Natural Areas of more than 300 acres
- Minimally / inconsistently maintained
- Many invasive and weedy plants
- Grants and partnerships require a plan

Starting Point



City of Richfield NRMP - 4-Park Site Context



NRM Plan Structure

- Park Overview
- Vegetation Assessment
- Define Objectives
 - Recreation
 - Ecological
- Define Management Areas
- Phasing and Costs

Sample Plan Woody Habitat

Y1: Invasive woody removal

Y2~Y4: Continued invasive control (canopy & understory)

Y2~Y5: Enhance canopy and understory diversity

Long term: Functional habitat for woodland wildlife, improve filtration of runoff into surface and ground water.



Phasing & Cost Summary

Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Applicable Management Units
Dead down woody disposal	\$XX,XXX					1, 2
Hazard tree removal	\$XX,XXX					1, 2
Woody invasive control	\$XX,XXX	\$X,XXX	\$X,XXX	\$X,XXX		1, 2
Establishment maintenance	\$XX,XXX	\$X,XXX	\$X,XXX	\$X,XXX	\$3,900	1, 2
Herbaceous invasive control		\$X,XXX				1, 2
Non-native grass removal		\$X,XXX				1, 2
Woody follow up maintenance		\$X,XXX	\$X,XXX			1, 2
Reed canary grass control		\$X,XXX	\$X,XXX	\$X,XXX		1, 2
Plant native savanna trees		\$X,XXX	\$X,XXX	\$X,XXX	\$600	1, 2
Understory seeding		\$X,XXX	\$X,XXX	\$X,XXX	\$1,800	1, 2
Plant native pollinator shrubs			\$X,XXX			1, 2
Reseeding			\$X,XXX			1, 2
Shoreline buffer plantings			\$X,XXX	\$X,XXX	\$X,XXX	1, 2
Planting of native trees and shrubs				\$X,XXX	\$X,XXX	1, 2
Total	\$XXX,XXX	\$XX,XXX	\$XX,XXX	\$XX,XXX	\$X,XXX	\$XXX,XXX

Appendix

- Invasive removal methods
- Invasive treatment timelines
- Site preparation procedures
- Seed Mix recommendations
- Tree and shrub recommendations

General How To Guide



Before & After: Two Rivers High School



April 24, 2023



June 20, 2023



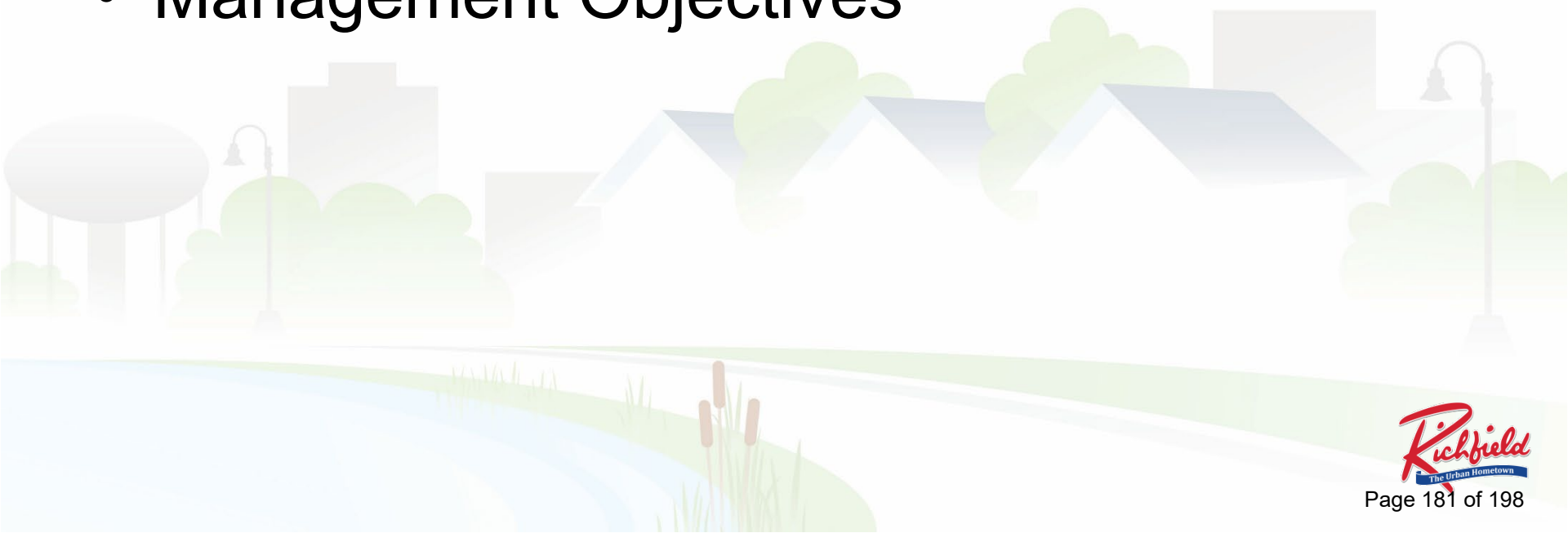
July 3, 2024

Before & After: Cedar Lake Farm



Park Feedback

- Park Overview
- Vegetation Assessment
- Management Objectives



Richfield Lake

- 24 acres
- 1 mile of multi-use trails
- Upland 10.3 acres
- Connected to downtown
- Neighborhood Park



Richfield Lake Park and Project Area Overview
Richfield, Minnesota

Plant Communities

1. Woodland
2. Mowed Grass
3. Prairie
4. Pavement
5. Transitional Land
6. Open Water
7. Wetland



Minnesota Land Cover Classifications System (MLCCS)
Richfield Lake Park, Richfield, MN

Management Objectives

- Maintain Views
- Stabilize Shoreline
- Develop Shade Canopy
- Stormwater Infrastructure
- Manage Geese Impacts
- Remove Invasives,
Encourage Native Plants



12 Maintained Views



- 7 Benches
- 5 Entrances

Taft Park

- 42 acres
- Natural area 29 acres
- 1 mile of multi-use trails
- Regional Trail Connection
- Sports Complex
- Neighborhood Park



Taft Park and Project Area Overview



Plant Communities

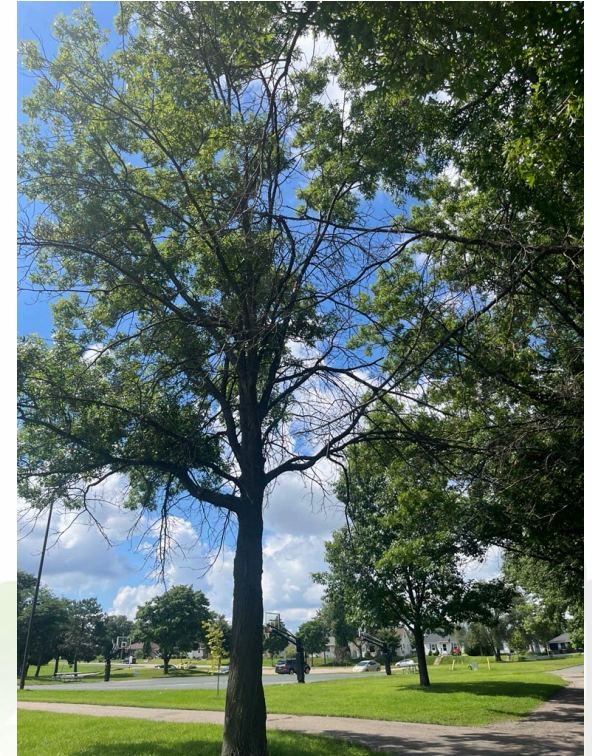
1. Woodland
2. Mowed Grass
3. Prairie
4. Pavement
5. Transitional Land
6. Open Water
7. Wetland



Minnesota Land Cover Classifications System (MLCCS)
Taft Park, Richfield, MN

Management Objectives

- Stabilize Shoreline
- Shoreline Fishing Spaces
- Forest Nature Experience
- Stormwater Infrastructure
- Manage Geese Impacts
- Remove Invasives, Encourage Native Plants



Taft Park Work Units



Taft Lake Park Restoration Work Units

Veterans Memorial Park

- 108 acres
- 2 mile of multi-use trails
- Upland habitat 57 acres
- Pavilion
- Mini Golf
- Pool
- Ice Arena



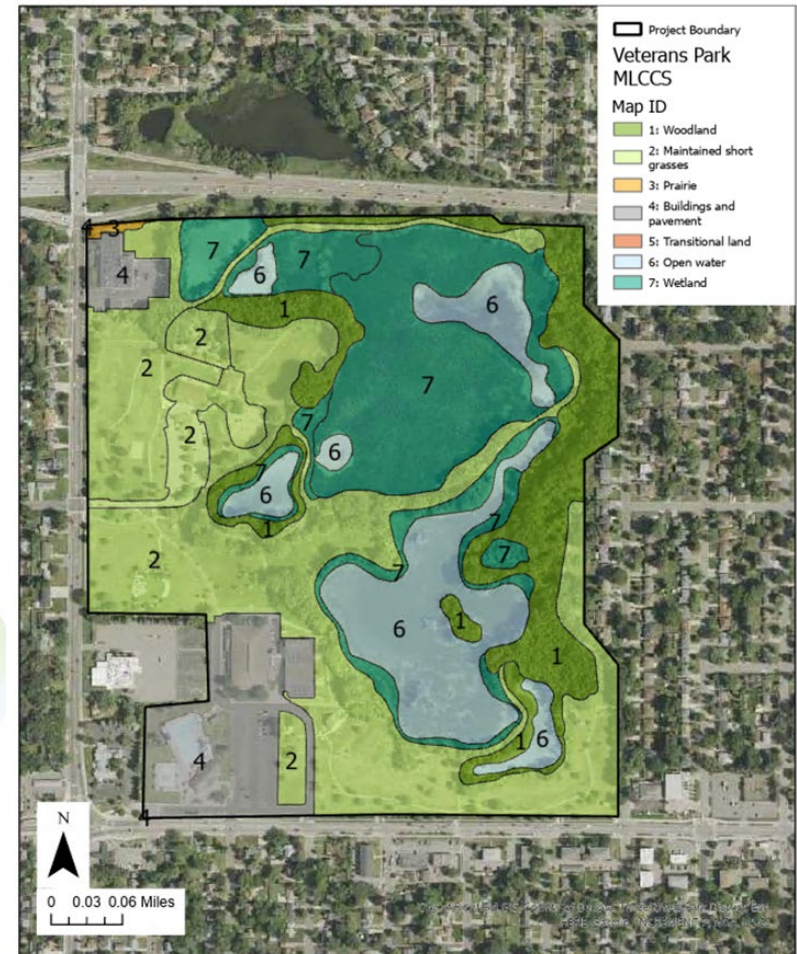
Veteran's Park and Project Area Overview

Management Objectives

- Transition Unused Mowed Areas to Prairie
- Maintain Diversity of Views
- Protect Stormwater Infrastructure
- Manage Geese Impacts
- Remove Invasives, Encourage Native Plants

Plant Communities

1. Woodland
2. Mowed Grass
3. Prairie
4. Pavement
5. Transitional Land
6. Open Water
7. Wetland



Minnesota Land Cover Classifications System (MLCCS)
Veterans Park, Richfield, MN

Work Units



Veteran's Memorial Park Restoration Work Units

Wood Lake Nature Center

- 150 acres
- Over 3 miles of multi-use trails
- Community nature center
- Significant biodiversity in aquatic and terrestrial habitats



Wood Lake Nature Center Project Overview



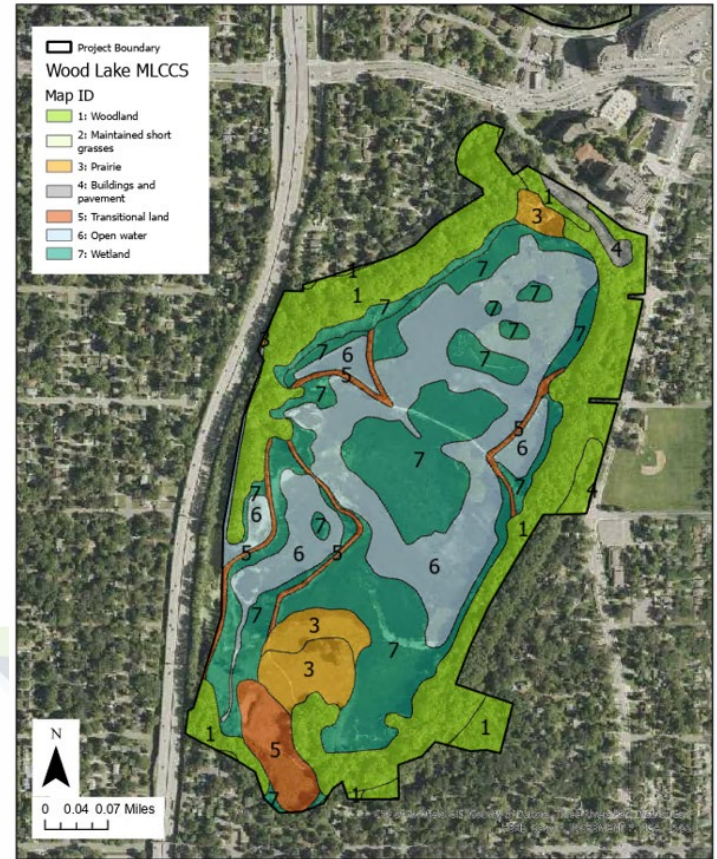
Management Objectives

- Maintain Diverse Views
- Enhance Natural Spaces
- Water Quality Improvement
- Balance restoration with nature center activities

Wood Lake Nature Center

Plant Communities

1. Woodland
2. Mowed Grass
3. Prairie
4. Pavement
5. Transitional Land
6. Open Water
7. Wetland



Minnesota Land Cover Classifications System (MLCCS)
Wood Lake Nature Center, Richfield, MN

Work Units



Wood Lake Nature Center Restoration Units



Questions?