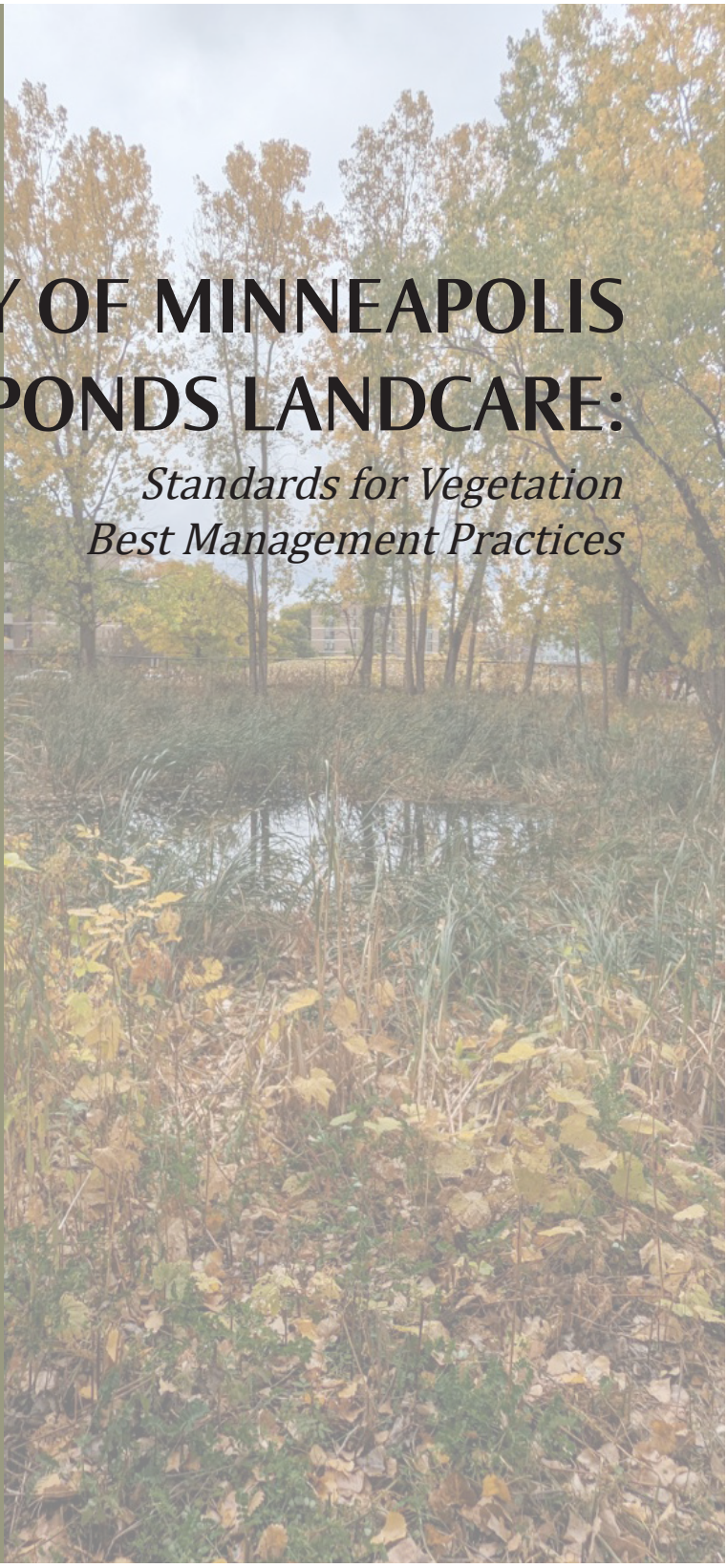
CITY OF MINNEAPOLIS PONDS LANDCARE:

Standards for Vegetation Best Management Practices



Minneapolis
City of Lakes

CITY OF MINNEAPOLIS
PONDS LANDCARE:
STANDARDS FOR VEGETATION
BEST MANAGEMENT PRACTICES

Developed by:

Metro Blooms DESIGN +BUILD

www.metrobloomsdb.com

Cover Photo description: Harrison Education Center Wet Pond

City of Minneapolis Water Resources Land Acknowledgment

The City of Minneapolis is located on Dakota Land. Though we have arrived here in a multiplicity of ways, we recognize our occupation on land that is of great historical, spiritual, and cultural significance to Dakota people.

Our Shared Waters

It is essential to acknowledge that these ponds and other stormwater measures you may be visiting are constructed on the ancestral and contemporary homelands of the Dakóta and Anishinaabe peoples.

Significance

The waters of the area have deep traditional significance to Dakóta and Anishinaabe peoples. The Wakpá Tháŋka (meaning "Great River" in the Dakóta language, the Mississippi) eventually meets the Mnísota Wakpá (Minnesota River) at Bdoté in present Fort Snelling, which is central to Dakóta creation stories. The Anishinaabe people reached their homelands in this region after pursuing the growth of manoomin (wild rice) on waters, which is historically significant to them as a gift from the Creator and presently used in daily life and ceremonies.

Acknowledgment

We acknowledge that this land was stolen from the Dakóta and Anishinaabe by the state of Minnesota and the federal government and offer our respect to the elders who have cared for the land and its waters for generations and continue to do so. We also acknowledge the past and present harm done to Dakota, Anishinaabe, and other Indigenous nations through the systematic forced removal of communities and the unjust seizure of their lands. With this statement we commit to learn the history of the area and to advocate for and collaborate with Indigenous people.

Table of Contents

Pond inlet sedimentation needs maintenance.
Photo Credit: Metro Blooms Design + Build

Introduction

The Purpose of Vegetation Standards

This booklet provides standards and practices for the sustainable care of vegetation associated with City of Minneapolis stormwater best management practices (BMPs). This includes wet ponds, dry basins as well as bioinfiltration basins. Strategies are included to support healthy ecosystems and plantings associated with these BMPs as they evolve over time.

Topics covered:

- A brief description of the applicable stormwater BMPs.
- Standards for rating the success of the type and coverage of vegetation at these BMPs.
- Techniques to identify, care for, and support the native plants in and around stormwater ponds including practices that reduce the use of harmful chemicals.
- Focus on establishing monitoring strategies and achievable, measurable goals when assessing and caring for vegetated pond BMPs.
- Native plant recommendations & invasive species and their approved management and removal priorities.

Minnesota Water Protection

Since the 1953 Federal Watershed Protection and Flood Prevention Act, the State of Minnesota has been introducing and refining water quality standards. These statewide protections, like the 2006 Clean Water Legacy Act and the 2008 Amendment has established regulations and funding to improve water quality through monitoring and assessments, making regular inspections, maintenance and care of pond BMPs an important part of our public water management efforts.

Public waters, as defined by the Minnesota Department of Natural Resources, include the care of water basins that are both natural and

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altered. If an area is intentionally retaining water to prevent or reduce downstream flooding or nutrient loading, these retention basins fall under the state classification of public waters and thus, are required to meet water quality standards and care.

Why are BMPs and vegetation management practices important?

Cities, towns, and surrounding landscapes are filled with impervious surfaces, including rooftops, sidewalks, roads, driveways, and parking lots. When rainwater hits these surfaces, it runs off, picking up pollution before entering storm sewers and flowing directly to our lakes, rivers, and streams. Development has increased stormwater runoff. Sediment, nutrients, bacteria, metals and other pollutants on our streets and other impervious surfaces form a highly concentrated "first flush" of pollutants entering our storm sewers during rain events. Stormwater BMPs that are properly implemented and cared for can slow the flow and reduce that first dense pollutant load.

There is growing awareness about the value of stormwater BMPs. In many communities, property owners, especially of "high-impact" properties with large amounts of runoff, are required to put in stormwater BMPs to reduce the pollution flowing to local waterways. State, city, and local governmental offices provide up-to-date regulations and guidance for care of these BMPs. It is important for landcare managers to not only install but also know how to care for their BMPs to ensure that they function over time.

Vegetated Pond BMPs

There are many approaches to stormwater management. This booklet focuses on vegetated stormwater ponds. Stormwater ponds are designed to be catch basins for developed areas. Stormwater ponds collect rainwater (stormwater runoff) that runs over impermeable surfaces such as parking lots, roads, and buildings. In undeveloped areas rainwater can be absorbed into the soil, taken up by trees and plants or flow into rivers, streams or wetlands naturally. The chemical, biological, and physical properties of the plants, microbes, soils, and

other structures remove pollutants from the runoff and provide opportunities for native habitat.

While vegetated stormwater BMPs like wet and dry ponds may capture and control stormwater volume and improve water quality, they also deliver a variety of secondary benefits.

These include:

- Social benefits such as increased community green space
- Environmental benefits including habitat creation, reduction in the urban heat island effect, air purification and carbon sequestration
- Economic benefits such as urban renewal and green jobs creation

Vegetated stormwater BMPs have structural elements that need to be maintained. For example, an inlet structure, where water enters a wet pond, should have its sediment dug out on a regular basis. In addition, they also have living, dynamic systems of vegetation and soils. These systems are the focus of this guide. They are systems that change over time, and methods should be adjusted accordingly to keep these delicate systems in balance.

A vegetated stormwater BMP that is poorly maintained will be an unattractive feature in the landscape. It will likely not function effectively long term. At worst, the system can fail, resulting in restoration costs. Vegetation that is lacking or is overgrown can be a sign of performance issues. When vegetation dies and is not replaced, the BMP loses the pollutant filtration and evapotranspiration benefits provided by the plants. Clogged soil can prevent infiltration and lead to complete failure. Lack of mulch or plant cover can create an environment for weeds to establish, and they can dry out the soil and cause sedimentation on the soil surface if exposed to rainfall.

This booklet provides the City of Minneapolis standards for determining the health and success of vegetation associated with stormwater ponds. Many stormwater ponds have significant infestations of invasive species, weedy trees, and poor establishment of

desirable species. These standards are meant to direct maintenance and care efforts towards reductions in invasive species and bare soil and then the establishment of valuable native habitat.

Pollinator Habitat & Stormwater BMPs

Healthy pollinator habitat is characterized by a diversity of native plant species that bloom throughout the growing season, thereby providing forage and nectar for pollinators all through the season in which pollinators are active. A diversity of plant species will support a greater diversity of pollinator species including bees, butterflies, moths, beetles, and even birds and bats. Stormwater BMPs have the opportunity to provide valuable pollinator habitat. The large stands of vegetation at a pond edge and surrounding many of our city's stormwater ponds are uniquely poised to provide key habitat for our state's declining bee species.

Many Minnesota native plants are deep-rooted and the establishment of native plants as vegetation around and in stormwater BMPs can help hold soil in place and reduce erosion. The successful establishment of native species in and around stormwater BMPs is critical to compete against non-native invasive species. Invasive species are, by their very nature, aggressive at establishing and it is critical to put significant effort towards the establishment period of native species. The establishment period can be defined as the first 2-3 growing seasons.

Photo Credit: Metro Blooms Design + Build

The goal is to establish healthy stands of native vegetation that contains diverse, resilient species which provide valuable habitat and ecological resources. Management of invasive species should be done in a way that protects pollinators and works to establish native vegetation to replace it.

How to use this guide:

This booklet consists of three sections:

- **Section One** covers the definitions and typical elements of vegetated pond BMPs managed by the City of Minneapolis. Standard requirements of vegetated pond care are then provided to give parameters to the landcare process.

- **Section Two** discusses an array of vegetation maintenance challenges and City of Minneapolis preferred solutions to maintain vegetation quality.

- The final **Appendix** section provides plant lists and Individual Site Assessments for use during the maintenance of the physical and vegetative components of each pond.

The ultimate goal is to have thriving plant community so a vegetated pond BMP can fulfill the water filtering function and meet water quality objectives. With regular care and clear standards, your local vegetated pond can go beyond it's basic functions to contribute much to the local community.

Photo Credit: Metro Blooms Design + Build

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Section One: Stormwater Pond Types & Functions

Types of Minneapolis Ponds

Water Quality Improvement

When new urban areas are built, water moves through our paved environments with higher collection amounts and velocities. Streams and rivers rise to new peak flows and discharge to our local lakes with greater amounts of pollution. Stormwater ponds are designed to help manage this flow by collecting rainwater in "treatment trains." These ponds may look like a "natural" environment but are actually designed to work in tandem with other local ponds to control pollution rates, reduce the impacts of flooding, and improve the health of streams and rivers downstream.

BMP Type 1: Wet Ponds (aka Retention Ponds)

Minneapolis Wet Ponds in reference:
Shingle Creek North, Shingle Creek S, Park 44th, Park 43, Camden, Logan, Mead, Columbus Lowry Rocket, Central, 25th Ave and Heritage Park.

A wet pond's primary function is to collect stormwater and hold a permanent pool to cleanse the water before a controlled overflow releases some of the water to local streams or water bodies. Pond size and how outflow is regulated influences how each pond "flash floods" during a storm and how much pollutants and sediment settle to the bottom of the pond over time. Plants compliment the process by taking up the excess nutrients. According to the Minnesota Stormwater Manual, a properly designed wet pond has the ability to capture 85 % of sediment and about 60% of phosphorus during each storm event if a pond is well maintained.

Elements of a Wet Pond & How it Works:

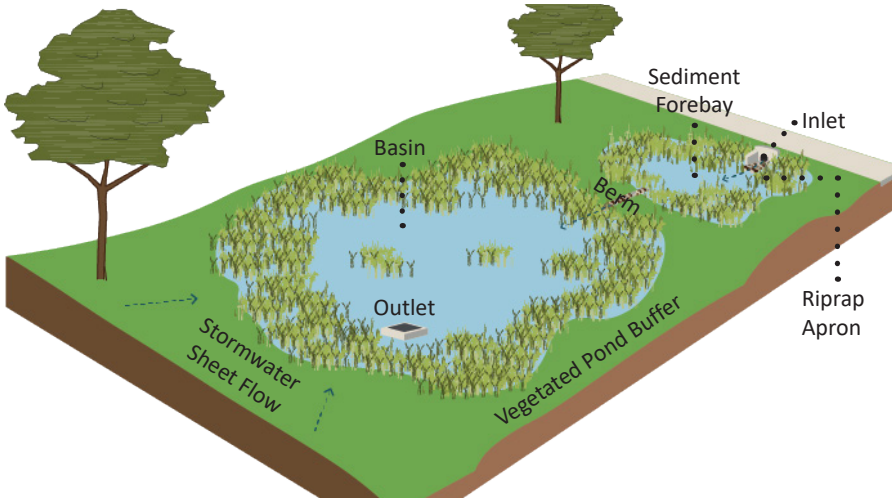


Diagram Credit: Metro Blooms Design & Build

For more information, refer to Minnesota Stormwater Manual & Plants for Stormwater Design. *See Resources.*

Harrison Education Center Wet Pond

BMP Type 2: Bioinfiltration Basins

Minneapolis Bioinfiltration Basins in reference:
16th Ave, Mid City, Winter Street and Blue Water

Bioinfiltration basins, also called raingardens, manage stormwater runoff from impervious surfaces at a development or regional scale as well as a singular site scale using native soils.

All bioinfiltration basins should drain completely within a 24 - 48 hour period. As stormwater accumulates and starts to flow into the underlying soil, chemical, biological and physical processes remove pollutants and delay peak stormwater flows. Most bioinfiltration basins are designed with native vegetation that is well-adapted to the unique conditions of our region.

Elements of a Bioinflitration Basin:

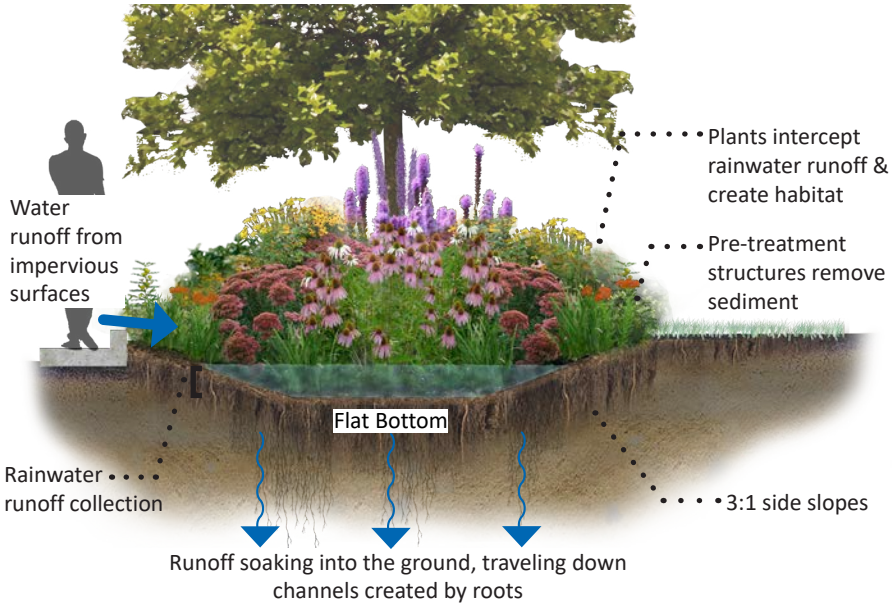


Diagram Credit: Metro Blooms Design + Build

BMP Type 3: Biofiltration (underdrained)

Minneapolis Biofiltration Basins in reference:
Heritage Park, Lowell Curve, Riverside

Utilizing a single basin or a series of basins, biofiltration basins are similar to bioinfiltration basins in that stormwater temporarily ponds on the surface and then slowly filter down through soil and vegetation. A buried drainage pipe below the basin accumulates the filtered runoff and overflows to the connected storm sewer system. This cleans and slows stormwater runoff before it reaches downstream water ways and is used where infiltration is not feasible.

Biofiltration basins can vary widely in size and shape in the urban environment. These are frequently used throughout local Minnesota watersheds at smaller site scales.

Elements of a Bioflitration Basin:

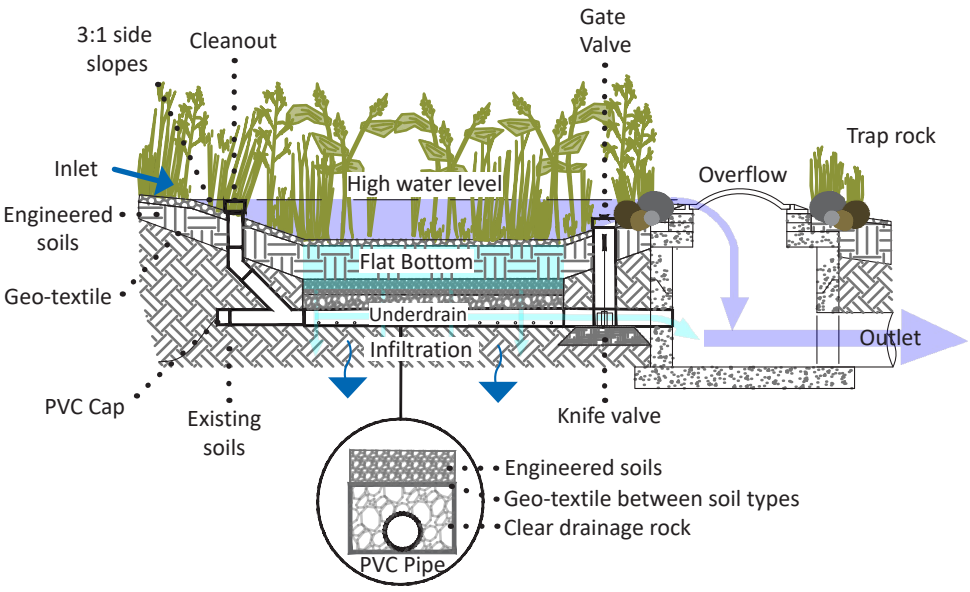


Diagram Credit: Metro Blooms Design + Build

BMP Type 4: Dry Ponds

Minneapolis Dry Basins in reference:
Sibley, Columbus & 37th, Bancroft Meadows

Dry ponds, also called "detention ponds," are stormwater basins designed to intercept a volume of stormwater runoff and temporarily impound the water for gradual release to the receiving water either by gravity, lift station or a combination of both. Dry ponds are typically on-line, end-of-pipe BMP's designed to completely empty out storm events and therefore primarily provide runoff rate control as opposed to water quality control.

Dry detention ponds are designed to empty in a time period of less than 24 hours, after the rain event. If the basin retains water for over 48 hours, expect that some maintenance is required. Dry basins are simplified BMPs but still need weekly, monthly and annual maintenance. Invasive species can still take root within a mown turf area, but most frequently within the inlet and outlet areas. Watch for bare areas or gullies after high velocity storms to repair turf as necessary.

Dry Pond Lawn Management Standards:

- Grass shall not be mowed below 4"-6" tall to reduce potential for bare areas and erosion, unless specified otherwise.
- Grass clippings are not to be mowed onto impervious surfaces.
- 90% turf coverage, no bare soil or erosion.
- High-traffic problem areas should be addressed with rock/mulch paths.
- Inlet(s) and other structures are clear of trash and debris, components are in working order in case of emergency.
- Standing water after rain event infiltrates or evaporates within 48 hrs.
- Remove weedy trees.
- Threshold for broadleaf and/or grassy weeds in turf areas is 50%. When it has been determined that this percentage has been reached or exceeded, the appropriate post emergent or pre-emergent herbicide may be applied, preferably on a spot spray basis. Selection

of the appropriate herbicide of choice will be determined by trained staff after evaluating the site, the hazard rating of the product and the specific location. See section page 27, When to Use Herbicides, for specific herbicide practices.

Dry Ponds during a dry period:

Bancroft Meadows Photo Credit: City of Minneapolis

Dry Pond during a rain event:

Bancroft Meadows Photo Credit: City of Minneapolis

Section Two: Stormwater Pond Standards of Success

General Maintenance Goals

Proper routine maintenance can reduce the expenses of non-routine maintenance later. Examples of routine maintenance activities include:

- Vegetation Management
- Debris and littler removal
- Inspection of mechanical components

Reducing use of commercial herbicides can be accomplished through proper establishment of native vegetation, thereby reducing cost of maintenance down the road. Installing grates and catch basins at inlets can make debris and litter removal easier. Regularly inspecting mechanical components allows for quick repair and reduces need for replacement of components later, also ensuring that systems are functioning properly in the case of an unprecedented storm event. Always consult the Operations & Maintenance (O & M) plans and as-built record drawings for each BMP for information about specific inlet and outlet structures and other mechanical components.

Non-Routine Maintenance

- Soil stabilization & erosion control repairs
- Sediment removal (once yearly). Sediment removal shall be limited to hand tools for City of Minneapolis ponds sites.
- Repair or replacement of mechanical components

Vegetation management goals include establishment and preservation of existing native vegetation to reduce erosion and promote vegetated coverage. If existing vegetation is to be disturbed, ensure slope stabilization is in place before removing existing vegetation. Temporary cover crops or mulch can be used to aid in stabilization during plant establishment. The goal is to manage and reduce invasive plant species to reduce competition from weeds and allow native vegetation to thrive. Native plants are plants with genetic origin within Minnesota.

Note on Establishing New Vegetation

When establishing vegetation at a newly constructed BMP, or establishing vegetation in a bare area of an existing BMP, it is important to recognize the additional care that plants will need during the establishment phase. The 'establishment phase' is generally recognized as the first 2-3 growing seasons after planting. Regarding the following vegetation management standards and goals, it is important to note that sites may not meet these standards when vegetation is in the establishment phase. For example, in the first 1-3 growing seasons, native plants may not have reached mature size and vegetation coverage may not meet the High Quality standard, however proper care during establishment may ultimately result in meeting the standard of 90% vegetated cover.

Note on BMP Area

At smaller BMPs with less vegetated area, the number of native plant species present is likely to be less than at sites with a large vegetated area. For this reason, larger sites may be able to achieve the High Quality native plant diversity standard while smaller sites may not have the square footage available to support a diverse stand of native plants. A table on page 17 lists the potential native diversity range that could be expected in BMPs of varying sizes.

Blazing star in Heritage Park Pond 3

Required Standards for Success

Coverage:

- No eroded soils present
- Vegetation coverage must exceed 90% over any 10 sf area.
- Bare soil areas will not exceed 1 sf.
- No sediment collecting within the BMP.

Invasive Species Presence:

- Less than 2% noxious and less than 5% aggressive species (https://www.dnr.state.mn.us/invasives/index.html) within 10 sf area. See Appendix pages for recommended species to remove and control.
- Required to inspect site for invasive plant species that might pose a challenge for the establishment of native plant species.
- Removal of invasive and aggressive tree species is required, especially where roots may impact structural component such as embankments and conveyance swales.

* While some trees are native, they may produce many volunteer trees. Weedy trees not a part of the original plan must be removed.

Native MN plant - Canada Anemone

Native Diversity:

- Must be greater than 20 native plant species present (>2% cover ea.)
- Planted areas contain minimum 75% native vegetation species
- Must be at least 3 native flowering species per season with >2% cover each. Seasons include Spring, Summer and Fall.

Timeline for Invasive Species Reduction:

The goal for reduction in invasive species should be 50% of the invasive species removal per year. Set a goal of a realistic change of 3-5 years to remove invasive species from a site. See chart below for example species quantity change.

	Invasive Quantity	Native Quantity
Year 1	50%	50%
Year 2	25%	75%
Year 3	12.5%	87.5%

***See pages 11-12 for BMP Vegetation Score Chart**

Cattails in Heritage Park Basin 6

BMP Vegetation Score Chart

The BMP vegetation score chart is a tool to track the success of each site. It displays the ranking of each of 3 categories: Coverage, Invasive Species Presence, and Native Diversity. Using this chart, an overall score is calculated.

Overall site scoring:

0 - 7 = Low Quality Vegetation
8 - 14 = Moderate Quality Vegetation
15 + = High Quality Vegetation

		Low Quality = 0 point
Coverage	Erosion	• Erosion is present in many areas (runnels, on slopes, high traffic areas, etc.).
	Bare Soil	• Bare soil areas are greater than 10 sf.
	Vegetation Coverage	• Vegetation coverage is less than 50%.
	Sedimentation	• Basin is collecting sediment and filling outlets regularly.
Invasive Species Presence	Mn Noxious Weeds Priority 1	• Site is over 10% noxious species and needs immediate care.
	Aggressive Weeds Priority 2	• Site is greater than 50% aggressive species and needs immediate care.
	See Invasive Species Management, Appendix	
Native Diversity	Diversity of Species	• Less than 5 native plant species present.
	Native Coverage	• Planted areas are less than 50% native species.
	Seasonal Bloom	• No native flowering species in one or more season.
	See Successful Native Vegetation Developement, Appendix	

Coverage: the extent to which the site is covered by ANY vegetation

Invasive Species Presence: amount of total vegetative coverage that consists of invasive species

Native Diversity: presence and variety of native species coverage.

Your goal is to achieve High Quality ranking for each category at each site.

Moderate Quality =1 point ea	High Quality = 2 point ea
• Some erosion is present.	• Soils are stable. No Erosion present.
• Bare soil areas are of moderate size, 1-10 sf	• Bare soil areas do not exceed 1 sf.
• Vegetation coverage is between 50 - 90%.	• Vegetation coverage exceeds 90%.
• Sediment is collecting in low areas and filling outlets over a season.	• No Sedimentation
• Noxious species cover 2-10% of the site.	• Less than 2% Noxious species within 10 sf area.
• Aggressive species cover 5-50% of the site.	• Less than 5% aggressive species within 10 sf area.
• 5-20 native plant species present.	• Greater than 20 native plant species.
• Planted areas are 50-75% native species.	• Planted areas are greater than 75% native species.
• At least 1 native flowering species per season.	• Greater than 3 native flowering species per season.

Section Three

Successful Vegetation Management

Vegetation management is most effective when you know the best time to intervene and the best methods of removal. Since weeds adversely affect the local or larger ecosystem balance and can often out-compete many other species, they frequently conflict with human goals (choke waterways, impede agriculture and disease control efforts, and more) and thus must be managed or regulated.

Below are weed-control practices that work for most weeds:

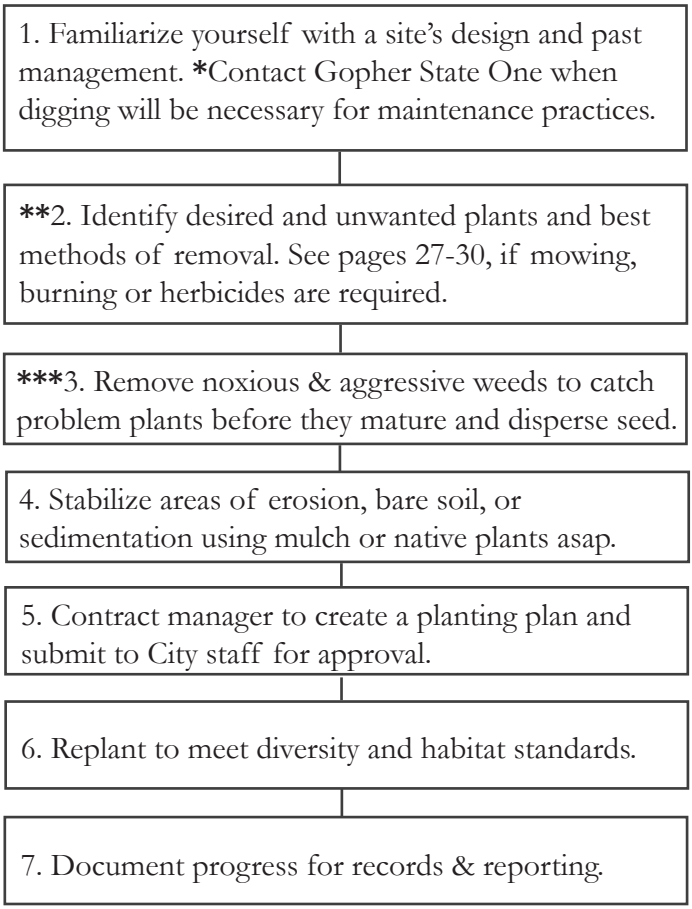
- Remove weeds on a regular schedule, while they are small.
- Remove and properly dispose of the weeds completely: seed heads, berries, roots, etc.
- Keep bare soil covered by double-shredded hardwood mulch or similar equivalent until the desirable plants fill in to keep new weeds from quickly growing back into the disturbed soil.
- Be careful to minimize damage to neighboring desirable plants. Support the desirable plants with good watering practices.

City of Minneapolis Vegetation Management Goals:

- Public safety
- Prevent erosion
- Protect and improve water quality and ecological function
- Slow water movement, hold or convert pollutants, and enhance infiltration and evapotranspiration
- Conduct preventive maintenance for longevity of infrastructure
- Control invasive species (non-native and selected native species) growth and prevent the production and dispersal of seed
- Create wildlife habitat
- Provide a neat and attractive appearance

• Perpetuate the original intent of the species planted. On many sites the original intent was to establish a simplified native grassland community. Plant species were selected for their resilience, habitat value and beauty. These plants shall be managed for their proliferation.
• Manage land areas using pollinator-friendly practices. Control invasive plant species to enhance biodiversity essential to pollinators. Plant pollinator forage in appropriate locations. Do not use insecticides known to kill bees and other pollinators. Avoid spray drift at all times.
• Control all species listed on the MN Noxious Weed List and comply with the MN Noxious Weed Law.
• Control invasive species in order to prevent Public Works sites from becoming sources of invasive weed seed that can disperse and establish on neighboring properties. An example is Canada thistle, which produces copious amounts of wind-blown seed that can easily become a problem on nearby public and private lands. Early detection and control will reduce the amount of herbicide needed in the long term.
• Control aggressive species that if allowed to exist on a site will quickly spread and overwhelm the site. Aggressive native species include but are not limited to Canada goldenrod, sandbar willow and cottonwood. Non-native species include but are not limited to Canada thistle, crown vetch, bird's-foot trefoil, reed canary grass, *Phragmites australis*, spotted knapweed, smooth brome, sweet clover, purple loosestrife, Siberian elm, European buckthorn, and Tartarian honeysuckle.
• Control non-native cattails (hybrid and narrow-leaf). They are common weeds in stormwater treatment facilities that may clog inlet and outlet structures, and they reduce habitat function.
They are to be controlled when a threat to structures occurs, primarily by cutting the plant below the water surface. Where this is not feasible, as a last resort wick application of an aquatic-safe herbicide may be warranted, however herbicide application over water shall be avoided where practicable.
• Control fast growing, woody species such as willow, Siberian elm and box elder especially if located where they can quickly establish and form a thicket around stormwater treatment facilities or can cause a public safety issue.
• Control species that are allelopathic. These include but are not limited to spotted knapweed, garlic mustard, and leafy spurge.

Basic Vegetation Management Approach:



*Report any damages asap, whether existing or created, to Contract manager as necessary. A field inspection is required to confirm damages are repaired appropriately and to the satisfaction of the owners. It shall be the Contractor's responsibility to coordinate work with the utility companies to accomplish utility relocations and to preserve the existing condition of any utilities to remain in their current location.

See **Resources at the end of this booklet for individual species control methods.

***See Noxious and Aggressive plant lists.

A Brief Word on Maintenance Etiquette:

1) **Project areas must be kept clean**. Prevent passage of sediment, vegetation clippings, mulch and all other materials into underground or surface drainage or stormwater treatment systems.

2) There must be **no dirt tracking** onto city streets. Tracking results in sedimentation to adjacent properties which could also affect waterways.

3) **Use caution to not damage or impair street access.** The Contractor will be responsible for all repairs and restoration of access on public streets and project site areas disturbed by the Contractor.

See City of Minnepolis contract for more information.

Sibley dry pond - Bare soil due to construction

Integrated Pest Management

The City of Minneapolis ponds maintenance work follows the Minneapolis Park and Recreation Board (MPRB) Integrated Pest Management (IPM) Policy to guide the use of herbicides.

Integrated Pest Management (IPM) is a pest management strategy that focuses on long-term prevention or suppression of pest problems with minimum impact on human health, the environment and nontarget organisms.

Taking action against invasive plants involves consideration of the various tools and techniques available for each plant and situation including site conditions, time of year, and resources available. Secondary and unintended consequences of control should also be considered, for example, if plants are pulled up, soil disturbance could bring more weed seed to the surface or facilitate invasion by additional invasive plants.

A number of concepts are vital to the development of a specific IPM policy goal:

1. Integrated pest management is not a predetermined set of practices, but a gradual stepwise process for improving pest management.
2. Integrated pest management programs use a combination of approaches, incorporating the judicious application of ecological principles, management techniques, cultural and biological controls, and chemical methods to keep pests below levels where they cause economic damage. (Laws of MN, 1989)
3. Implementing an integrated pest management program requires a thorough understanding of pests, their life histories, their environmental requirements and natural enemies, as well as establishment of a regular, systematic program for surveying pests, their damage and/or other evidence of their presence. When treatments are necessary, the least toxic and most target specific plant protectants are chosen.

The four basic principles of IPM used in designing a specific program:

1. Know your key pests.
2. Plan ahead.
3. Scout regularly.
4. Implement management practices.

Selection of Management Strategies

Selection of Management Strategies pest management techniques include:

- Encouraging naturally occurring biological control.
- Adoption of cultural practices that include cultivating, pruning, fertilizing, maintenance and irrigation practices that reduce pest problems.
- Changing the habitat to make it incompatible with pest development.
- Using alternate plant species or varieties that resist pests.
- Limiting monoculture plantings where possible.
- Selecting plant protectants with a lower toxicity to humans or non-target organisms

The criteria used for selecting management options include:

- Minimization of health risk to employees and users.
- Minimization of environmental impacts (e.g. water quality, non-target organisms).
- Risk reduction (losses to pests, or nuisance/threshold level).
- Ease with which the technique can be incorporated into existing management approaches.
- Cost-effectiveness of the management technique.

Posting of Plant Protectant Applications

Comply with the City of Minneapolis ordinance regarding pesticide application (Minneapolis Code of Ordinances Title 11 [Health and Sanitation] Chapter 230 [Pesticide Control])

Recordkeeping

Produce and maintain the necessary records of all pest management activities as required by the Minnesota Department of Agriculture.

Erosion Control Management

Minor Erosion Repair And Erosion Control Blankets

1. Upon identification of erosion that includes the scouring or washout of soil and/or denuding of vegetation greater than an area of 50 square feet or is currently active, the Contractor shall notify the City Representative via email or phone call. If possible, the Contractor shall document the erosion with photographs to be included in the notification.

2. The City Representative will inspect the site to determine erosion cause and shall issue direction to the Contractor to install the Minor Erosion Repair as specified in order to limit further erosion and establish vegetation on the location.

3. Upon determination by the City Representative that the cause of the erosion has been identified and corrected, as necessary the Contractor shall install the Minor Erosion Repair:

4. Soil Preparation
   a) Schedule operations to minimize the amount of area disturbed and thus susceptible to erosion at any given time. Do not work on wet ground.
   b) Furnish, install, and lightly compact MnDOT 3877.2, A Select Topsoil Borrow in order to fill and level to create a seed bed.
   c) Loosen surrounding soil in order to create an appropriate soil condition for seed establishment.

5. Seeding
   a) Furnish and install MnDOT Seed Mix 35-621 (Native Grassland/Dry Prairie South) to conform to MnDOT Standard Specification 2575 for Turf and Seed Establishment.
   b) Immediately prior to seeding, all dead weeds shall be removed and the Contractor shall loosen topsoil to a depth of 6 inches on all areas using discs, harrows or tiller rakes to produce a fine grade.

6. Stabilization

a) Uniformly apply MnDOT 3882.2A, Type 1 straw mulch over all turf seed on slopes less than 3:1. Approximately 10% of the soil surface shall be visible through the mulched areas. Disk anchor as specified in MnDOT 2575.3D.

b) Install erosion control blanket per MnDOT 3885, on all slopes 3:1 or greater. Furnish and install MnDOT erosion control blanket category 3 including natural fiber and netting as per manufacturer's recommendations and MnDOT 3885. Erosion control blanket shall be installed with the recommended stapling pattern as per manufacturer's recommendations.

7) Maintenance

a) The Contractor is responsible for maintaining all native seeded areas by watering and weeding until it is evident that the seed so placed has germinated and will establish an adequate protective cover. In the event of seeding failures, the Contractor will be required to correct and re-seed such areas at no expense to the City until adequate turf is established.

b) Any seed that does not show definite growth and establishment 60 days after installation shall be replaced and established at the proper season by the Contractor at the Contractor's expense.

c) Maintain the minor erosion repairs in a fully functioning manner throughout the duration of the Contract and until establishment has occurred per the City Representative's approval. Water for the establishment of the seeding shall be the responsibility of the Contractor.

Lake Mead, erosion

Invasive Plant Management Tools

Where feasible, use mechanical means such as pulling and mowing, in order to minimize chemical usage.

- Herbaceous Plantings
  - o Pulling (preferred)
  - o Mowing (preferred)
    - Flail mowing
    - Spot mowing
  - o Burning
  - o Herbicide application
    - Spot spraying
    - Wick application
- Woody Plants
  - o Pulling (preferred)
  - o Cutting with stump application of herbicide

Ewing wetland, burdock and buckthorn

Weed Control in Upland Plantings, Shrub Beds and Around Trees

Plants are selected and/or replaced in order to provide disease and insect resistant plantings, thereby reducing plant protectant applications.

Due to changing climate conditions, increasing populations of tap-rooted and other perennial weeds are being transported by birds and other means. Pulling or digging of these weeds is usually not successful. Spot spraying of these tap-rooted weeds with a low toxicity herbicide will help prevent flowering, seeding and further dispersal of these pest weeds.

Appropriate mulching of upland plantings, shrub beds and around trees will help decrease the number of pest weeds. If control of annual weeds in pathway or mulched areas is required, the proper pre- or post-emergent low toxicity herbicide will be applied on a spot spray basis. Posting of any plant protectant applications will be carried out according to City ordinance.

Ewing wetland, Purple loosestrife and Reed Canary Grass

Mowing for Weed Control

When a patch of weeds is too large to remove mechanically from the soil by hand or tool, or when there simply isn't enough time before a target species begins to produce seed, mowing can be an effective treatment. Using either a string trimmer or a mower to cut back weeds several times in a season is a good way to deplete the underground energy storage in the roots. Knocking back a specific weed at the right time can allow desired vegetation to overtake and eventually suppress it. For example, a cool season grass like quackgrass can be mowed in a prairie planting in the late spring before it flowers and produces seed. This helps warm-season native grasses emerge unencumbered.

Timing is very important. Make sure you understand the target species and its phenological stage before doing the work. Mowing at the wrong time (after the plant flowers) can spread weed seed widely. If some plants, such as garlic mustard, are mowed during flowering, they can continue to produce seed. Be sure to bag up the cut plants instead of letting them lie in place.

Integrated weed management approaches often include mowing. For example, herbicide treatments on new plant growth require mowing a few weeks before application. Lawn mowers, tractors or string trimmers are appropriate for upright herbaceous and woody weeds (but not for low-growing ones such as creeping charlie or clovers). Annual and second-year biennial plants can be effectively destroyed if they are mowed when flower buds are just forming. Additional mowing may be necessary if these plants grow back in the same season, but these treatments can keep seed from forming.

City of Minneapolis Mowing Procedures

a) Mowing may be performed as per the Management Plan.
b) Consider Fall mowing for monarch and ground-nesting bird habitat; consider use of flushing bar to move wildlife out of the mowing path.
c) Use a flail-type mower to prevent creation of mats of clippings.
d) Use low-profile equipment appropriate to slope conditions and to minimize the damage to soils and vegetation.
e) Mow at a height between six and eight inches. Do not mow shorter than six inches.

Mow plants short

Burning for Weed Control

A **Prescribed Burn Permit** is required prior to commencement of work.

All prescribed burns shall be **supervised by an experienced burn foreman** who shall have completed S-130 and S-190 training for wildland fire suppression.

Any prescribed burning also requires **a procedures plan**:

- including a list of contingencies and planned responses to contingencies;
- notification of neighbors and
- emergency agencies, fire departments and police departments; and
- a list of required permits and
- approvals and methods for complying with them.

Contractors shall have previous burn experience with sites of applicable size and condition.

Contractor shall coordinate with City Representative and provide a written notice of intent to burn to an agreed upon list of surrounding neighbors, municipal agencies, and other parties as suggested by property owner at least 14 days prior to the burn. All costs associated with the mailing shall be considered incidental to the contract amount.
i. All appropriate burn permits must be secured by Contractor and at the Contractor's expense.
ii. Permit applications available through City of MPLS Fire Prevention Bureau – 612-673-2546.
iii. All appropriate signage and posting shall be placed on site as required by permitting.

Burning as strategies and look for them to be utilized in their maintenance plan with an expectation fall or spring burns occur every 2-3 years unless there is overwhelming evidence that it is not needed.

City of Minneapolis Burning Procedures

a) Safety and Traffic

i. Contractor is responsible for establishing and maintaining all appropriate safety and traffic control measures prior to and during all burn operations.

b) Timing and Atmospheric Conditions

i. Predicted wind conditions for the day of the burn must not exceed 18 mph and shall be persistent from a constant direction. Direction of blowing smoke must be taken into consideration prior to burn. Gusty or variable winds can cause fire control and smoke management problems.

ii. Humidity for the day of the burn must be between 30% and 70%.

iii. Late fall to early spring, early or late in the day

c) Air Quality Check

i.The Contractor must check with MPCA regarding the Air Quality Index for the Twin Cities on the day of the burn. Burning shall not occur if index exceeds 100 in value. AQI values can be checked by phone at 651-297-1630 or by internet at http://www.pca.state.mn

d) Protection of Trees/Shrubs

i. All desirable trees, shrubs, and/or perennial plantings within or adjacent to areas targeted for prescribed burning shall be protected during burn by mowing and/or wetting a perimeter. It is the responsibility of the Contractor to confirm or disconfirm any desirable plantings in question.

ii. Replacement of any desirable trees, shrubs, or plantings damaged by the burn shall be the responsibility of the Contractor.

e) Clean Up

i. The Contractor is responsible for ensuring all embers are appropriately watered down and thoroughly extinguished and no smoke is coming from the burn site.

ii. The Contractor shall notify fire dispatch and other appropriate authorities of completion of burn in accordance with permits.

When to Use Herbicides

Early control of invasive species reduces the likelihood of establishment and expansion. When deciding between physical and chemical methods, keep in mind that manual removal of plants can result in disturbance to the soil which can further encourage the invasive species and open the site up to new introductions. While using less herbicide is preferred, an herbicide leaves the plants and soil in place, thus minimizing the likelihood of introduced species spread. Taking action against invasive plants involves consideration of the various tools and techniques available for each plant and situation including site conditions, time of year, and resources available.

The goal is to achieve effective long-term control and eventual restoration using approaches that pose the least risk of harm to people and to the environment including non-target plants and wildlife. And the bottom line is that the target species will be successfully controlled or at least reduced to a manageable level.

Herbicide Applicators must have an applicators license as required in the State of Minnesota. For all herbicide applications to aquatic vegetation or spraying completed over open water shall have an Aquatic Category certification (either commercial or non-commercial).

Management plans for herbicide treatments need to include a list of the targeted weeds; neighbor notification and on-site postings method; anticipated list of herbicides, and copy of herbicide applicator license.

Note: If treatments are applied at the wrong times or amounts, it can be costly and less effective. Herbicides can kill desirable plants and harm animals and people if not used correctly. For example, glyphosate is frequently used for buckthorn control, but if it's applied in Spring when sap is flowing up from the roots, it's significantly less effective, especially compared to fall applications when the plant is drawing nutrients down into its roots. Similarly, while raingardens, bioretention gardens, and bioswales are made to collect and fill up with rainwater, excess runoff is directed to creeks and streams. Herbicides sprayed in

them can spread, discharging into creeks, streams, and lakes where they can harm other plants and animals.

In general, herbicides in stormwater landscaping features should only be used to kill the stumps of woody trees and shrubs that must be cut off and left in place because they are too big to remove. In those situations the herbicide amounts used are small and are applied only to the stump of the tree or shrub.

Occasionally, BMPs will be invaded by very aggressive weed species that have dense, extensive root systems, such as reed canary grass, quack grass, cattails, or giant reed grass. If they are not controlled early, the invaders can form dense mats that are difficult to control without herbicides. In this situation, utilize guides like those on the **Resources** page if you have been trained in the proper use of herbicides.

Wet Ponds and Herbicide Recommendations
Use a product that is 15-25% solution of glyphosate and is approved for use near water, such as Rodeo, Aquamaster or Glypro. (Note that these products cannot be applied when foliage is wet or when a rain event is predicted in the next 48 hours after application.) Other herbicides are used for treating cut stumps in dry land areas and may require specialized training beyond the scope of typical maintenance. Glyphosate only kills actively growing plants and must touch the vegetation. It is not drawn up into plants from the soil, which makes it one of the safer herbicides to use in this type of application. Be careful in choosing herbicides, as some can kill plants by moving through the soil to be absorbed by plant roots, and be aware of appropriate application times during the year for the most effective treatment.

NOTE: *Check with City Representative to confirm that herbicide use prior to application at each site. Some sites such as Columbus dry basin do not allow herbicide use.*

Woody Plant and Tree Management

When working with BMP ponds, it's essential to have a certified arborist to monitor and assess tree and shrub maintenance needs. Arborists shall be certified by Minnesota Society of Arboriculture or International Society of Arboriculture.

Arborists should determine management plans for each site: When trees and shrubs are too big to pull or dig out, how to appropriately prune with the appropriate safety equipment and staff, as well as when to treat with herbicide or utilize other mechanical methods of care.

Native Tree Replacement:

If an intentional native tree that is a component of a vegetated BMP dies, then it is the contractor's responsibility to remove the dead tree and replace it with a similarly beneficial native tree species that contributes diversity to the site, at least 10 gallons in size. Balled & burlapped (B&B) trees will not be accepted.
While some trees are native, they may produce many weedy, volunteer trees. Weedy trees not a part of the original plan must be removed.

City of Minneapolis Tree Pruning Procedure

1. Contractor shall notify the City Representative of tree damage or malformation to trees over 6" in caliper size requiring tree pruning discovered during regular monthly site inspection visits or other maintenance work.
2. Pruning, removal, and replacement of trees for the Public Works stormwater treatment facilities is the responsibility of the Contractor.
3. An annual tree pruning, removal, replacement, and planting plan shall be prepared for review within 30 days of contract signing in Year 1, and before January 1 of each subsequent year. This plan shall be in accordance with in accordance with A300 pruning

standards and maintain a no net loss of trees on any given site.
4. Pruning, removal, and replacement of trees for the boulevard adjacent to Public Works stormwater treatment facilities is the responsibility of the Minneapolis Park and Recreation Board (MPRB). Only when infeasible for MPRB to accomplish pruning needs of PW-SWS as determined by City Representatives should pruning in the boulevard be carried out by Contractor.
5. All laborers pruning trees shall be certified arborists in the State of Minnesota or by the International Society of Arboriculture.
4. During the growing season, tree pruning shall be limited to dead or hazardous trees or limbs or those indicated for removal by the City Representative.
6. Do not prune oak trees during the oak wilt season from April through July, to prevent the spread of oak wilt disease. Immediately treat accidental cuts or wounds to oaks with a wound dressing. Keep wound-dressing material available for the project during the oak wilt season.
7. A pruning and Planting plan shall be submitted to the contract manager each January
8. Routine tree pruning shall occur on frozen ground during the months of February and March.
9. All tree waste produced by pruning operations shall become property of the Contractor and shall be removed from site.
10. No chippings or other waste from the tree pruning operations shall be left on site.

Tree Guying and Staking

1. All trees shall be maintained in a plumb position.
2. If deemed necessary by the City Representative, the Contractor shall install tree guying and staking in order to maintain the tree in a plumb position.
3. Tree guying or staking shall be incidental to planting of the trees.

Existing Trees & Mulch

a) Prior to adding mulch to existing beds prepare the area by raking

back and turning existing mulch.
b) There shall be a minimum of 3" of mulch installed above the existing soils.
c) No mulch shall be in contact with the trunks or stems of trees or shrubs.
d) Mulch should be spread a foot or more from the base of the tree in all directions. Mulch can be placed directly on grass when mulching established trees. There is no need to till the soil.

New Tree Installations & Mulch

a) After tree installation remove all weeds or intrusive grasses no less than 6"beyond drip line.
b) New planting beds shall be cut down no less than 4" below existing grade. Remove existing soils as needed to a depth of no less than 4" below existing grades when adjacent to any impervious area, catch basin, manhole, or overflow structure.
c) Lightly water the soil before applying/spreading mulch. Do not saturate.
d) Clean site. Remove all dead material, plants, and debris.
e) There shall be a minimum of 3" of mulch installed above the existing soils.
f) No mulch shall be in contact with the trunks or stems of trees or shrubs.
g) Place mulch within 48 hours of second watering.
h) Mulch product cost shall be incidental to new tree installation.


Willlow thicket at Heritage Park

Watering Practices

Watering during plant installation and establishment period:

1. Within 2 hours of installation, saturate the backfill soil of each plant with water. After settling, provide additional backfill to fill in the voids.

2. Provide watering equipment and personnel on the project capable of completely watering plants as often as necessary to maintain soil moisture in the root zones.

3. Install with each tree a 20 gallon TREEGATOR™ watering bag or approved equal. Install per manufacturer's recommendations.

4. Tree watering bags shall be filled as needed to supplement rain to achieve the equivalent of 1" water per week with the exception of the months of July and August in which tree watering bags shall be filled as needed to achieve the equivalent of 2" water per week, with a minimum of two fillings per week.

5. During the Plant establishment period, watering and tree watering bags shall be incidental to planting. The plant establishment period is considered the first 3 growing seasons after planting.

Watering shall be incidental and performed by the Contractor, at the rate and frequency as necessary to initiate rooting, and until the work is accepted by City Representative.

Mulch Practices

Mulch shall consist of *shredded* raw hardwood material only.

- Material should be free of sticks, large chunks, mold, dirt, sawdust, and deleterious material.
- Do not use wood material in an advanced state of decomposition, chipped-up manufactured boards or chemically treated wood; including wafer board, particle board, Chromated Copper Arsenate (CCA), or penta treated wood; Material is air dried;
- Do not allow unattached bark, green-leaf composition to exceed 20 percent by mass;

Provide mulch from a supplier outside of the Emerald Ash Borer quarantine areas or, if the mulch originates from within the quarantine areas, obtain a Compliance Agreement with the MDA. The Department will not allow mulch transported in or through a quarantine area to be transported outside the Emerald Ash Borer quarantine area without approval from the MDA. Contact MDA for more information.

Mulch Installation And Mulch Site Preparation

1. Existing Planting Beds

   a) Prior to adding mulch to existing beds prepare the area by raking back and turning existing mulch.

   b) If exposed grade is less than 3" below the grade of any adjacent impervious area, catch basin, manhole, or overflow structure follow procedures for New Planting Beds (S-12E.2)

   c) Spread existing mulch back across bed removing any large or non-mulch material.

   d) Add a new layer of mulch to provide for a total depth of no less and no more than 4".

   e) Spread mulch evenly across bed with top layer of mulch a minimum of 2" below the edge of the planting bed when adjacent to any impervious area, catch basin, manhole, or overflow structure.

2. New Planting Beds

a) Remove all weeds or intrusive grasses, both in and around the area to be mulched.

b) Remove existing soils as needed to a depth of no less than 4" below existing grades when adjacent to any impervious area, or stormwater catch basin, manhole, or overflow structure.

c) Turn the soil to aerate no less than 2.5" to provide loose dirt for root establishment.

d) Remediate soils as needed.

e) Beds shall be graded and leveled with hand tools to prevent puddling and irregularities.

f) Lightly water the soil before applying/spreading mulch. Do not saturate.

g) Clean site. Remove all dead material, plants, and debris.

h) Add mulch and spread across bed to provide for a total depth of no less than 3", where edge of the planting bed is adjacent to any impervious area, catch basin, manhole, or overflow structure, minimum of 2".

i) Mulch must be installed within seven days of planting.

j) No mulch shall be in contact with the trunks or stems of trees or shrubs.

k) Spread mulch evenly across bed with top layer of mulch.

l) Mulch product cost shall be incidental to new planting bed installation.

Mulching practices

Appendix

Invasive Species Management
Minnesota Noxious Weeds: Priority 1 List

Species in these lists require immediate management. These are categorized as problematic species to be controlled per the Minnesota Noxious Weed Law. Control methods could range from mechanical pulling to timely mowing or prescribed burns. Herbicide treatments are considered to be the last option but may be required considering the size and agressiveness of a species.

Invasive species shall not be allowed to go to seed. Treatment should occur while species are in flower or before. If an invasive species has gone to seed they shall be cut, bagged, and removed from site for disposal. In order to avoid spreading upland invasive species outside of the project site, establish staging areas for storing equipment and materials. Prior to leaving the project site, wash machinery and boots to ensure that they are free of all soil and other substances that could possibly contain invasive species.

For specific information, management tools and techniques for each of these species, see the MnDNR and Mn Dept of Ag Noxious Weeds lists.

	Scientific Name	Common Name
Prohibited - Eradicate	*Ailanthus altissima Swingle*	Tree of Heaven
	Amaranthus palmeri S. Watson	Palmer Amaranth
	Centaurea diffusa Lam.	Diffuse Knapweed
	Centaurea jacea L.	Brown Knapweed
	Centaurea solstitialis L.	Yellow Starthistle
	Cynanchum louiseae Kartesz & Gandhi	Black Swallow-wort
	Cynanchum rossicum (Kleopow) Borhidi	Pale Swallow-wort
	Digitalis lanata Ehrh.	Grecian Foxglove
	Dipsacus fullonum L.	Common Teasel
	Dipsacus laciniatus L.	Cutleaf Teasel
	Heracleum mantegazzianum Sommier & Levier	Giant Hogweed
	Humulus japonicus Siebold & Zucc.	Japanese Hops

	Scientific Name	Common Name
Eradicate	*Linaria dalmatica (L.) Mill.*	Dalmatian Toadflax
	Lonicera japonica Thunb.	Japanese Honeysuckle
	Sorghum halepense (L.) Pers.	Johnsongrass
	Thladiantha dubia Bunge	Red Hailstone
Prohibited - Control	*Berberis vulgaris L.*	Common Barberry
	Cardamine impatiens L.	Narrowleaf Bittercress
	Carduus acanthoides L.	Plumeless Thistle
	Celastrus orbiculatus Thunb.	Roundleaf Bittersweet
	Centaurea x moncktonii C.E. Britton [jacea × nigra]	Meadow knapweed
	Centaurea stoebe L. subsp. micranthos (Gugler) Hayek	Spotted Knapweed
	Cirsium arvense (L.) Scop.	Canada Thistle
	Conium maculatum L.	Poison hemlock
	Euphorbia esula L.	Leafy Spurge
	Lythrum salicaria L. and Lythrum virgatum L.	Purple Loosestrife
	Pastinaca sativa L.	Wild Parsnip
	Phragmites australis (Cav.) Trin. Ex Steud. subsp. australis	Non-native Phragmites
	Polygonum spp.	Knotweeds
	Tanacetum vulgare L.	Common Tansy
Restricted	*Alliaria petiolata*	Garlic Mustard
	Alnus glutinosa (L.) Gaertn.	European Alder
	Ampelopsis brevipedunculata (Maxim) Trautv.	Porcelain Berry
	Berberis thunbergii DC. and listed hybrids and cultivars.	Japanese Barberry
	Caragana arborescens	Siberian Peashrub
	Daucus carota	Wild Carrot
	Euonymus alatus	Winged Burning Bush
	Ficaria verna Huds.	Lesser Celandine
	Frangula alnus Mill.	Glossy Buckthorn
	Lonicera spp.	Asian Bush Honeysuckles
	Miscanthus sacchariflorus	Amur Silvergrass
	Rhamnus cathartica L.	Common Buckthorn
	Robinia pseudoacacia L.	Black Locust
	Rosa multiflora Thunb.	Multiflora Rose
	Securigera varia (L.) Lassen	Crown Vetch
	Tamarix ramosissima Ledeb.	Saltcedar
Regulated	*Acer ginnala Maxim. & A. tataricum L.*	Amur & Tatarian Maple
	Acer platanoides L.	Norway Maple
	Phellodendron amurense Rupr.	Amur Cork Tree
	Pyrus calleryana Decne.	Callery Pear
	Toxicodendron rydbergii (Small) Greene	Poison Ivy
	T. radicans (L.) Kuntze subsp. negundo (Greene) Gillis	Poison Ivy

Invasive Species Management
Aggressive Weeds: Priority 2 List

Species in these lists require on-going management over time to keep populations in check. Like the above Minnesota Noxious Weeds list, control methods for aggressive species could range from mechanical pulling to timely mowing or prescribed burns. Herbicide treatments are considered to be the last option but may be required considering the size and aggressiveness of a species.

Invasive species shall not be allowed to go to seed. Treatment should occur while species are in flower or before. If an invasive species has gone to seed they shall be cut, bagged, and removed from site for disposal.

For specific management tools and techniques for each of these species, see Resources.

	Scientific Name	Common Name
Aggressive	*Acer negundo*	Boxelder
	Ambrosia artemisiifolia	Common Ragweed
	Ambrosia trifida	Giant Ragweed
	Arctium minus	Common burdock
	Berteroa incana	Hoary Alyssum
	Bromus inermis	Smooth brome grass
	Centaurea maculosa	Spotted knapweed
	Chenopodium album	Lamb's quarters
	Cirsium vulgare	Bull thistle
	Commelina communis	Asiatic Dayflower
	Convolvulus arvensis	Field Bindweed
	Dactylis glomerata	Orchard grass
	Echinochloa muricata	Barnyard grass
	Elaeagnus angustifolia	Russian olive
	Elaeagnus umbellata	Autumn olive
	Elytrigia repans	Quack grass
	Fraxinus pennsylvanica	Green Ash
	Glechoma hederacea	Creeping charlie
	Hesperis matronalis	Dame's rocket
	Iris pswudacorus	Pale-yellow iris
	Juniperus virginiana	Eastern red cedar
	Lactuca serriola	Prickly lettuce

	Scientific Name	Common Name
Aggressive	*Linaria vulgaris*	Butter and Eggs
	Lotus comiculatus	Birds foot trefoil
	Marus alba	White mulberry
	Medicago sativa	Alfalfa
	Melilotus alba	White sweet clover
	Melilotus officinalis	Yellow sweet clover
	Phalaris arundinacca	Reed canary grass
	Phleum pratense	Timothy
	Phragmites australis	Giant reed grass
	Poa pratensis	Kentucky Bluegrass
	Populus alba	White or European poplar
	Populus deltoides	Eastern cottonwood
	Rumex crispus	Curly dock
	Salix x fragilis	White crack willow
	Salix exigua	Sandbar willow
	Saponaria officinalis	Bouncing Bet (Soapwort)
	Setaria spp	Foxtail grass
	Solarium dulcamara	Bittersweet nightshade
	Torillis japonica	Japanese hedge parsley
	Trifolium pratense	Red clover
	Typha angustifolia	Narrow-leaf cattail
	Typha x glauca	Hybrid cattail
	Ulmus pumillla	Siberian elm
	Urtica dioica	Stinging nettle
	Vicia cillosa	Hairy vetch
	Vicia cracca	Cow vetch
	Vitis riparia	Riverbank Grapevine
	Zanthoxylum americanum	Prickly ash

Ewing Wetland - Reed Canary Grass

Successful Native Vegetation Development: Diversity & Habitat Goals

Native Diversity Development

A diverse stand of native vegetation is beneficial when it has enough species diversity to ensure continuation during harsh disturbance or weather conditions. Successful plant diversity will be achieved by having at **minimum 15-20 native species on a site** (more if a site is larger). At **least three of these species would be in bloom during each season**, Spring, Summer and Fall. When repairing disturbed areas or increasing species diversity, select plants from the native species list starting on page 16. Consider site sun/shade conditions, bloom time etc. when making selections.

The table below is a general guide to native diversity levels for current project conditions and functions. It is important to consider species abundance along with the number of species present, to ensure that individual species provide sufficient cover to meet vegetation goals.

Minimum # of Species per current site conditions

Current Site Conditions	Native Plants for Marsh or Wetland	Native Plants for Prairie or Forest
Natural Area with High Diversity	30	40
Urban site with some diversity	25	35
Disturbed site with Invasive Species risk	20	20

Adapted from the Minnesota BWSR Plant Diversity Standards

Pollinator Habitat Enhancement

Pollinator forage at stormwater management ponds is highly valued and supported by Minneapolis Public Works Department. According to The Xerces Society for Invertebrate Conservation (excerpts, 2015):

- The great majority of pollinators are insects, including bees, wasps,

flies, beetles, butterflies and moths. Many bird and bat species pollinate as well.

- A pollinator community requires consistent sources of nectar, pollen, host plants and nesting material during times adults are active.
- Ideally, flowers should be available to pollinators throughout the entire growing season. Increase the abundance of pollen, nectar, and host-plant resources with use of a diverse range of plants that flower throughout the growing seasons.
- It is desirable to include a diversity of plants with different flower colors, sizes, and shapes as well as varying plant heights and growth habits to encourage the greatest number and diversity of pollinators.
- Diverse plant communities provide higher habitat value for bee pollinators. Bee diversity continues to rise with increasing flowering plant diversity.

The following plants are key pollen and nectar sources for Minnesota pollinators in the Spring (Apr-mid June), Summer (mid-June - early Sept) and Fall (mid-Sept - early Nov). When repairing disturbed areas, species should be selected that are well adapted to site conditions.

Native Species of Minnesota

Scientific Name	Common Name	Blooms	Pollinator Value
Abies balsamea	Balsam Fir	May - June	Medium
Acer rubrum	Red Maple	April - May	High
Acer saccharinum	Silver Maple	March - April	High
Acorus calamus	Sweet Flag	June - July	High
Actaea pachypoda	White Baneberry	May - June	High
Actaea rubra	Red Baneberry	April - June	High
Adiantum pedatum	Maidenhair Fern	May - Oct	Unknown
Aesculus glabra	Ohio Buckeye	April - May	High
Agalinis aspera	Tall False Foxglove	July - Sept	High
Agalinis tenuifolia	Slenderleaf False Foxglove	Aug - Sept	High
Agastache foeniculum	Anise Hyssop	Julp - Sept	Very High
Agastache scrophulariaefolia	Giant Hyssop	July - Aug	High

Scientific Name	Common Name	Blooms	Pollinator Value
Ageratina altissima	White Snakeroot	July - Aug	High
Agrimonia gryposepala	Tall Hairy Agrimony	June - Sept	Low
Agrostis perennans	Upland Bentongrass	July - Sept	Low
Alisma triviale	Large-flowered Water Plantain	May - Sept	Low
Allium canadense	Wild Garlic	June - July	High
Allium cernuum	Nodding Onion	June - Sept	Very High
Allium stellatum	Prairie Onion	July - Sept	High
Alnus incana	Speckled Alder	March - May	Med
Amelanchier arborea	Juneberry	May	Med
Amelanchier laevis	Allegheny Serviceberry	April - May	Med
Amorpha canescens	Leadplant	June - Aug	Very High
Amorpha fruticosa	False Indigo Bush	April - June	Very High
Amorpha nana	Dwarf False Indigo	June - July	Med
Anaphalis margaritacea	Pearly Everlasting	July - Sept	Very High
Andropogon gerardii	Big Bluestem	July - Sept	High
Anemone canadensis	Canada Anemone	May - July	Med
Anemone cylindrica	Thimble Flower	June - July	Low
Anemone virginiana	Tall Thimbleweed	June - Aug	Medium
Angelica atropurpurea	Angelica	May - June	Very High
Antennaria neglecta	Pussytoes	May - June	Medium
Antennaria plantaginifolia	Plantain Pussytoes	March - June	Very High
Aquilegia canadensis	Columbine	May - July	Very High
Arisaema dracontium	Green Dragon	May - July	Low
Arisaema triphyllum	Jack in the Pulpit	May - June	Medium
Aronia melanocarpa	Black Chokeberry	May - June	Very High
Artemisia ludoviciana	Prairie Sage	May - Oct	High
Asarum canadense	Wild Ginger	May - June	Medium
Asclepias exaltata	Poke Milkweed	June - July	Very High
Asclepias incarnata	Marsh Milkweed	June - Aug	Very High
Asclepias speciosa	Showy Milkweed	May - Sept	Very High
Asclepias sullivantii	Prairie Milkweed	June - Aug	Very High
Asclepias syriaca	Common Milkweed	July	Very High
Asclepias tuberosa	Butterfly Weed	June - Aug	Very High
Asclepias verticillata	Whorled Milkweed	June - Aug	Very High
Asplenium platyneuron	Ebony Spleenwort	April - May	Unknown
Aster macrophyllus	Large-leaved Aster	July - Oct	High
Aster oblongifolius	Aromatic Aster	Sept - Nov	High
Aster oolentangiensis	Azure Sky (Blue) Aster	Sept - Oct	High
Aster prenanthoides	Crooked-stemmed Aster	Sept - Oct	High
Astragalus canadensis	Canada Milkvetch	June - July	Very High
Astragalus crassicarpus	Ground Plum	April - June	High
Athyrium filix-femina	Lady Fern	May - Oct	Low
Baptisia australis	Blue False Indigo	June - July	High

Scientific Name	Common Name	Blooms	Pollinator Value
Baptisia bracteata	Cream Wild Indigo	June - July	Medium
Baptisia lactea	White Wild Indigo	May - July	High
Betula nigra	River Birch	April - May	Low
Blephilia ciliata	Downy Wood Mint	June - July	High
Blephilia hirsuta	Hairy Wood Mint	June - July	Very High
Boltonia asteroides	False Aster	July - Oct	Very High
Bouteloua curtipendula	Side Oats Grama	July - Oct	Medium
Bouteloua gracilis	Blue Grama	July - Sept	High
Bromus ciliatus	Fringed Brome	April - May	Unknown
Bromus kalmii	Kalm's Brome	July - Sept	Low
Calamagrostis canadensis	Blue-joint Grass	Aug - Sept	Unknown
Callirhoe involucrata	Purple Poppy Mallow	March - June	Medium
Caltha palustris	Marsh Marigold	May - June	High
Campanula americana	Tall Bellflower	June - Aug	High
Campanula rotundifolia	Harebell	June - Sept	High
Carex bebbii	Bebbs Sedge	May - June	Unknown
Carex brevior	Plains Oval Sedge	May - July	Unknown
Carex comosa	Bottlebrush Sedge	May - June	Unknown
Carex crinita	Fringed Sedge	June - Aug	Unknown
Carex eburnea	Ivory Sedge	May - July	Unknown
Carex grayi	Gray Sedge	May - June	Unknown
Carex hystericina	Porcupine Sedge	June - July	Unknown
Carex interior	Inland Sedge	April - May	Unknown
Carex lacustris	Lake Sedge	June - Sept	Low
Carex lupulina	Hop Sedge	April - May	Low
Carex muehlenbergii	Muhlenberg's Sedge	June - July	Unknown
Carex muskingumensis	Palm Sedge	May - June	Unknown
Carex pensylvanica	Pennsylvania Sedge	May - June	Unknown
Carex radiata	Eastern Star Sedge	June - July	Unknown
Carex rosea	Rosy Sedge	April - July	Unknown
Carex sprengelii	Long Beaked Sedge	June - July	Unknown
Carex stricta	Tussock Sedge	June	Medium
Carex tribuloides	Blunt Broom Sedge	May - June	Unknown
Carex typhina	Cattail Sedge	April - May	Unknown
Carex utriculata	Northwest Territory Sedge	June - Aug	Unknown
Carex vulpinoidea	Fox Sedge	April - May	Unknown
Carpinus caroliniana	Hornbeam	April - May	Medium
Castilleja coccinea	Indian Paintbrush	July - Sept	Medium
Caulophyllum thalictroides	Blue Cohosh	April - May	High
Ceanothus americanus	New Jersey Tea	June - July	Very High
Celtis occidentalis	Hackberry	April - May	Medium
Cephalanthus occidentalis	Buttonbush	June - Aug	Very High
Chamaecrista fasciculata	Partridge Pea	July - Sept	Very High

Scientific Name	Common Name	Blooms	Pollinator Value
Chamerion angustifolium	Fire Weed	July - August	High
Chelone glabra	Turtlehead	July - Sept	High
Chelone obliqua	Rose Turtlehead	July	High
Cimicifuga racemosa	Black Cohosh	May - June	Very High
Cirsium discolor	Native Field Thistle	Fall	Very High
Cirsium muticum	Native Swamp Thistle	July - Oct	Very High
Claytonia caroliniana	Broadleaved Spring Beauty	May	Low
Claytonia virginica	Spring Beauty	May	High
Clematis virginiana	Virgin's Bower	July - Aug	Very High
Coreopsis lanceolata	Lanceleaf Coreopsis	April - June	Very High
Coreopsis palmata	Prairie Coreopsis	June - Aug	Very High
Cornus alternifolia	Pagoda Dogwood	May - June	High
Cornus amomum	Silky Dogwood	June to July	High
Cornus racemosa	Gray Dogwood	May to June	High
Cornus sericea	Red Osier Dogwood	May to June	Very High
Corylus americana	Hazelnut	April - May	Low
Cyperus diandrus	Umbrella Flatsedge	June - Aug	Unknown
Dalea candida	White Prairie Clover	June - Aug	High
Dalea purpurea	Purple Prairie Clover	July - Aug	Very High
Dalea villosa	Silky Prairie Clover	July - Aug	High
Delphinium virescens	Prairie Larkspur	June - Aug	High
Desmodium canadense	Showy Tick-Trefoil	July - Aug	Very High
Dicentra cucullaria	Dutchman's Breeches	May - June	Very High
Diervilla lonicera	Dwarf Bush Honeysuckle	June - Aug	Very High
Dirca palustris	Leatherwood	April - May	Medium
Dodecatheon amethystinum	Amethyst Shooting Star	April - June	Low
Dodecatheon meadia	Shooting-Star	May - June	Medium
Doellingeria umbellata	Flat Topped Aster	Aug - Sept	Very High
Dryopteris marginalis	Wood Fern	May - Oct	Low
Echinacea angustifolia	Narrow-leaved Purple Coneflower	July - Sept	Very High
Echinacea pallida	Pale Purple Coneflower	July - Aug	High
Echinacea paradoxa	Yellow Coneflower	May - June	High
Echinacea purpurea	Purple Coneflower	July - Sept	High
Eleocharis acicularis	Spike Rush	July	Unknown
Eleocharis palustris	Common Spikerush	May - June	Unknown
Elymus canadensis	Canada Wild Rye	July - Oct	Medium
Elymus hystrix	Bottlebrush Grass	May - June	Medium
Elymus villosus	Silky Wildrye	July - Oct	Unknown
Elymus virginicus	Virginia Wildrye	July - Sept	Low
Eragrostis spectabilis	Purple Lovegrass	Apr - May	Low
Eriophorum angustifolium	Cotton Grass	May - June	Unknown
Eryngium yuccifolium	Rattlesnake Master	July - Aug	Very High
Euonymus atropurpureus	Eastern Wahoo	May - July	High

Scientific Name	Common Name	Blooms	Pollinator Value
Eupatorium maculatum	Joe-Pye Weed	Aug - Sept	Very High
Eupatorium perfoliatum	Boneset	June - Aug	Very High
Eupatorium purpureum	Sweet Joe-Pye Weed	July - Aug	Very High
Euphorbia corollata	Flowering Spurge	July - Aug	Medium
Eurybia macrophylla	Large Leaved Aster	Aug - Oct	Very High
Euthamia graminifolia	Flat-top Goldentop	July - Sept	Very High
Filipendula rubra	Queen of the Prairie	August	High
Fragaria vesca	Woodland Strawberry	April - June	Very High
Fragaria virginiana	Wild Strawberry	May - June	Very High
Fraxinus nigra	Black Ash	May	Medium
Galium boreale	Northern Bedstraw	June - Aug	Medium
Gentiana andrewsii	Bottle Gentian	August - Oct	Medium
Gentiana flavida	Cream Gentian	Sept - Oct	Medium
Gentianella quinquefolia	Stiff Gentian	Sept - Oct	High
Geranium maculatum	Wild Geranium	May - June	Very High
Geum triflorum	Prairie Smoke	May - June	Medium
Gleditsia triacanthos	Honey Locust	May - June	Very High
Glyceria canadensis	Rattlesnake Mannagrass	NA	Low
Glyceria grandis	American Mannagrass	July - Sept	Low
Hamamelis virginiana	Witch Hazel	Sept - Nov	High
Hedyotis longifolia	Longleaf Bluets	June - Sept	Medium
Helenium autumnale	Sneezeweed	August - Oct	Very High
Helianthus laetiflorus	Showy Sunflower	Aug - Sept	High
Helianthus maximiliani	Maximilian Sunflower	Aug - Sept	Very High
Helianthus occidentalis	Western Sunflower	Aug - Sept	Medium
Helianthus pauciflorus	Stiff Sunflower	July - Aug	Very High
Helianthus strumosus	Woodland Sunflower	July - Oct	Very High
Heliopsis helianthoides	Oxeye	July - Sept	Very High
Heuchera richardsonii	Alumroot	May - June	Medium
Hibiscus laevis	Halberdleaf Rosemallow	June - Aug	High
Hierochloe odorata	Sweet Grass	July - Sept	Unknown
Hydrophyllum virginianum	Virginia Waterleaf	May	High
Hypericum pyramidatum	Great St. Johnswort	July - Sept	High
Ilex verticillata	Winterberry	June - July	Very High
Impatiens capensis	Jewelweed	July - Sept	Very High
Iris cristata	Dwarf Crested Iris	May - June	High
Iris versicolor	Blue Flag Iris	June - July	Very High
Juncus canadensis	Canadian Rush	June - Aug	Low
Juncus effusus	Soft Rush	June - July	Low
Juncus tenuis	Path Rush	June - Aug	Low
Juncus torreyi	Torrey's Rush	May - Oct	Unknown
Juniperus virginiana	Eastern Red Cedar	April - May	Medium
Koeleria macrantha	June Grass	May - Aug	Medium
Lespedeza capitata	Roundheaded Bushclover	Aug - Sept	Very High

Scientific Name	Common Name	Blooms	Pollinator Value
Liatris aspera	Rough Blazingstar	Aug - Sept	Very High
Liatris cylindracea	Cylindrical Blazingstar	August	High
Liatris ligulistylis	Northern Blazing Star	July - Sept	High
Liatris punctata	Dotted Blazingstar	August - Oct	Very High
Liatris pycnostachya	Prairie Blazingstar	July - Aug	Very High
Liatris spicata	Dense Blazing Star	July - Sept	Very High
Lilium michiganense	Michigan (Turk's Cap) Lily	June - Aug	High
Lobelia cardinalis	Cardinal Flower	May - Sept	High
Lobelia siphilitica	Blue Lobelia	May - Sept	High
Lobelia spicata	Pale-spike Lobelia	Aug - Sept	High
Lupinus perennis	Wild Lupine	May - June	Very High
Lycopus americanus	Waterhorehound	July - Sept	Very High
Maianthemum canadense	Wild Lily-of-the-Valley	June - July	Low
Maianthemum racemosum	Feathery False Lily-of-the-Valley	May - June	High
Matteuccia struthiopteris	Ostrich Fern	June - Aug	Low
Mertensia virginica	Virginia Bluebells	May - June	Very High
Mimulus ringens	Monkey Flower	June - July	Very High
Monarda fistulosa	Wild Bergamot	July - Aug	Very High
Monarda punctata	Spotted Bee Balm	July - Sept	Very High
Nelumbo lutea	American Lotus	July - Sept	High
Oenothera rhombipetala	Fourpoint Evening Primrose	July - Sept	High
Onoclea sensibilis	Sensitive Fern	May - Oct	Low
Opuntia humifusa	Eastern Prickly Pear	May - July	Very High
Osmorhiza claytonii	Clayton's Sweetroot	May - June	High
Osmunda claytoniana	Interrupted Fern	May - Oct	Low
Osmunda regalis	Royal Fern	May - Oct	Low
Ostrya virginiana	Ironwood	April - May	Medium
Packera aurea	Golden Ragwort	March - Apr	Very High
Packera plattensis	Praire Groundsel	May - June	High
Panicum virgatum	Switchgrass	July - Oct	High
Parthenium integrifolium	Wild Quinine	June - July	High
Pedicularis canadensis	Wood Betony	April - May	High
Penstemon digitalis	Smooth Penstemon	June - July	Very High
Penstemon gracilis	Slender Penstemon	June - July	Medium
Penstemon grandiflorus	Showy Penstemon	June - July	High
Penstemon hirsutus	Hairy Penstemon	May - June	High
Phlox divaricata	Blue Phlox	May - June	Very High
Phlox pilosa	Prairie Phlox	June - July	Very High
Physocarpus opulifolius	Ninebark	May - Aug	Very High
Physostegia virginiana	Obedient Plant	July - Aug	Very High
Picea glauca	White Spruce	May - June	Medium
Picea mariana	Black Spruce	June	Medium

Scientific Name	Common Name	Blooms	Pollinator Value
Pinus strobus	White Pine	May - June	Medium
Podophyllum peltatum	May Apple	May - June	Very High
Polemonium reptans	Jacob's Ladder	May - June	Very High
Polygonatum biflorum	Solomon's Seal	May - July	High
Polystichum acrostichoides	Christmas Fern	May - Oct	Low
Pontederia cordata	Pickerelweed	June - Sept	Very High
Populus deltoides	Cottonwood	April - May	Medium
Populus tremuloides	Quaking Aspen	April - May	Very High
Potentilla arguta	Prairie Cinquefoil	July - Aug	Medium
Prenanthes alba	Rattlesnake Root	Aug - Sept	High
Prunella vulgaris	Self-heal	June - Oct	High
Prunus americana	American Plum	May	Very High
Prunus pumila	Eastern Sand Cherry	May - June	Very High
Prunus serotina	Black Cherry	May - June	Very High
Prunus virginiana	Chokecherry	May	Very High
Pseudognaphalium obtusifolium	Sweet Everlasting	July - Sept	Medium
Pycnanthemum virginianum	Mountain Mint	July - Sept	Very High
Quercus alba	White Oak	April - May	Medium
Quercus bicolor	Swamp White Oak	May	Medium
Quercus ellipsoidalis	Northern Pin Oak	May	Medium
Quercus macrocarpa	Bur Oak	April - May	Medium
Quercus rubra	Red Oak	April - May	Medium
Ranunculus pensylvanicus	Pennsylvania Buttercup	June - Aug	Medium
Ratibida columnifera	Upright Coneflower	July - Sept	Very High
Ratibida pinnata	Grey-headed Coneflower	July - Oct	High
Rhus aromatica	Fragrant Sumac	April - June	Very High
Ribes missouriense	Missouri Gooseberry	April - June	Medium
Rosa arkansana	Wild Roses	June - July	Very High
Rosa blanda	Early Wild Rose	June - July	Very High
Rudbeckia hirta	Black-eyed Susan	June - Sept	Very High
Rudbeckia laciniata	Green-headed Coneflower	July - Sept	Very High
Rudbeckia subtomentosa	Sweet Coneflower	July - Aug	Very High
Rudbeckia triloba	Thinleaved Coneflower	July - Aug	High
Ruellia humilis	Wild Petunia	July - Sept	Low
Rumex orbiculatus	Greater Water Dock	June - July	Very High
Sagittaria latifolia	Arrowhead	July - Aug	Very High
Salix bebbiana	Bebb Willow	May - June	High
Salix discolor	Pussy Willow	April - May	Very High
Salix humilis	Prairie Willow	March - May	Very High
Salix interior	Sandbar Willow	Aug - Sept	Very High
Sambucus canadensis	Common Elderberry	July - Aug	High
Sambucus racemosa	Red Elderberry	April - June	Very High
Sanguinaria canadensis	Bloodroot	April - May	High

Scientific Name	Common Name	Blooms	Pollinator Value
Sanicula marilandica	Maryland Sanicle	June - July	Medium
Schizachyrium scoparium	Little Bluestem	July - Sept	High
Schoenoplectus acutus	Hardstem Bulrush	Aug - Sept	Unknown
Scirpus atrovirens	Green Bulrush	July - Aug	Medium
Scirpus cyperinus	Woolgrass	July - Sept	Medium
Scirpus pungens	Three-squared Bulrush	June - Sept	Low
Scirpus validus	Softstem Bulrush	July - Sept	Unknown
Senna hebecarpa	Wild Senna	July - Aug	Medium
Silene regia	Royal Catchfly	July - Aug	Low
Silene virginica	Fire Pink	April - June	High
Silphium laciniatum	Compass Plant	July - August	Very High
Silphium perfoliatum	Cup Plant	July - Sept	Very High
Silphium terebinthinaceum	Prairie Dock	July - Aug	High
Sisyrinchium angustifolium	Narrowleaf Blue-Eyed Grass	April - May	High
Sisyrinchium campestre	Prairie Blue-Eyed Grass	May - June	Low
Sisyrinchium montanum	Blue Eyed Grass	May - June	Medium
Smilacina racemosa	False Solomon's Seal	May - July	High
Solidago flexicaulis	Zig Zag Goldenrod	Aug - Oct	Very High
Solidago nemoralis	Gray Goldenrod	Aug - Sept	Very High
Solidago ptarmicoides	White Upland Aster	Aug - Sept	High
Solidago riddellii	Riddell's Goldenrod	Aug - Sept	High
Solidago rigida	Rigid (Stiff) Goldenrod	Sept - Oct	Very High
Solidago speciosa	Showy Goldenrod	Aug - Sept	Very High
Solidago ulmifolia	Elmleaf Goldenrod	Sept - Oct	Very High
Sorghastrum nutans	Indian Grass	July - Sept	Medium
Sparganium eurycarpum	Giant Bur-reed	June - Aug	Unknown
Spartina pectinata	Prairie Cordgrass	Aug - Oct	Low
Spiraea alba	Meadowsweet	Aug - Sept	Very High
Spiraea tomentosa	Steeplebush	Aug - Sept	Very High
Sporobolus heterolepis	Prairie Dropseed	Aug - Oct	Medium
Staphylea trifolia	American Bladdernut	April - June	Very High
Stylophorum diphyllum	Celandine Poppy	March - April	High
Symphoricarpos albus	Common Snowberry	May - June	Very High
Symphoricarpos orbiculatus	Coralberry	April - May	Very High
Symphyotrichum cordifolium	Blue Wood Aster	Sept - Oct	Very High
Symphyotrichum ericoides	Heath Aster	Sept - Oct	Very High
Symphyotrichum laeve	Smooth Aster	Sept - Oct	Very High
Symphyotrichum novae-angliae	New England Aster	Aug - Oct	Very High
Symphyotrichum oblongifolium	Aromatic Aster	July - Sept	High
Symphyotrichum puniceum	Purple-stemmed Aster	July - Aug	Very High
Symphyotrichum sericeum	Silky Aster	Aug - Sept	Medium
Symphyotrichum shortii	Short's Aster	Sept - Oct	Medium
Tephrosia virginiana	Virginia Tephrosia	April - July	High

Scientific Name	Common Name	Blooms	Pollinator Value
Thalictrum dasycarpum	Tall Meadow Rue	June - July	Low
Thalictrum dioicum	Early Meadow Rue	April - May	High
Thalictrum thalictroides	Rue Anemone	May	Medium
Thuja occidentalis	Eastern White Cedar	April - May	Medium
Tiarella cordifolia	Heartleaf Foamflower	April - June	High
Tilia americana	American Basswood	June - Aug	Very High
Tradescantia bracteata	Spiderwort	June - Aug	High
Tradescantia ohiensis	Ohio Spiderwort	June - July	High
Trillium grandiflorum	Showy Trillium	May - June	High
Uvularia grandiflora	Large Flower Bellwort	May	Medium
Vaccinium macrocarpon	Large Cranberry	June - Aug	Very High
Valeriana edulis	Edible Valerian	May - June	Low
Verbena hastata	Blue Vervain	July - Sept	Very High
Verbena stricta	Hoary Vervain	June - Sept	Very High
Vernonia fasciculata	Ironweed	Aug - Sept	Very High
Veronicastrum virginicum	Culvers Root	June - Aug	Very High
Viola canadensis	Canada Violet	May	Very High
Viola missouriensis	Missouri Violet	May	High
Viola pedata	Bird's Foot Violet	May - June	Very High
Viola pedatifida	Prairie Violet	April - June	Medium
Viola pubescens	Yellow Violet	May	Very High
Viola sororia	Common Violet	April - May	Very High
Zizia aptera	Heart-leaved Golden Alexander	May - June	Very High
Zizia aurea	Golden Alexander	May - July	Very High

Winter Street Pond - Blue Vervain

Resources

The resources below include basic plant identification information for some of the most common weeds found in urban and suburban gardens of the Twin Cities metro. Below are local resources if further plant ID information is required for your site.

Plant ID Guide Books:

Common Lake Shore Weeds, 2nd Edition: A Guide for Identification and Control in Lake Shore Stabilizations, Raingardens and any Native Planting is intended to facilitate quick reference and concise instructions for weed identification and control.

Invasive Plants of the Upper Midwest: An Illustrated Guide to their Identification and Control is an informative and comprehensive guide to plant species that are currently endangering native habitats in the region.

Common Backyard Weeds of the Upper Midwest approaches weeds from the layperson's perspective with photos showing parts or stages of growth to help with identification.

The Central Region: Seedling ID Guide for Native Prairie Plants was created by USDA's NRCS and Missouri Dept. of Conservation, which can help identify native plants at various stages of growth with color photos.

Weeds of North America was created by Richard Dickinson and France Royer as a comprehensive guide to most weed species in North America.

Online Resources:

Minnesota Stormwater Manual	https://stormwater.pca.state.mn.us/
Minnesota Wildflowers Information	minnesotawildflowers.info
University of Minnesota Extension Services	extension.umn.edu/garden/yard-garden/weeds
Blue Thumb	bluethumb.org/plants
Minnesota Department of Natural Resources	dnr.state.mn.us/invasives/index.html
Mn Dept of Agriculture	https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.

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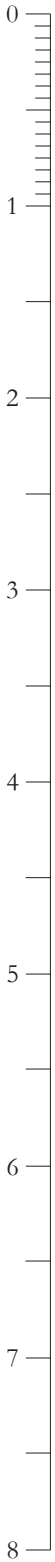
Native vervain and butterfly milkweed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