Item 7D.
BCWMC 3-21-19

Met Council Stormwater Grant

Northside Neighborhood Engagement & Opportunities in Clean Water Initiatives

Final Report
February 2019

Implemented by
Bassett Creek Watershed Management Commission

I. PROJECT PURPOSE:

The Northside Neighborhood Engagement & Opportunities in Clean Water Initiatives project addressed local water quality issues related to urban runoff pollution from private property and provided multiple community benefits by engaging communities in the Harrison Neighborhood of Minneapolis in an effort to create local expertise in the planning, installation and maintenance of stormwater best management practices (BMPs). The project area was within the Bassett Creek and Mississippi River Watersheds in Minneapolis, Minnesota. The main stem of Bassett Creek is a Priority 1 stream for the Bassett Creek Watershed Management Commission (BCWMC) and is included on the Minnesota Pollution Control Agency's (MPCA) Impaired Waters list for aquatic life (due to chlorides) and aquatic recreation (due to fecal coliform). While the BCWMC works to address these impairments in a variety of ways throughout the watershed, related goals outlined in its 2015 Watershed Management Plan include increased public awareness of our impact on water quality and initiatives that motivate behavioral changes and engage the public as partners for improved water quality.

Near North Minneapolis has a history of racial, economic, and environmental disparity. The Harrison Neighborhood, which is part of the North Minneapolis HUD promise zone, is comprised primarily of people of color and people who are living in conditions of economic poverty. It is also a community with great knowledge and resilience with a strong and growing community of gardeners working to establish local food networks.

This project successfully partnered with local organizations to engage neighborhood property owners and identify opportunities for stormwater management on private property at the alleyway (backyards & driveways) and in the public right-of-way (boulevards). These underutilized spaces offered significant opportunities for runoff filtration and/or infiltration. The project also included a partnership with youth and young adult outdoor jobs programs and provided on-the-job training and opportunities to receive industry recognized certification in the inspection and maintenance of raingardens as a component of a career pathways initiative. This project helped to address concerns raised by community members about a lack of local jobs and career advancement opportunities for youth and young adults of color in environmental initiatives.

The project was implemented and managed by Metro Blooms. Through their tried and true approach, property owners agreed to install stormwater management practices on their property with assistance from youth and young adult outdoor jobs programs, and agreed to maintain the installed practice with assistance through follow-up maintenance education and assistance during the establishment period. The Harrison Neighborhood Association (HNA) acted as the neighborhood partner for community engagement activities. The Youth Outdoors Programs included the Minneapolis Park and Recreation Board, the Mississippi River Green Team, and the Conservation Corps of Minnesota and Iowa (CCM). Crews with these organizations assisted with engagement, and provided labor for installation and establishment-period maintenance. These programs helped young people from diverse backgrounds become more connected to the environment, engaged in conservation, involved in the community, and prepared for future employment.

The project started in early 2017 and was grant activities were completed in December 2018. The following pages provide detail on the outcomes of specific project goals and objectives.

II. GOAL 1

Improve water quality in Bassett Creek by engaging community members to install and maintain boulevard bioswales in collaboration with the Minneapolis Park and Recreation Board's Emerald Ash Borer tree replacement program.

Objective 1: Work with the Harrison Neighborhood Association (HNA) to identify 5- 6 target blocks within the Harrison Neighborhood based on interest in participation, opportunity for runoff capture, and timing of ash tree removal.

Activity: Identify 5- 10 block captains

Outcomes: 7 boulevard captains were identified and engaged to reach out to their neighbors to participate in a Blooming Boulevard installation in 2017. Captains were identified through neighborhood events, flyers, block parties and word of mouth. A boulevard captain training was held on May 1, 2017 and then 4 block parties were held with some parties hosting multiple blocks. Some parties were standalone events and others were in conjunction with other planned block events. Metro Blooms worked with block captains to invite neighbors to the events and created a number of educational/outreach materials to assist with engagement.

In 2018 boulevard captains continued to be engaged in the project through maintenance activities. A number of boulevard captains stepped up and engaged their neighbors that have a boulevard bioswale to order replacement plants, water, and weed when necessary. Later in the year boulevard captains were updated on project outcomes and given opportunities to complete KAP surveys.

Activity: Notify Minneapolis Park and Rec Board (MPRB) for tree marking/stump removal for 50 – 70 trees

Outcomes: Early in 2017, 21 ash trees were marked and all 21 were removed by MPRB. Ash stumps were ground by MPRB. Metro Blooms subcontracted with NEON to deep grind the stumps and lateral roots and begin excavation for each boulevard bioswale (45-50 total).

Activity: Excavate and Plant 50 – 70 Boulevard Bioswales

Outcomes: Throughout 2017, approximately 90 boulevard bioswales were installed on 37 individual properties totaling 10,825 square feet (Figure 1)

Activity: MPRB replants 50 – 70 boulevard trees

Outcomes: 35 trees were replanted by MPRB in spring 2018

Objective 2: Establish and implement an equitable framework to evaluate change in the knowledge, attitudes and practices (KAP) of project participants that provides measurable outcomes and guides the future replication of the project.

Activity: Establish & administer pre-test framework

Outcomes: Metro Blooms contracted with Lune, LLC (an evaluation & research firm) to develop and administer quantitative and qualitative research tools. Metro Blooms gathered qualitative data in May/June 2017 to advise KAP survey development. The initial KAP survey was distributed via mail to each Harrison resident (approx. 600) in June 2017. In February 2018, the initial KAP survey report was completed (Appendix A). The final KAP survey was administered in December 2018. Metro Blooms will complete final KAP survey report at the end of 2019 that will include data received throughout implementation of Glenwood Corridor projects.

In June – December 2018, Metro Blooms developed a scoring process similar to that of the Minnehaha Creek Watershed District process for selecting business/commercial projects to receive implementation funds. Metro Blooms worked with their partners to draft a comparable tool that intentionally incorporates principles and practices of equity, equitable development, and environmental justice within it (which is something Metro Blooms has been encouraging other watershed officials and planners to do) so that people who have historically and continue to be disproportionately impacted by pollution are meaningfully involved in projects to increase water ethic and awareness of need to protect Minnesota's precious water resources. Preserving community assets through clean water initiatives is protective, proactive, and offers strategies that prevent displacement

Metro Blooms worked with JooHee Pomplun from the Alliance for Metropolitan Stability to support the work that went into creating the Equitable Development Principles and Scorecard by participating in pilot activities and sharing experiences working with the tool at their Scorecard Workshop event on December 5, 2018. Metro Blooms utilized the glossary and modified several questions within the tool to craft a tool for equitable engagement and equitable development through water resource investments that benefit and is inclusive of underserved and diverse watershed stakeholders.

The tool is a work in progress and it will be refined over the next year to inform Metro Blooms' own work and to share experiences with their partners. Metro Blooms gathered feedback from their partners who shared suggestions for questions and the weighting of sections. The framework prioritizes the following themes: **Water Quality** (50%), **Equity** (31%) and **Sustainability** (19%).

It was important to place a heavy weight on Water Quality performance indicators as a great deal of the funding leveraged for this project came from the Clean Water Fund. Equity and Sustainability indicators, combined, are equally important and weighted accordingly. Metro Blooms will work with partners and cultural organizations who are willing to help us strengthen questions around equity and sustainability.

Metro Blooms staff participated in some of the US Water Alliance and EcoDistricts Summit planning steering committee activities and shared project highlights on 2 bus tours (in July and October) to discuss environmental justice, equity, resilience, and benefits of using green infrastructure as a to tool achieve economic, environmental, social, and community identified goals.

Activity: Final Evaluation

Outcomes: The KAP survey is meant to gauge the knowledge, attitude and practice of the resident. At the beginning of this project, Metro Blooms distributed a understand the knowledge, attitude and current practices of residents through a separate survey. The survey used at the beginning of the project in 2017 was almost identical to the survey conducted in 2018, except Metro Blooms added one question that is more relevant in understanding community members' involvement and exposure to clean water initiatives such as their previous involvement in Blooming Boulevards or Glenwood commercial projects. The KAP Survey was electronically delivered to neighborhood participants and 215 hard copies were hand delivered to residences of Harrison community members. The sample size of the final survey was much smaller than the initial size with focus on residents North of Glenwood where the majority of ash trees were identified for removal.

Preliminary results of the final KAP Survey from the electronically distributed surveys had a 40% response rate, while paper copies are still being received by mail at the Metro Blooms office (as of December 2018). In order to gain insight about the respondents, there were some self-identifying questions about race, gender, and income. Survey results show that 95% of the respondents were white, with an income range of $75,000-$100,000. Conversely, only two respondents were people of color; one of them living below the poverty rate and the other respondent had reported income to be $150,000.

Harrison Neighborhood Association's website states that "their neighborhood is one of the most culturally, racially, and economically diverse communities in Minneapolis," yet based on the demographic indicated by the survey, there is a clear disparity in reaching low income, people of color in the Harrison neighborhood through this type of research process. A community-based participatory action research (PAR) approach may have yielded different results.

The results of the final survey show that the primary concern of Harrison neighborhood residents who completed the survey continues to be **litter and trash** (57%); with climate change/extreme weather impacts (42%) and soil contamination (38%) presenting as additional concerns. Community members surveyed indicated trust in state government (62%) and watershed district/management organizations (52%) as a source of environmental and water information in their community. However, 57% percent of the community members surveyed believe that the City of Minneapolis should be responsible for maintaining clean water in their neighborhood while 48% believe that neighborhood residents should take that responsibility.

The majority of the respondents are concerned about surface water quality and (71%) were able to identify stormwater runoff as the primary source of pollution in the neighborhood. indicated that their activities in their yard have an overall impact on water quality. Many residents also indicated the use of best management practices (BMPs) on their own property such as limiting the use of fertilizers, limiting the use of salt or other de-icers, or having their downspouts leading to a garden or grass rather than a sidewalk or the street. However, these respondents did not have raingardens or bioswales on their property. One of the main barriers that prevents community members from taking additional steps to protect water quality in their neighborhood is the cost of the practice or project. It was discovered that residents would likely install permeable pavers or rain barrels on their property if costs were not prohibitive.

We know that no one person or no one organization can do it all. Through collaborative partnerships we have been able to have a greater impact but we need to find more innovative ways to demonstrate that the impact and the benefits reach more people of color and we need the community to help guide the research process.

III. GOAL 2

Provide opportunities for neighborhood youth to access job training and career pathways in green infrastructure

Objective 1: Contract with youth and young adults in outdoor jobs programs for installations. Connect with current underutilized business contractors and develop new local connections to perform contract work.

Activity: Contract/schedule youth outdoor jobs programs to complete boulevard excavation and planting using 15 – 50 neighborhood youth

Outcomes: Early in 2017, an application for Conservation Corps youth crew time for this project was submitted and approved for 2017. Metro Blooms worked with Conservation Corps young adult crews for 2 days to plant bioswales along Morgan Ave in spring 2017. In July 2017, Metro Blooms worked with Conservation Corps youth crew for 10 days to complete excavation, mulching and seeding of the boulevard bioswales. They also worked with a crew of Step Up Interns from Wilderness Inquiry and 50 high school youth from Wilderness Inquiry to plant completed boulevards. Following the completion of training with Metro Blooms, Step Up Interns reported interest in learning more about careers in landscape design, inspections, native plants, and green infrastructure installation.

As an outgrowth of this work, in 2018 Metro Blooms staff attended Minneapolis Park and Recreation Board Outdoor Career and Job Programs team meetings where partners worked together to engage Minneapolis young adults in outdoor career and recreational experiences for future projects.

Activity: Purchase/install turf alternatives in boulevard bioswales including 100-300 grasses, sedges, low grow forbs per property and or seed mix.

Outcomes: In initial bioswales turf alternative plantings were installed. Boulevards installed in July 2017 the remainder of the bioswales were planted and seeded with one of 5 plant palettes developed by Metro Blooms. Each participant selected their palette of choice. Boulevards were planted with the Conservation Corps of Minnesota, 50 high school youth from Wilderness Inquiry and through 2 volunteer events hosted by Utepils Brewing Co.

Activity: Contract with 1- 2 local landscape contractor(s) for excavation assistance.

Outcomes: In spring 2017, Northside Economic Opportunities Network (NEON), a local landscape contractor, removed 5 ash tree roots on Morgan Avenue and prepped 3 boulevard bioswales along Morgan. NEON was also used in the summer 2017 to deep grind roots and begin excavation in each of the boulevard bioswales installed in July (for a total of 90 bioswales at 37 properties). As a result of this work, Metro Blooms was awarded grant funding from the MPCA Environmental Assistance (EA) program to establish a joint venture with NEON and one additional partner for field training 10-15 crew members and establishing 2 maintenance contracts for services within North Minneapolis and surrounding communities.

Objective 2: Develop a Stormwater and Sustainable Landscape Inspections and Maintenance Training Program for youth and young adults in outdoor jobs programs which can be implemented as an on-the-job training program.

Activity: Development and pilot implementation of maintenance training program with 5 modules

Outcomes: In early 2017, project partners were recruited and committed to the project. Project development got underway with a focus on plant ID (native plants and the top 20 most troublesome invasive plants) as well as recommended management. Pilot tests took place including with various groups.

By the end of 2017, four modules were developed (1. Intro to stormwater BMPs, 2. Inspections & Maintenance Planning, 3. Plant/Weed ID and Management, 4. Structural Maintenance) and a total of five pilot trainings took place. These included three youth/young adult trainings (Mississippi River Green Team, Wilderness Inquiry Step Up Interns, Conservation Corps), one train the trainer event for Master Gardeners, Master Water Stewards, and Metro Blooms staff, and one training for NEON contractors focused on general stormwater management principles, structural maintenance and weed ID.

Piloting the Sustainable Landcare training in 2017 was invaluable to the program. Metro Blooms staff learned lessons from every pilot training and received great feedback, enabling them to adapt program resources to fit the needs of their audiences. One lesson learned was the importance of including the maintenance of small scale structural BMPs such as trench drains and permeable pavement. While Stormwater U offers training in these topics, the level at which the training is presented is meant for professionals in stormwater management, making them daunting and less accessible for contractors that don't currently offer these services. Metro Blooms hopes to work with Stormwater U to refine these trainings to meet their audience.

In 2018, the pilot continued and refinements to the Sustainable Landcare Training program were made. Metro Blooms joined the Outdoor Youth Advisory Council to connect with outdoor jobs programs, and continue to seek funding for program implementation. They hired a Sustainable Landcare Project Manager in 2018 as they work to expand this program. In 2018, Metro Blooms worked primarily with the Mississippi River Green Team (MRGT) and the Northside Economic Opportunity Network (NEON) to train their crew members in stormwater BMP maintenance, native plant identification, and weed identification. In order to be effective, the training took place multiple times during the year as weeds change throughout the season.

Twenty youth with the MRGT spent a day training and maintaining boulevards at Redeemer Lutheran Church in Harrison and a day maintaining Sentyrz Market raingardens in June/July 2018. Additionally, Metro Blooms met NEON at one of their job sites to provide weed identification and management training. The MRGT and NEON have indicated that native plant and weed identification is an ongoing need for their crews. Metro Blooms plans to continue this training partnership through this year and in future years. Additionally, Metro Blooms has been in discussion with a number of housing facilities that are interested in the training for their residents and staff.

Because of the initial Met Council-funded grant project, the work conducted and products developed reached additional audiences and leveraged additional funds to expand the program. Metro Blooms received 2019 grant awards from Hennepin County and the MPCA to continue expansion of the pilot effort to build capacity with the goal of serve vulnerable watershed stakeholders through the Sustainable Landcare programs. In 2019, Metro Blooms will recruit and hire their first crew targeting youth and young adult outdoor program alumni. These crews will be the first cohort to complete all modules of the Sustainable Landcare Training program and become Blue Thumb Certified in Sustainable Landcare. They will be maintaining public schools and affordable housing stormwater BMPs, training and assisting property managers to secure and maintain compliance with City of Minneapolis, Chapter 54 regulations.

Activity: Revisions and Publications

Outcomes: In June 2017, a draft of the pocket guide book for plant/weed identification was completed and printed and one revision was made to incorporate field activities into the guide.

During the fall/winter of 2017 the Sustainable Landcare Guide was refined to focus on weed identification, as this was the need described by training participants and partner associations. Rather than include plans for each training module in the guide book, Metro Blooms created separate lesson plans for each training module that work in conjunction with the guide.

Throughout the winter/spring of 2018, Metro Blooms worked with Blue Thumb partners to refine the list of weeds to include in the Sustainable Landcare Guide. And, they used maintenance trainings during the summer of 2018 to gather high quality weed photos to include in the guide. Finally, Metro Blooms also established a "weed of the week" blog for the 2018 growing season (posted on Facebook and the Metro Blooms website). The blog helps training participants continue their education following field trainings.

Also during 2018, Metro Blooms staff continued editing and making revisions to the Sustainable Landcare Guide with a focus on image sourcing, compiling images of the morphological stages of plants/weeds (i.e., seed head, seed, root structure, flower color(s)) and control methods. Staff also discussed opportunities to involve youth in capturing images that will used in future guides.

The Sustainable Landcare Guide can be found in Appendix B.

IV. Water Quality Outcomes (see Figure 1)

- 90 bioswales across 37 residential properties in Harrison Neighborhood were created
- 10,825 square feet of clean water and pollinator habitat were created
- 10,825 gallons of stormwater runoff is captured annually
- 416 lbs of sediment and 2 lbs of phosphorous are captured, annually

V. Additional Outcomes

As a direct result of this project and in addition to the above activities and outcomes, there has been significant interest in and promotion of the Harrison Neighborhood Project in the last 6 months. Metro Blooms' Community Engagement Manager gave a presentation on environmental justice and this project to a group of 40 WaterShed Partners in the spring of 2018. Additionally, Metro Blooms worked with Augsburg College throughout the summer of 2018 to engage large commercial properties in the Cedar Riverside Neighborhood of Minneapolis to implement stormwater management practices and think about the opportunities to engage underserved watershed

stakeholders. Lastly, Metro Blooms worked with the Environmental Justice Coordinating Council (EJCC) to lead a bus tour for the One Water Summit in July. As part of the tour, the bus stopped at the Harrison Boulevards and Metro Blooms presented on this project to a national audience. We've heard from a number of partners since these presentations that are re-thinking their current outreach methods to be more equitable and engaging.

VI. Lessons Learned

Water resource investments have the potential to create economic, environmental, and social benefits for environmental justice (EJ) communities. Green infrastructure can be used as a tool to meaningfully involve and build the capacity of local residents to take clean water actions that build resilient neighborhoods and cities.

Vulnerable stakeholders need access to resources that help them thrive in their communities. However, structural barriers to resources and a systemic lack of access have compounded disparities across generations and into the present. Shifting these disparities takes long-term investment and long-term commitment. It begins with projects like this one.

Although 37 residential property owners in Harrison Neighborhood participated in the Boulevard Bioswales (Blooming Boulevards) project, many residents in the neighborhood who wanted to participate were unable to due to lack of additional funding. Some residents in the neighborhood also expressed interest in the Metro Blooms' Blooming Alleys program.

We learned that disparities in homeownership rates impact the ability of some residents to participate and benefit from the investments that were made in the community. This lesson spurred work that will continue to be undertaken with low income housing community stakeholders.

This project could be a springboard for integrating arts and culture into clean water action initiatives that are being undertaken with underserved, diverse watershed stakeholders.

VII. Continuing Need and Next Steps

Green infrastructure can not only help improve water quality by better managing stormwater— sometimes even at a lower cost than conventional alternatives—but also can attract investment; help revive distressed neighborhoods; encourage redevelopment; provide recreational opportunities; and help achieve other social, economic, public health, and environmental goals. https://www.epa.gov/sites/production/files/2014-10/documents/green-infrastructure.pdf

In Harrison Neighborhood, an environmental justice (EJ) community, we are using these investments to improve water ethic, revitalize the neighborhood, remove financial barriers for property owners, to prevent the displacement of community members and community assets, to support and encourage investment and redevelopment oriented around transit, and to create green jobs and career pathways.

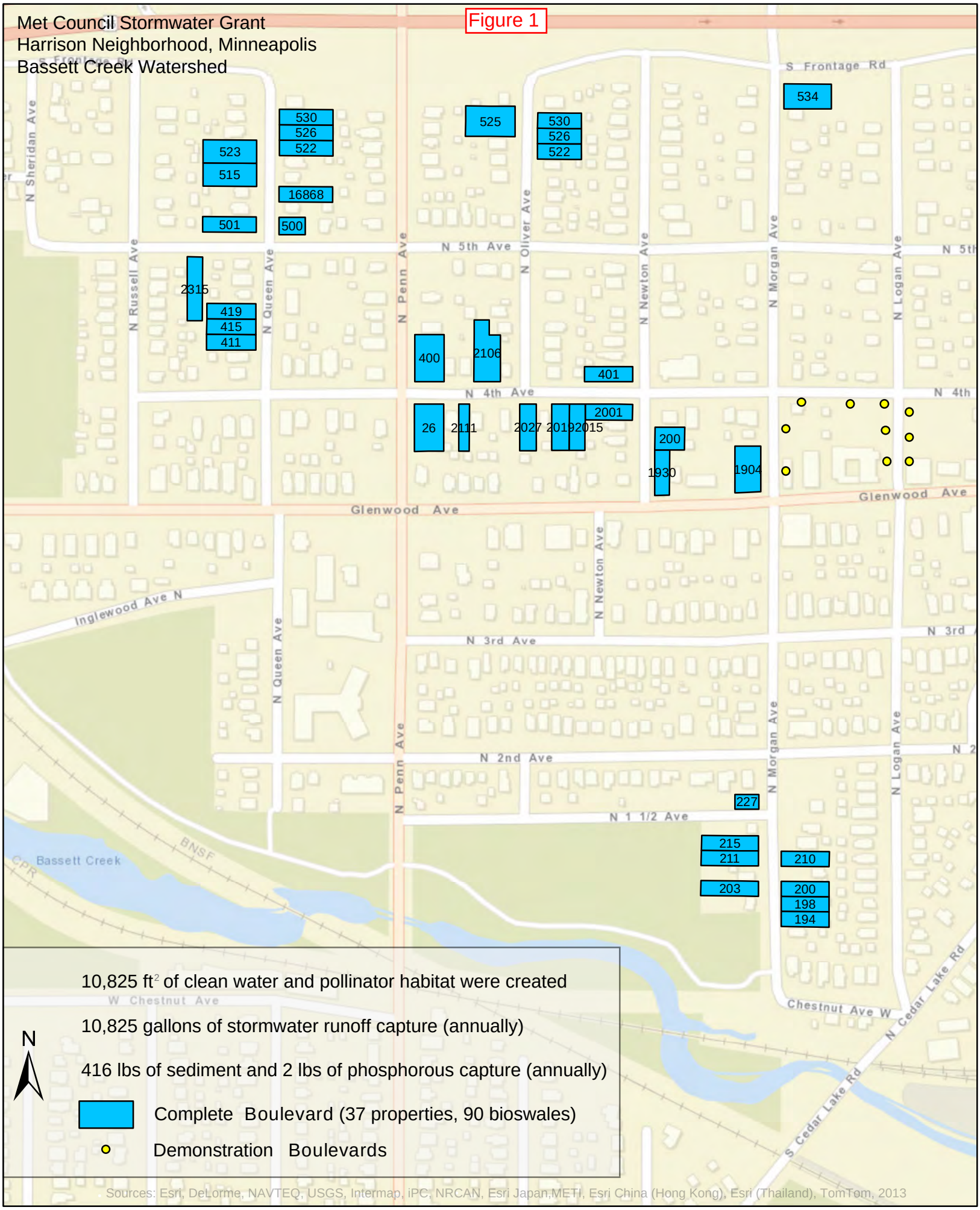
The maintenance of green infrastructure investments is an ongoing need that should be addressed. This project found that using new maintenance approaches such as providing local, technical expertise to maintain vegetative stormwater BMPs is as important as providing technical assistance to install the BMPs initially. This project provided support for the development of new agreements to replicate the Sustainable Landcare Training and Certification Program with new partners beyond the project period. Metro Blooms is developing a regional model to build climate resilience WITHIN vulnerable and underserved communities that can be replicated and expanded regionally, to other Minneapolis neighborhoods, watersheds, and integrated into sectors related to food justice, clean energy, land restoration, and land conservation. They are also seeking opportunities to partner with solar

garden installers due to the importance of capturing rain runoff from their panels. To do all of this important work, we need to embed and tie equity metrics to organizational outcomes to get more buy-in and investment from community leaders, funders, municipalities, watershed managers, workforce organizations, and developers who find value in creating more just and more fair pathways to green jobs and green careers.

Sharing information on the implementation of the Sustainable Landcare Field Trainings allows us to secure new partnerships to replicate the engagement and training process regionally. We will disseminate project information to our funders and partners through a communications and promotions plan; the frequency and type of contact will vary. Modes of contact include email, phone calls, social media, newsletters, conference/board presentations, and community blogs. Metro Blooms will work with the Conservation Corps and Minneapolis Park and Recreation Board Outdoor Career Advisory Committee to share recruitment and project opportunities and to build partnerships that target diverse opportunity youth on a seasonal basis. They will also continue to develop connections to local contract work and work with local contractors such as Northside Economic Opportunity Network, Blue Thumb Partners, and other underutilized business contractors. Metro Blooms will co-host a Recognition for Achievement of Blue Thumb Sustainable Landcare Certification ceremony for those who successfully complete the program and can demonstrate they have achieved a level of competence needed to perform the duties associated with inspection, installation, and maintenance of vegetative stormwater BMPs. Project successes and lessons learned will be shared in presentation to Blue Thumb Partners during quarterly meeting(s).

Metro Blooms continues to work with local municipality staff to expand the Boulevard Bioswale program in conjunction with ash tree replacement. The City of Minneapolis has a strong interest in expanding this program, specifically as a water quality engagement and education tool in diverse, low income neighborhoods. We hope to see that expansion funded in 2019.

Northside Neighborhood Engagement & Opportunities in Clean Water Initiatives: Bioswale Installations 2017 – 2018



Project Budget Status

Project Tasks (2016 – 2018)	Grant Budget	Match Budget	Updated Match Budget (April '17) [1]	UPDATED TOTAL BUDGET (April '17)	Grant Funds Spent	Match Spent	TOTAL SPENT
Project Management and Engagement	$24,840	$20,150	$6,852.25	$31,692.25	$23,162.50	$10,852.25	$34,014.75
Education and Exhibit Materials [2]	$2,500	$6,700	$403.72	$2,903.72	$1,925.71	$403.72	$2,329.43
Job Training + Maintenance & Inspections Development and Pilot Implementation	$25,000	$6,500	$25,000	$50,000	$23,475.10	$38,080.49	$61,555.591
Landscape Contractor and Landscape Supply	$32,810	$39,700	$16,027.67	$48,837.67	$33,032.54	$16,027.67	$49,060.21
Landscape Design + Oversight [3]	$9,000	$11,750	$13,282	$22,282	$11,723.00	$13,282	$25,005.00
Monitoring and Evaluation	$5,500	$5,500	$0	$5,500	$5,727.44	$217.37	$5,727.44
Local Travel [4]	$350	$550	$434.46	$784.46	$953.71	$434.46	$1,388.17
TOTAL	**$100,000**	**$90,850**	**$62,000.10**	**$162,000.10**	**$100,000.00**	**$79,297.96**	**$179,297.96**

Budget Notes:

[1] (Same notes as 7-1-17 grant report) Metro Blooms was awarded grants from Minnehaha Creek Watershed District's Cynthia Krieg fund ($10,000) and Hennepin County's Green Partners program ($15,000) to develop and implement pilot programs for the sustainable landcare maintenance training program.

[1] (Same notes as 7-1-17 grant report) We were planning to submit an Opportunity Grant application to Hennepin County to expand the boulevard project but the County requested that we focus an Opportunity Grant application on working with commercial properties along Glenwood Avenue instead. The potential $50,000 from Hennepin County was removed from the updated match budget below.

[1] 2017 match of $4,000 from BCWMC was added for engagement and education.

[2] Education Materials: (Same notes as 7-1-17 grant report) The 2016 funding from the Center for Prevention at Blue Cross Blue Shield and from Bassett Creek Watershed Management Commission was spent primarily on plant material and installation of the demonstration boulevards at Redeemer Lutheran Church. The money allocated to education and exhibit materials was utilized primarily for landscape supply. In the budget below, $2,500 was re-allocated from Landscape Contractor & Supply to Education Materials in order to cover education and outreach materials including signage, doorhangers, display boards for plant palettes, etc.

[3] Landscape Design + Oversight: We were able to utilize this project as a job training opportunity for local contractors and youth crews that had little to no experience in landscape installation prior to the Blooming Boulevards experience. Because of this, these crews required much more training, oversight, and guidance from our Landscape Design team than we typically provide our landscape contractors. Also, because it was a training experience for them, the installations took longer than we anticipated. In addition, this was the first year that Metro Blooms installed more than 5 Blooming Boulevards. The quick expansion of the program was a learning experience, and required project development time from our landscape designers.

[4] Local Travel: The Harrison Neighborhood is a diverse, low income community. This type of community has historically not been engaged in clean water projects. Working with this new community to gain trust, we found it necessary to have a strong presence in the neighborhood. This was often accomplished by Metro Blooms' Community Engagement Manager spending time "in the field" in Harrison working with boulevard captains and neighborhood partners to talk with their neighbors face-to-face. The installations also required more staff support to complete than we anticipated.

Appendix A

Initial KAP survey report

February 2018

HARRISON NEIGHBORHOOD WATER QUALITY SURVEY SUMMARY

Conducted by Metro Blooms in partnership with LUNE, LLC., Harrison Neighborhood Association, and the Bassett Creek Watershed Management Commission.

Funded by the Metropolitan Council

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Introduction

Harrison Neighborhood is one of the most culturally, racially, and economically diverse communities in Minneapolis. The neighborhood is on the forefront of a major economic boom spurred by transit investments and corridor development. It is located to the west of downtown Minneapolis within the Northside Achievement Zone (NAZ). A history of undesirable development in the neighborhood caused soil and water contamination. Concerns regarding health impacts of pollution have been raised.

Harrison Neighborhood Association was formally organized in 1984 to address neighborhood problems. Harrison neighborhood residents are civic stewards who have worked diligently to clean up a former superfund site, stabilize housing and support local businesses. The neighborhood association's partnership and the residents' ongoing commitments to address environmental issues and equitable development have been critical to achieving the health, social, and environmental challenges of managing urban runoff.

In order to manage this type of pollution, local governments are turning to citizens to manage stormwater on their property in order to minimize the polluted runoff that enters our storm drains. Metro Blooms has been working with cities, watershed districts, neighborhood residents, and businesses since 1983 to promote eco-friendly landscaping and educate citizens about the importance of stormwater management.

Metro Blooms began working with the Harrison Neighborhood Association and Bassett Creek Watershed Management Commission in 2016 on a project in this Near North neighborhood to engage residents and business owners in a project to prevent polluted stormwater from entering Bassett Creek and the Mississippi River. Bassett Creek is impaired, due to excessive chloride and bacteria (Minnesota Pollution Control Agency 303(d) impairment list). In order to meet local standards and reduce the negative impacts of urban runoff, the quality of water in Bassett Creek must be improved.

Metro Blooms is working with property owners in Harrison to manage their stormwater and improve water quality in Bassett Creek and the Mississippi River through the installation of boulevard bioswales. In addition to the environmental impact of these projects, Metro Blooms is working in partnership with Lune, LLC, Harrison Neighborhood Association, Bassett Creek Watershed Management Commission, and the Metropolitan Council to measure changes in knowledge, attitudes, and behavior related to water quality within the neighborhood. Qualitative data was gathered during the summer of 2017 (see Appendix I) to inform a neighborhood-wide Knowledge, Attitudes, and Practices (KAP) survey. The preliminary findings of the first round of the Harrison Neighborhood KAP survey are summarized in this report.

Methods

Knowledge, Attitudes and Practices (KAP) Survey

Metro Blooms contracted with Lune LLC to consult on a KAP study of the residents in the Harrison neighborhood during the summer of 2017. The University of Minnesota Water Resource Center has utilized the KAP method in more than 20 communities and has found the method to be comparatively quick and cost-effective. The Harrison neighborhood KAP study began with a series of qualitative survey activities, primarily short in-person interviews held at Blooming Boulevard Block Parties and Resilient Yard Workshops. Possible barriers to installing stormwater management practices on site and current resident knowledge were also discussed with Boulevard Captains and Blooming Boulevard participants. The qualitative data was then analyzed and utilized by Lune to inform the KAP survey questionnaire.

The questionnaire was then pre-tested and finalized. Lastly, a letter introducing the purpose of the survey, dates that the survey would take place, and confidentiality information was mailed to every single-family home and duplex in the Harrison Neighborhood (600 total). The pre-survey letter also gave residents the option to take the survey online through Survey Monkey before the door-to-door surveying began. The first-round KAP survey is attached as an appendix to this report as is the introductory letter.

Study Area

The area of interest for this KAP study was the Near North Harrison neighborhood (Fig. 1).

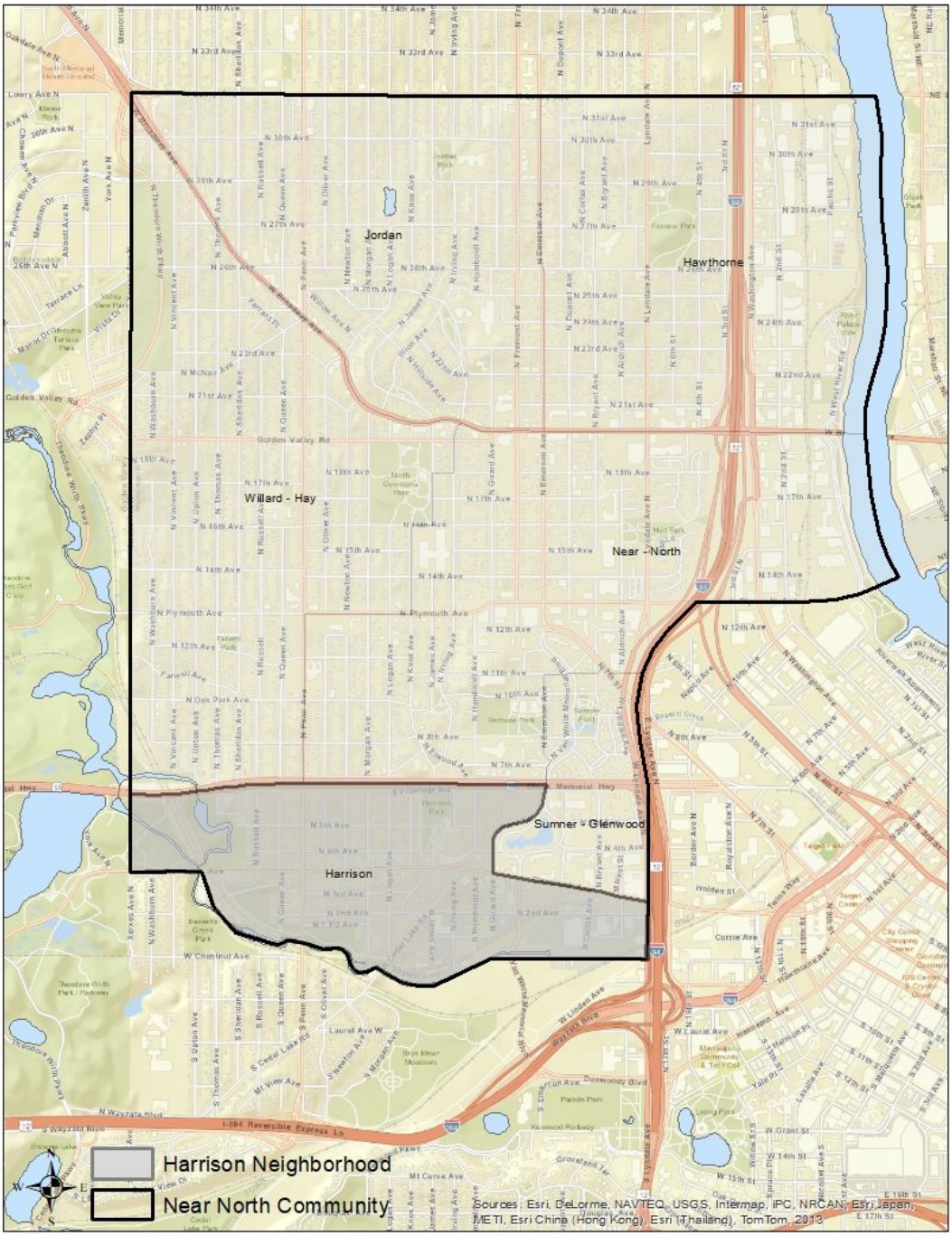


Figure 1. Outline of the study area of this KAP survey.

Survey Sample

Jeff Mattson, Director of the Center for Urban and Regional Affairs (CURA) GIS department and Dave Colling, Executive Director, Harrison Neighborhood Association provided parcel data using ArcGIS. Businesses, apartments, and vacant homes were removed from the sampling frame because we wanted to target homeowners in the area. Because the total number of single family homes and duplexes in Harrison is only about 600, we decided to distribute the survey to every household. Following the pre-survey letter mailing, approximately 15 homes were taken out of the sample due to vacancy.

Administering the Survey

Metro Blooms learned through the Nokomis KAP study experience that hiring doorknockers and administering surveys in person was not an effective use of time and resources.

Therefore the introductory letter was mailed and survey packets were delivered to Harrison neighborhood residents by Metro Blooms staff. Each packet contained a survey, a self-addressed and stamped envelope, and a note describing the survey and providing contact information for questions. Residents were also given the option to take the survey online through Survey Monkey (Appendix II).

18 residents took the survey online, and 15 homes were removed from the sample due to vacancy, reducing our door-to-door sample to 567 households. After one month, we received a total of 97 responses, for a 17% response rate.

Results

Knowledge

The knowledge questions in the Harrison KAP survey were meant to gauge residents' knowledge about stormwater runoff and its effects, but also about the primary causes of runoff pollution in the neighborhood. The first knowledge question of the KAP survey (Q6) examined participants' knowledge of primary source of pollution to surface waters.

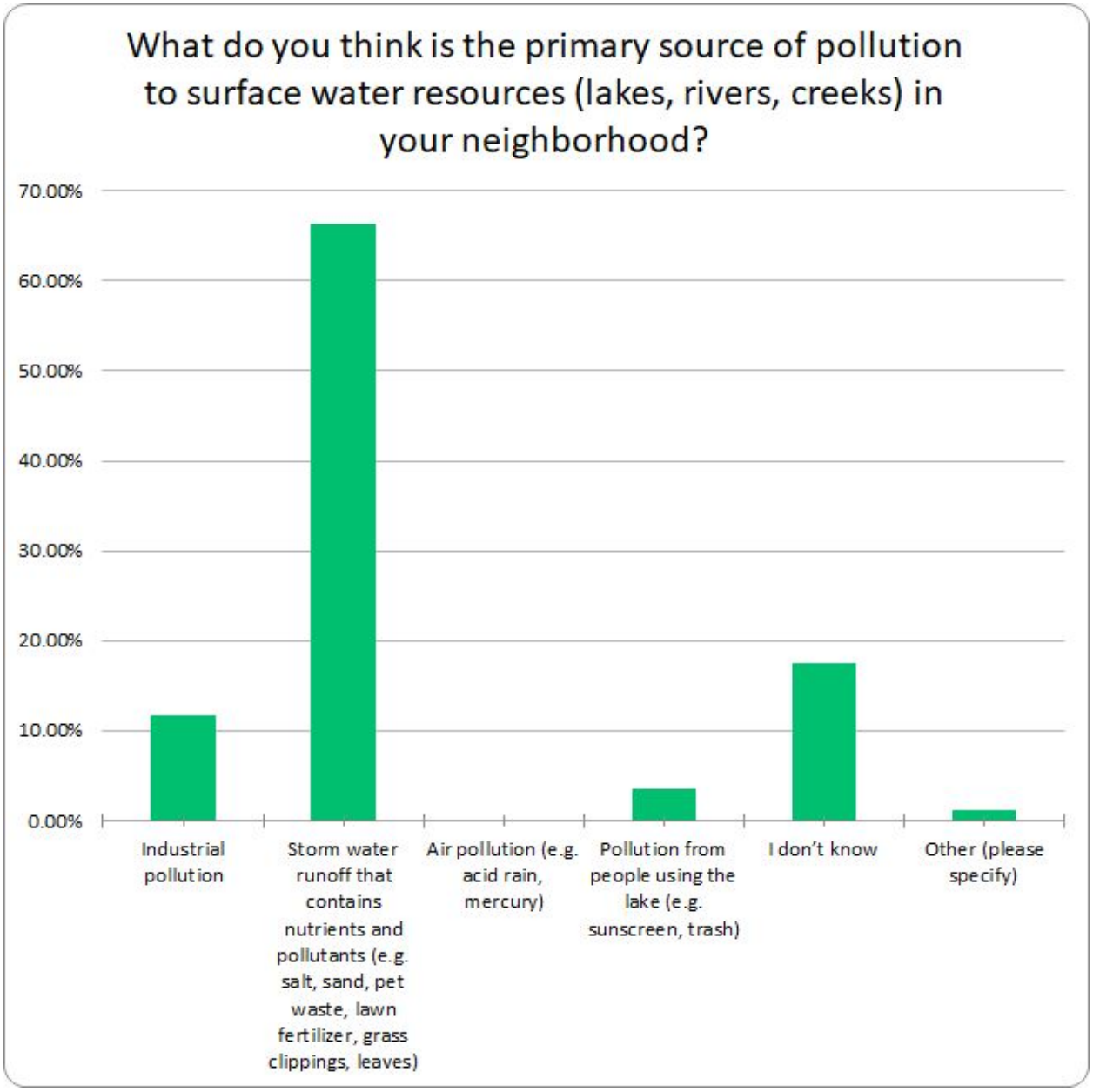


Figure 2. Harrison neighborhood resident knowledge about the primary source of pollution to surface water resources.

The majority (66%) of participants surveyed recognize that stormwater runoff containing nutrients and pollutants is the primary source of runoff pollution, but 17% said they didn't know, and another 12% believed industrial pollution was the primary source.

The next knowledge question (Q8) asked residents about the impacts of their yard care activities on water quality.

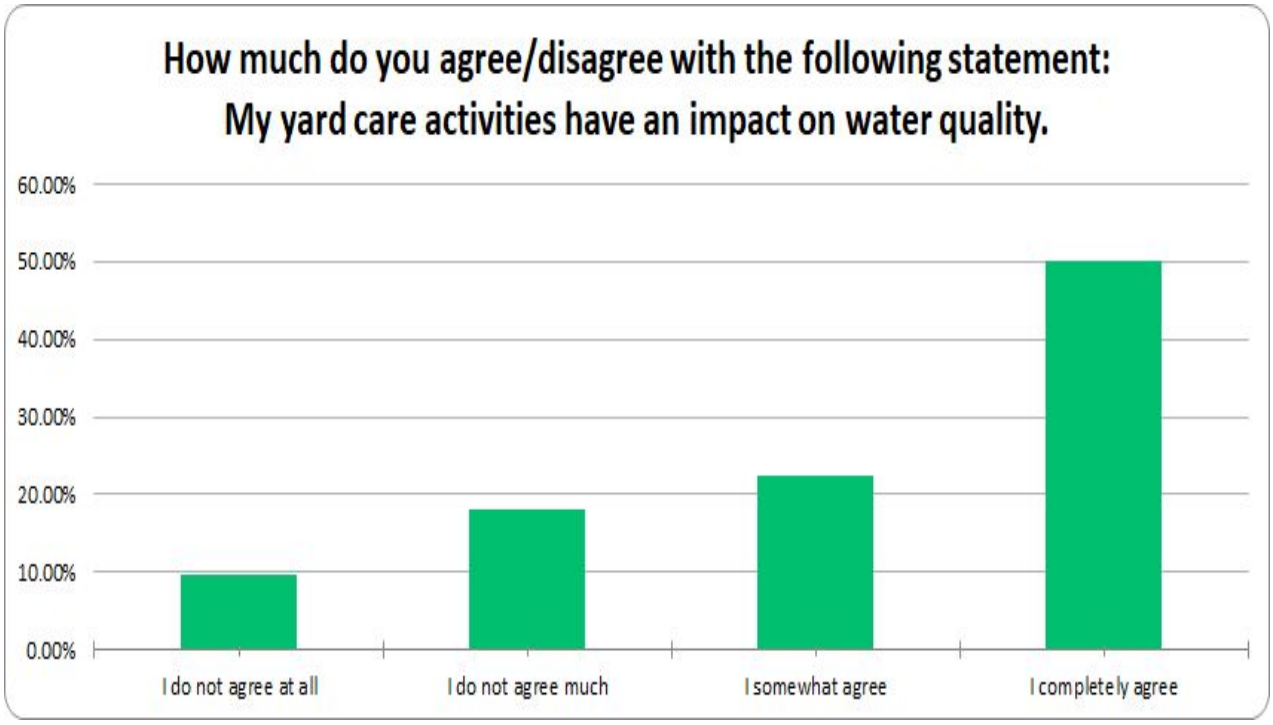


Figure 3. Harrison neighborhood resident knowledge about the impact of their yard care activities on water quality.

47 of the participants surveyed completely agreed with the statement: My yard care activities have an impact on water quality. 21 somewhat agreed and 26 residents did not agree much or at all with the statement. This result may be due to the fact that many are practicing yard activities that reduce the environmental risks of urban runoff.

Attitudes

The attitude questions in the KAP survey revealed residents' concerns about water quality and their beliefs about who is responsible for it as well as who they trust as a source of environmental information.

Most residents (64%) are either very concerned or fairly concerned about the water quality in their neighborhood (Q5). This shows us that they recognize the issue, although many people (36%) also expressed little to no concern at all about water quality in the neighborhood.

Participants were also asked about who they believed should be responsible for maintaining clean water in their neighborhood (Q7). Respondents were allowed to "circle all that applied" and while the vast majority (83%) said the City of Minneapolis should play a part, 71% believed neighborhood residents were responsible. Bassett Creek Watershed Management Commission (BCWMC) was third (68%) and local businesses came in fourth (66%) (Fig. 5). The number of respondents who reported that BCWMC should play a part shows us that most

people know what BCWMC is and what they do, showing a relatively high knowledge in the community about local government and water quality.

Figure 4. Harrison residents level of concern about surface water in the neighborhood.

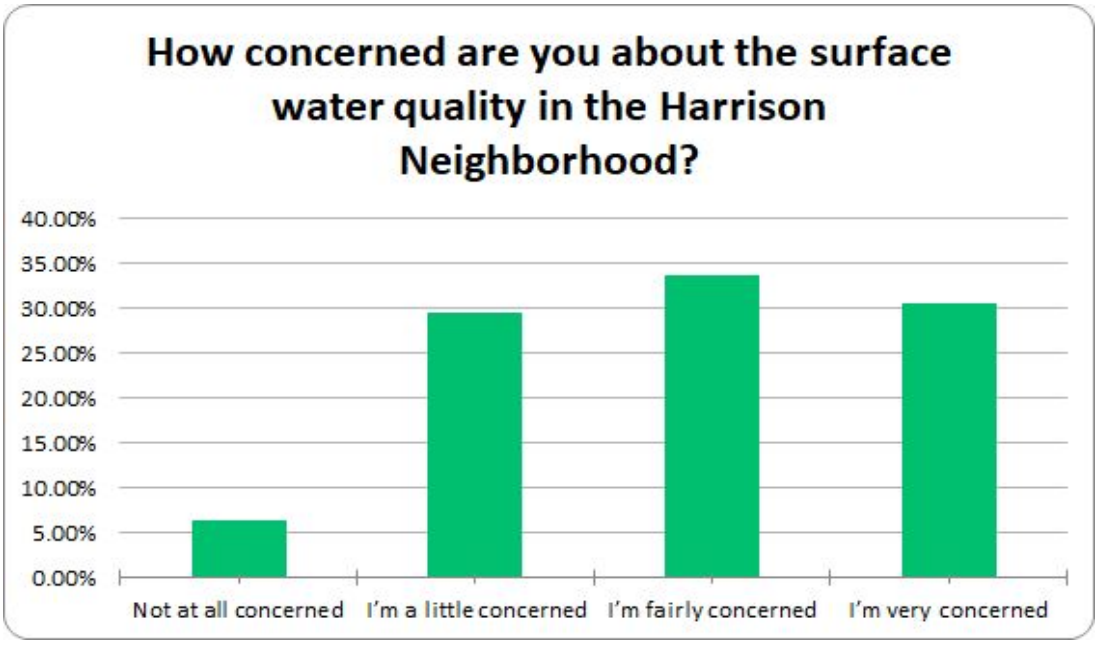
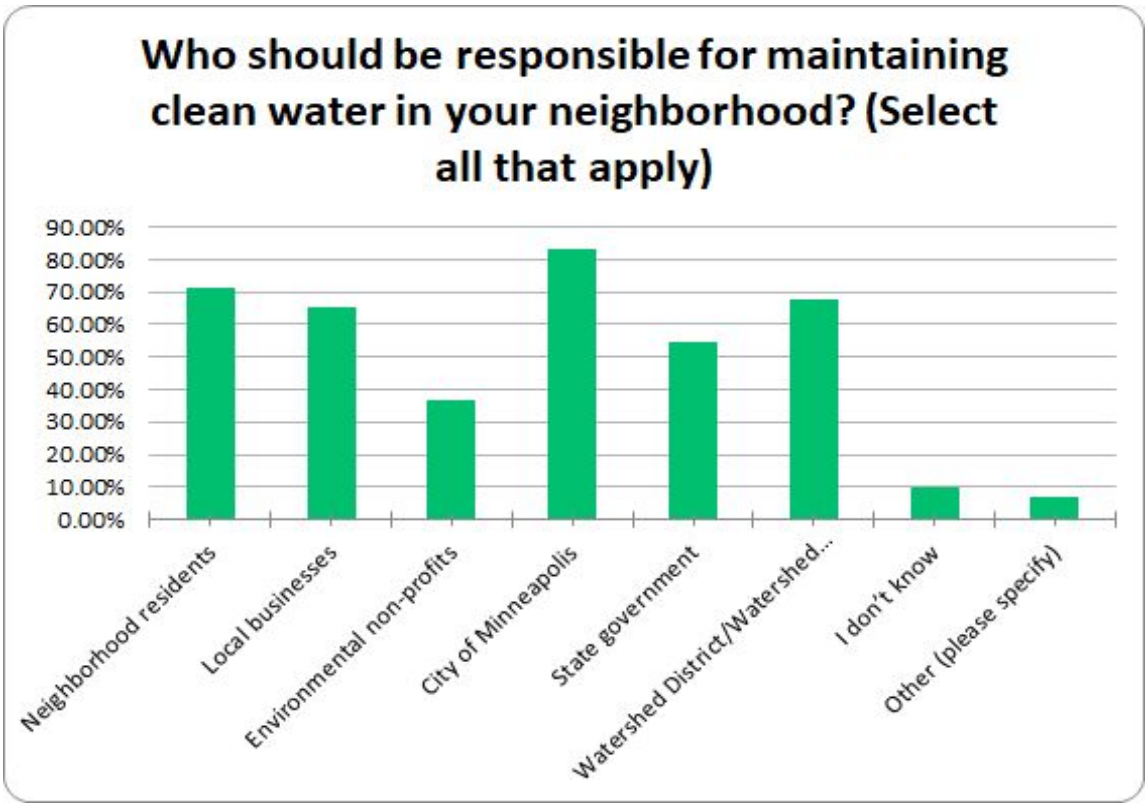
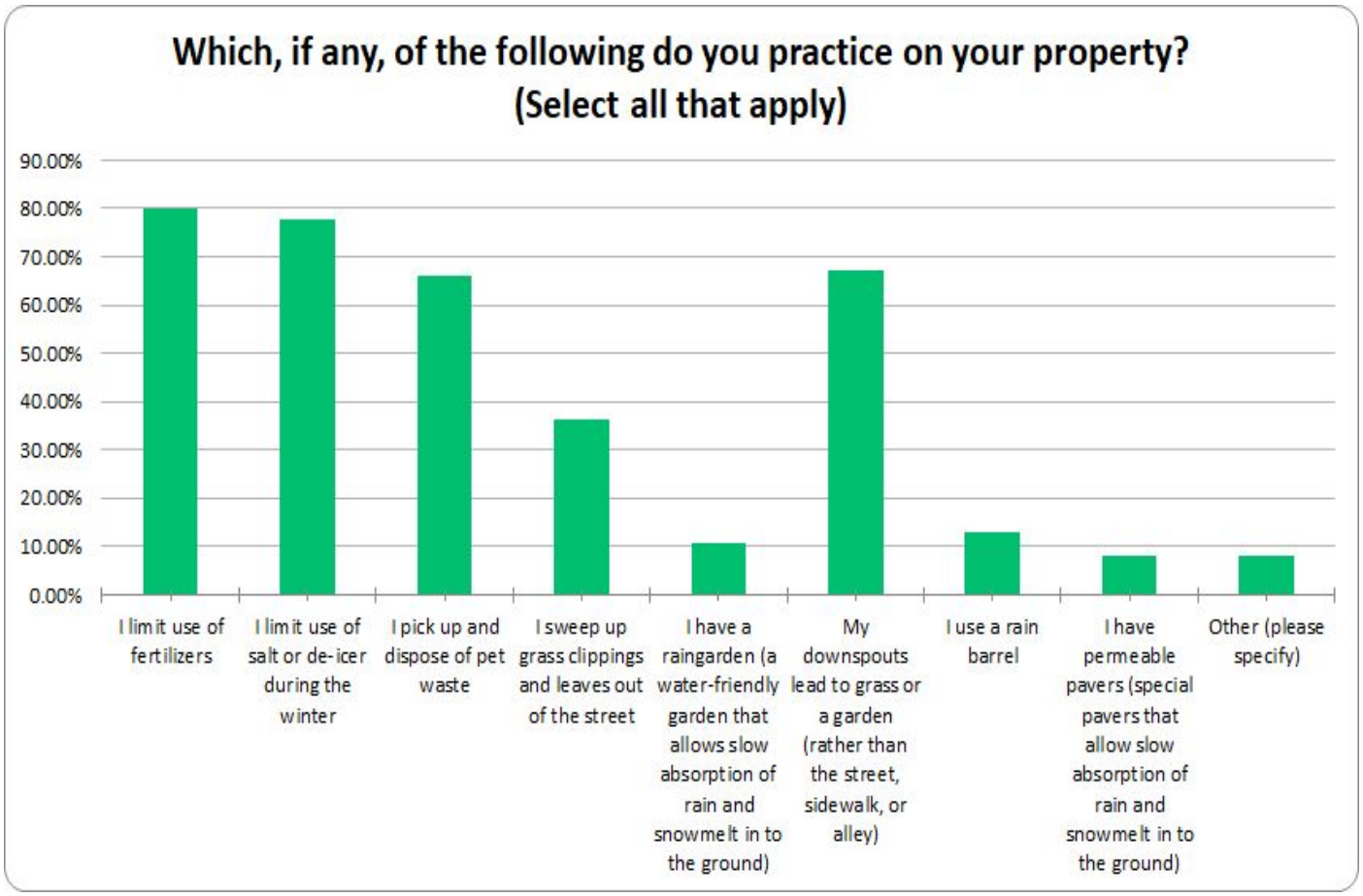


Figure 5. Attitudes about responsibility for maintaining neighborhood's clean water.



Practices

Figure 6. Practices that Harrison residents currently practice on their property.



A significant number of survey respondents are implementing clean water practices as part of the landscape routine. 78% are limiting the use of salt or de-icer during the winter, 80% are limiting the use of fertilizer, and 66% report that their downspouts lead to grass or a garden (rather than the street, sidewalk, or alley). These actions reduce the amount of nutrients and pollutants being distributed by urban runoff and demonstrate an attitude of personal responsibility

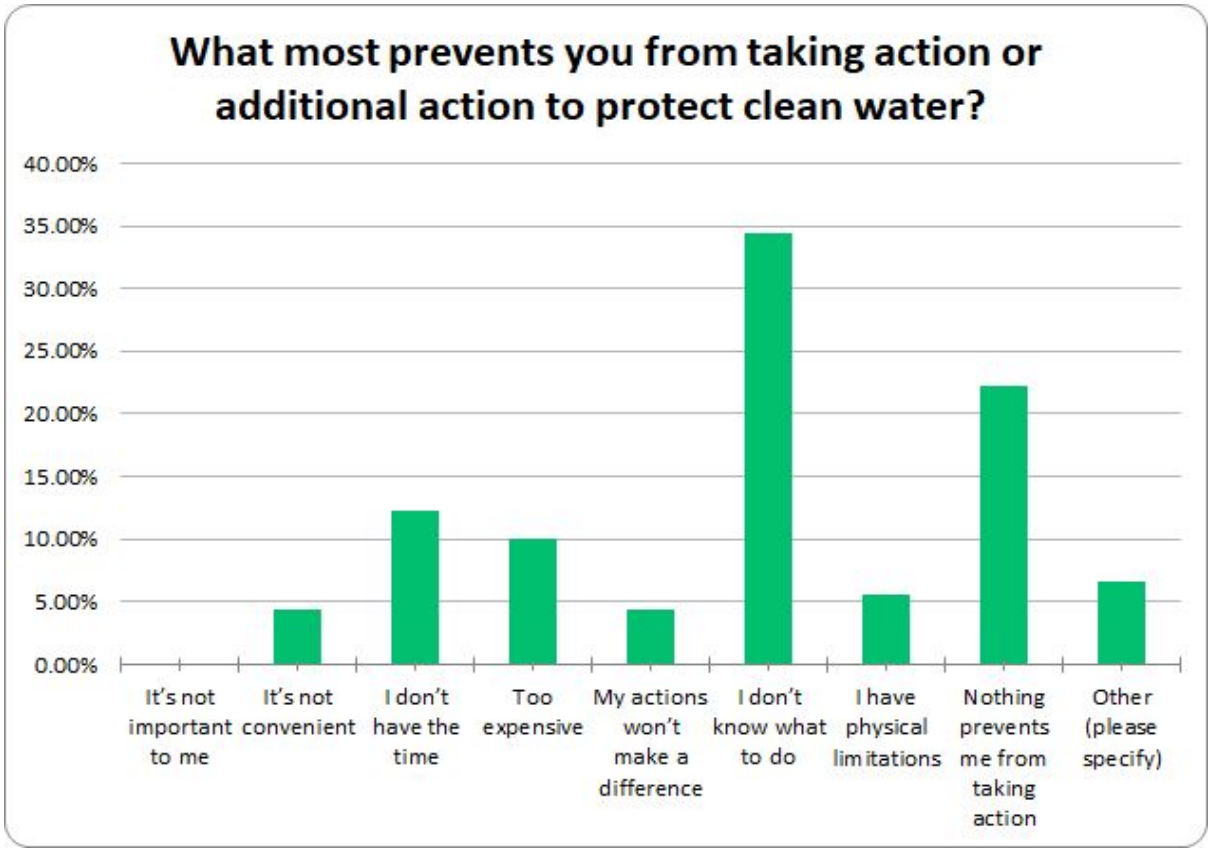


Figure 7. Barriers identified by residents that prevent them from taking action to protect water quality (Q15).

In contrast, based on the results obtained in this survey Metro Blooms learned that 33% of respondents did not know what action to take to protect clean water.

Conclusions

Equity

Harrison Neighborhood Association's website states that "their neighborhood is one of the most culturally, racially, and economically diverse communities in Minneapolis. Harrison residents have built a rich history of art, creativity, and resilience. Local businesses have built a strong community of investment and possibility. We stand at the crossroads of opportunity and equity". http://www.hnampls.org/

In general, the Harrison neighborhood stakeholders who completed our survey were mostly homeowners (73%) who seem to be aware of stormwater runoff issues and how they connect to their yard care practices.

However, when you look at the Wilder Foundation Minnesota Compass project report compiled about Harrison neighborhood, you will find demographic information that indicates that more than 50% of people who reside in the neighborhood are renters and people of color. http://www.mncompass.org/profiles/neighborhoods/minneapolis/harrison#

Eighteen percent of the participants surveyed for this report indicated that they were renters (Q18). 84 participants out of 97 provided demographic information (Q23) through which we learned that 86% described themselves as White, 11% described themselves as Black, 6% described themselves as Asian, 4% described themselves as being of Hispanic, Latino, or Spanish heritage, and 1% described themselves as Native American or Alaska Native. 13 did not respond to this question.

We recognize a need to integrate new equity mechanisms that increase access and opportunities for renters and people of color to participate in our clean water initiatives. Many renters do not have the authority or capacity to make landscaping decisions about the property. We learned that this was a major barrier for renters in Minneapolis Public Housing Authority (MPHA) scattered site housing properties in the neighborhood.

Financial Barriers

In addition to a high number of renters in the neighborhood, another possible reason for very few installed best management practices in Harrison is the perceived expense of installing such practices. Forty-six (58%) residents indicated that funds to help offset costs would help them take action on their property to protect clean water.

Neither the City of Minneapolis nor Bassett Creek Watershed Management Commission (BCWMC) have local cost share programs for private property owners. Exploring cost-effectiveness of other cities' cost share programs and tracking the environmental impacts of empowered stakeholders taking action to protect clean water resources could inform consideration. We would encourage these units of local government to expand the benefits of water investments more equitably to be more inclusive of all residents, especially renters and people of color, so that they can also take clean water action in their neighborhood. We also encourage these governmental units to continue to invest in building the capacity of non stormwater professionals to address environmental risks in their communities.

Knowledge Barriers

The education gap for all residents seems to be between recognizing the need for healthy lawn care practices that protect clean water resources and having the capacity and knowledge to implement them. Metro Blooms and partners began addressing this education gap through the Blooming Boulevards demonstration installation at Redeemer Lutheran Church, by distributing informational pamphlets, and encouraging residents to attend do-it-yourself workshops and participate in the Northside Neighborhood Engagement & Opportunities in

Clean Water Initiatives (NNEOCWI) project. Thirty-seven property owners have since installed Blooming Boulevards in the neighborhood and a minimum of 6 commercial and institutional business owners will have the opportunity to participate in the project as well.

Many more residents in the neighborhood have expressed interest in participating in the Blooming Boulevards program. Fifty-five (71 %) survey participants indicated they would be willing to add a Blooming Boulevard to their yard care activities (Q16). This presents a great opportunity for community resilience and clean water education and action; to show residents how they can address environmental risks by implementing practices on their own property.

References

APPENDIX I

Minnesota Compass-Harrison Neighborhood
http://www.mncompass.org/profiles/neighborhoods/minneapolis/harrison

Qualitative Data Analysis

METRO BLOOMS, BLOOMING BOULEVARDS PROJECT EVALUATION

JUNE, 2017

Table of Contents

Introduction

This document summarizes the findings from the qualitative data collection related to the evaluation of the Metro Blooms Blooming Boulevards Project in the Harrison Neighborhood.

The goal of this evaluation project is to identify impacts of the Blooming Boulevards Project in the Harrison Neighborhood of North Minneapolis in order to adaptively improve the effort in the Harrison Neighborhood and inform similar efforts in other neighborhoods in the Twin Cities Metro Area.

The effort has four key objectives:

- To identify community values, attitudes, knowledge, and behaviors related to protecting environmental assets and resources;
- To identify barriers and motivators to participation in pro-environmental behaviors, in particular, participation in the Blooming Boulevards Project;
- To explore community's perceived benefit of the Blooming Boulevards Project and track change in perception through implementation of the Project; and
- To identify the network of influence initiated by the Blooming Boulevards Project.

Evaluation and qualitative research overview

Evaluation is systematic program assessment to address questions about operations and results. Using social science methods, evaluation can offer insight into motivations and constraints of program participants and non-participants, suggest opportunities to increase effectiveness of program delivery, and provide recommendations for adjustments to help meet overall program goals.

Qualitative research is appropriate for the capture of deep stories on a range of perspectives. The goal of qualitative analysis is not to statistically represent the beliefs of a broad community population. Study findings will represent the beliefs and opinions of the study participants, who have different backgrounds, experiences, and connections to community and water. While study findings should not be generalized, the study provides important insight and lessons about community members and community engagement. Findings can support the development of further research, highlight gaps in current approaches to Metro Blooms programing, and highlight the voices of community members regarding natural resource and community issues.

Data collection

Matrix activity

Decision-making matrix approach is intended to provide a structure for community members to discuss and prioritize local environmental actions to support community-based implementation. The area of focus for this activity was "Creating a Resilient Yard". Participants were given 10 action items with the potential to create a more resilient yard. The items were:

A. Plant native plants and shrubs
B. Create a rain garden
C. Plant pollinator friendly plants
D. Talk to friends and neighbors about your actions
E. Keep up to date on changing climate and weather
F. Get involved in community decision making
G. Install permeable pavers/pavement
H. Encourage others to create resilient yards
I. Involve youth in creation of resilient spaces
J. Support organizations working to create resilient communities

Participants were asked to complete the following two tasks, in order-

1. For each action, use the corresponding letter to indicate on the grid how difficult to implement *and* how much impact it could have.

2. After you have completed the grid, prioritize the actions (1-highest priority, 10- lowest priority) by placing a number 1-10 on the line next to the action.

Interviews and "open house" sessions

Over the course of a series of community events, participants were invited to offer input via direct interview or an "open house" style response format. Both methods were intended to gather rich, meaningful information on participants' community values, priorities, and perspectives on their natural environment to inform future Metro Blooms programming and survey instrument development, actively engage community participants in the data collection process, and promote relationship development and reciprocal learning among community participants.

Facilitators managed a process to ask participants a series of questions about community values, needs, and priorities. These questions were either directly through a semi-formal group

interview or posed as an opportunity to respond to questions left on a flip chart sheet during a community event.

Findings

Matrix activities

The results of the matrix activity are as follows:

Overall impressions [7 respondents]

- Planting native plants and shrubs was generally perceived to be the lowest difficulty/highest impact action
- Planting pollinator friendly plants and talking to friends and neighbors were also generally perceived to be of lowest difficulty, but with mixed levels of impact
- 4 out of 7 respondents considered creating a rain garden and installing permeable pavers/pavement to be of highest difficulty, but also of medium to high impact

Averaged priority scores [6 respondents]

Highest priority to lowest priority

- A – Plant native plants and shrubs (2.7)
- C – Plant pollinator friendly plants (2.8)
- B – Create a rain garden (4.2)
- J – Support organizations working to create resilient yards (5)
- D – Talk to friends and neighbors about your actions (6)
- E – Keep up to date on changing climate and weather (6)
- F – Get involved in community decision-making (6)
- I – Involve youth in creation of resilient spaces (6.2)
- H – Encourage others to create resilient yards (6.5)
- G – Install permeable pavers/pavement (8.3)

Interviews and open ended questions

Theme tables offer a snapshot of the range of perspectives included in participant responses. Findings from the interviews and flip chart exercises are summarized below. The left column "Topic area" identifies the subject or issue of interest. Questions used to identify topic areas included:

- "*What makes you feel proud about your community?"*
- *"When you think about the future of your community, what is your top priority?"*
- *"What concerns you about the environment in your community?"*

- *"What would you change about the environment in your community if you had the opportunity?"*
- *"What motivates you to keep your community clean and be boulevard captain?"*

Responses to these questions were clumped into themes. The middle column, "theme" identities the over-arching groups of responses. The final column, "sub-theme", notes the more specific nuance within each theme group. In some cases, more specific sub-themes were not identified and the sub-theme column was remains blank for the theme group.

As an example, for the topic area of community pride, participants noted items related to location commonly. In turn, location was noted as a theme. The specifics of location as a source of pride (close to parks, close to downtown, etc.) are noted as sub-themes.

Theme Table

Topic area	Theme	Sub-theme
Areas of community pride	Sense of community	Connections between neighbors
		Small community
		Friendly relationships
		Not pretentious
	Diversity	
	Active involvement	Representation at HNA
		Involvement in block clubs
		Local investment
	Location	Close to parks
		Close to downtown
		Centrally located
		Transportation options and related development
	Resiliency	Anything can happen and they bounce back
		Strong community
		Stable community
		New families moving in
Community Priorities	Economic opportunities	Glenwood development planning
		Business development (filling vacant shops)
		Internship opportunities
		Livable wages
		Increasing property values
		Landlord buy-in to community investment
		New bus and LRT

	Increased transportation opportunities	More connected bike lanes
		Walkability improvements
	Aesthetic improvements	Changes to yards
		Picking on trash and litter
		Limiting erosion of hillsides on to sidewalks
	Increasing community connections	
Community Concerns	Resident longevity and community commitment	Rental upkeep/Absentee landlords
		Gentrification
		Home ownership rates
		Affordability/Increased property values
	Safety	Walkability/sidewalks
		Crime
	Environmental impacts	Paper plant pollution to Bassett Creek
		Soil contamination
		River pollution
		Garbage burner air pollution
		Erosion and runoff
		Trash and litter management
		Invasive species
Community environmental priorities	Housing stabilization	Increased homeownership
		People of color in rentals/apartments
		Minneapolis Public Housing landscaping, home improvements
		Landlord relations
		Better kept rentals
		Affordability – income cap on who can buy PRG houses
	Improved land use practices	Eco/bee friendly landscaping
		More community gardens
		Parks oriented towards community and youth engagement
Motivations to keep the community clean	Commitment to health and wellbeing	
	Community connection	Family
		Neighbors
		Friendships

Use of qualitative data analysis results

An initial primary use of findings from the qualitative data collection was to inform the development of a quantitative survey tool. The survey will be appropriate to glean generalizable and broad neighborhood level perspectives. It is important, however, that the survey resonates with the community. Integrating qualitative results should help produce that result.

For example, there was an interest in including questions in the survey about community values and priorities. The selection of answer to the question were taken directly from qualitative findings:

What do you value the most about the Harrison Neighborhood? *(Check one)*

[ ] Sense of community connection
[ ] Diversity
[ ] Active and involved citizens
[ ] Location near other amenities
[ ] Strength and resiliency, ability to bounce back
[ ] I don't know
[ ] Other (please specify): _____

Metro Blooms may additionally choose to use the qualitative findings independent of the survey results. For example, family, friends and neighbors emerged as important motivators for participation in environmental initiatives. In turn, Metro Blooms may find benefits to highlighting opportunities for social connections as part of their programing. Further, economic and housing stability appeared as a theme across qualitative research participants. This could be used to justify increased partnerships with other community organizations or to further explore the economic benefits of Metro Blooms' programming.

Metro Blooms
Grow. Bloom. Inspire!

June 1, 2017

Dear Harrison Neighborhood Resident,

As many of you know, Metro Blooms is a local organization that engages with neighborhoods across the metro on a range of issues, including the environment, gardening, water protection, youth development, economic opportunity, and community engagement. "**Blooming Boulevards**" is a **Northside Neighborhood Engagement & Opportunities in Clean Water Initiative** (metroblooms.org/boulevards)**.**

Community partners are working collaboratively with Metro Blooms to achieve clean water goals and respond to environmental threats to the urban forest in Harrison posed by the Emerald Ash Borer. We are doing this through environmentally friendly landscaping projects and are stimulating the local economy by employing local youth and contractors.

In order to better understand Harrison residents' thoughts and opinions around the Blooming Boulevards project, Metro Blooms will be sending you a survey in the mail in approximately one week. This survey will take about ten minutes to fill out, and free postage for mailing in your responses will be included. By completing the survey, you will be providing extremely valuable input that will help to guide program decisions and, ultimately, create a stronger and more resilient and healthy neighborhood for all.

Online survey option

If you would prefer to take the survey online instead of completing the mail version, please follow this link to access the survey: **https://www.surveymonkey.com/r/bloomingboulevards**

If you complete the online survey by June 15th, would like to ensure that you do not receive a mail survey, and are comfortable attaching your responses to information that could identify you, you are encouraged to enter your home address in the space provided at the end of the online version.

Survey follow-up & drawing registration

Your participation in this survey is entirely voluntary. We assure you that your responses will be kept entirely confidential and secure. The results will be released only as summaries so that individual responses cannot be identified. We ask that the survey be completed by the person in your home that makes most of the decisions, and is at least 18 years old. As a thank-you for your participation, households that complete the survey will be registered for a drawing to win a free rain barrel with installation from Metro Blooms!

If you have any questions about this survey, please contact Kim Carpenter (kim@metroblooms.org).

Thank you in advance for your help, and best regards!

Becky Rice

Becky Rice, Executive Director, Metro Blooms

Metro Blooms
PO Box 17099, Minneapolis, MN 55417
Phone: 651-699-2426
www.metroblooms.org

Harrison Neighborhood Survey

Conducted by Metro Blooms

Thank you for taking the time to participate in this survey about your community!

Metro Blooms is a non-profit organization in Minneapolis with the mission to promote and celebrate gardening, to beautify our communities and help heal and protect the environment. We are working in the Harrison neighborhood and want to learn more about how you feel about Harrison, water, and the environment. We assure you that your responses will be kept entirely confidential and secure. The results will be released only as summaries; individual responses will not be identified. We ask that the survey be completed by the person in your home that makes most of the lawn and yard care decisions and is at least 18 years old.

By completing this survey, you have the opportunity to win a free rain barrel with installation from Metro Blooms. If you'd like to enter the rain barrel drawing, please provide your contact information at the end of the survey.

Section 1 – The Harrison Neighborhood

Please share your thoughts on the Harrison Neighborhood. Learning more about the area will help us better design programs that are a good fit.

What do you value the most about the Harrison Neighborhood? *(Check one)*

[ ] Sense of community connection
[ ] Diversity
[ ] Active and involved citizens
[ ] Location
[ ] Strength and resiliency, ability to bounce back
[ ] I don't know
[ ] Other (please specify): _____

How important are the following qualities of <u>a neighborhood</u> to you? *(Circle one number in each row.)*

	Very unimportant	Somewhat unimportant	Somewhat important	Very important
Privacy and respect of property	1	2	3	4
Social interaction/Good relationships among neighbors	1	2	3	4
Access to public transportation	1	2	3	4
Economic and employment opportunities (livable wages)	1	2	3	4
Opportunities for youth to gain professional skills and be involved in the neighborhood	1	2	3	4
Promotes active/healthy living, recreation and leisure	1	2	3	4
Opportunities for meaningful involvement in decisions that affect me/my property	1	2	3	4

Opportunities to serve in leadership roles	1	2	3	4
A welcoming place for people of all backgrounds and perspectives	1	2	3	4
Access to basic services (e.g., health care, transportation, healthy food)	1	2	3	4
Safety and low crime	1	2	3	4
Trees	1	2	3	4
Clean streams and rivers	1	2	3	4

Which, if any, of the following environmental concerns do you have regarding your neighborhood? *(Check all that apply)*

[ ] Litter and trash
[ ] Loss of tree canopy due to Emerald Ash Borer
[ ] Air pollution
[ ] Access to green space or open space
[ ] Access to public transportation
[ ] Climate change and extreme weather impacts
[ ] Soil contamination and other impacts from historical industrial land uses

What types of activities would you suggest to bring the community together?

_____

_____

_____

Section 2 – Water and the environment

Please share your thoughts on water and the environment in the Harrison Neighborhood. For this survey we are most interested in hearing your thoughts on surface water resources like streams, lakes, rivers, and wetlands, (rather than drinking water or ground water). Learning more about this will help us target resources and assistance.

How concerned are you about the surface water quality in the Harrison Neighborhood?

[ ] Not at all concerned [ ] I'm a little concerned [ ] I'm fairly concerned [ ] I'm very concerned

Which of the following do you think is the primary source of pollution to surface water in your neighborhood?

[ ] Industrial pollution
[ ] Stormwater pollution: Yard/street runoff that carries nutrients and pollutants (e.g. salt, sand, pet waste, fertilizer, grass clippings, trash) to water resources
[ ] Air pollution (e.g. acid rain, mercury)
[ ] Pollution from people using the lake (e.g. sunscreen, trash)
[ ] I don't know
[ ] Other (please specify):_____

Which, if any, of the following concerns do you have regarding surface water resources (Bassett Creek, Mississippi River, Wirth Lake) in your neighborhood? *(Check all that apply)*

[ ] Negative impacts on fish and aquatic life
[ ] Harmful bacteria and fungi
[ ] Smell and looking bad
[ ] Impacts to recreational uses
[ ] I have no concerns
[ ] I don't know
[ ] Other (please specify): _____

How much do you agree/disagree with the following statement: My yard care activities have an impact on water quality

[ ] I do not agree at all [ ] I do not agree much [ ] I somewhat agree [ ] I completely agree

Who should be responsible for maintaining clean water in your neighborhood? *(Check all that apply)*

[ ] Neighborhood residents
[ ] Local businesses
[ ] Environmental non-profits
[ ] City of Minneapolis
[ ] State government
[ ] Watershed District/Watershed Management Organization
[ ] I don't know
[ ] Other (please specify):_____

Who do you trust as a source of environmental and water information in your community? *(Check all that apply)*

[ ] My neighborhood association
[ ] City staff person
[ ] Environmental non-profit
[ ] University of Minnesota Extension Office
[ ] State Government (Depart of Natural Resources, Minnesota Pollution Control Agency)
[ ] Watershed District/Management Organization
[ ] Federal government agency
[ ] My friends and family
[ ] My neighbors
[ ] Other (please specify): _____

Section 3 – About you

Please tell us about you and your household. Providing this information will help us understand what people are willing to do, who we are hearing from in Harrison and who we still need to reach.

What language(s) do you speak at home? _____

Approximately how many years have you lived in the Harrison neighborhood? _____ year(s)

What year were you born? _____ year [ ] Prefer not to respond

Which, if any, of the following do you practice on your property? *(Check all that apply)*

[ ] I limit use of fertilizers
[ ] I limit use of salt or de-icer during the winter
[ ] I pick up and dispose of pet waste
[ ] I sweep up grass clippings and leaves out of the street
[ ] I have a raingarden (a water-friendly garden that allows slow absorption of rain in to the ground)
[ ] My downspouts lead to grass or a garden (rather than the street, sidewalk, or alley)
[ ] I use a rain barrel
[ ] I have permeable pavement (special pavers that allow slow absorption of rain in to the ground)
[ ] Other (please specify): _____

What most prevents you from taking action or additional action to protect clean water? *(Check one)*

[ ] It's not important to me
[ ] It's not convenient
[ ] I don't have the time
[ ] Too expensive
[ ] My actions won't make a difference
[ ] I don't know what to do
[ ] I have physical limitations
[ ] Nothing prevents me from taking action
[ ] Other (please specify):_____

Which, if any, would you be willing to add to your yard care routine? *(Check all that apply)*

[ ] Fertilize less frequently
[ ] Use less salt and sand on my sidewalk and driveway
[ ] Pick up and dispose of pet waste every day
[ ] Sweep up grass clippings and leaves out of the street
[ ] Install and maintain a Blooming Boulevard or raingarden (a water-friendly garden that allows slow absorption of rain and snowmelt in to the ground)
[ ] Direct downspouts towards a garden or grass (rather than the street, sidewalk, or alley)
[ ] Set up a rain barrel
[ ] Install permeable pavement (special pavers that allow slow absorption of rain in to the ground)
[ ] None of the above

What would help you to take action on your property to protect clean water? *(Check all that apply)*

[ ] On-site help from a landscape professional
[ ] Learning more by attending a workshop
[ ] Online resources
[ ] Funds to help offset costs
[ ] Help with installation
[ ] I'm not interested
[ ] Other (please specify): _____

What is your housing arrangement? (*Please check one.*)

[ ] I own my own home
[ ] I rent
[ ] I am the landlord
[ ] I am sharing housing with others
[ ] Other (please specify): _____

Who makes decisions about the property where you live? *(Please check one.)*

[ ] I make the decisions.
[ ] A family member makes the decisions.
[ ] A family member and I make decisions together.
[ ] I leave it up to my renter.
[ ] I leave it up to the landowner/property owner.
[ ] I work together with the renter/landowner to make the decisions.
[ ] Some decisions are up to me; others are up to the property owner.
[ ] Other (please specify): _____

How do you prefer to receive information about activities and projects in your community? *(Check all that apply)*

[ ] Through social media (please specify):
[ ] Local newspaper
[ ] Neighborhood newsletter
[ ] By mail
[ ] Through email
[ ] In person (at events, workshops, etc.)
[ ] By visiting a website (please specify which ones): _____
[ ] Other (please specify):_____

What is your gender identity?

[ ] Male [ ] Female [ ] Transgender [ ] Gender non-conforming [ ] Another identity

[ ] Prefer not to respond

What is the highest level of formal education you have completed? (*Check one.*)

[ ] Some high school
[ ] Completed high school
[ ] Some college but no degree
[ ] Associate degree or vocational degree
[ ] College bachelor's degree
[ ] Some graduate work
[ ] Completed graduate degree (masters or Ph.D.)
[ ] Prefer not to respond

Which categories best describe you? (*Please check all that apply.)*

[ ] White
[ ] Hispanic, Latino, or Spanish heritage
[ ] Black or African American
[ ] Asian
[ ] American Indian or Alaska Native
[ ] Middle Eastern or North African
[ ] Native Hawaiian or Other Pacific Islander
[ ] Some other race, ethnicity or heritage (Please specify):
_____

Which of the following best describes your total household income? *(Please check one.)*

[ ] Under $10,000
[ ] $10,000 - $24,999
[ ] $25,000 - $34,999
[ ] $35,000 - $49,999
[ ] $50,000 - $74,999
[ ] $75,000 - $99,999
[ ] $100,000 - $149,999
[ ] $150,000 or more
[ ] Prefer not to respond

Optional: If you would like to be entered into a drawing to win a free rain barrel with installation from Metro Blooms, please provide your contact information below.

Email:

Or

Home Address:

Optional: Metro Blooms is working in your neighborhood to improve water quality and create pollinator habitat. If you would be interested in participating in a Blooming Boulevard project with Metro Blooms and your neighbors, provide your contact information below. If you already provided your contact information for the drawing above, please check the box below instead.

☐

Email:

Or

Home Address:

Thank you for taking the time to participate in the survey!

Once the survey is complete, please fold it in thirds, and mail it back in the enclosed addressed and stamped envelope.

If you have questions, please contact Metro Blooms at 651-699-2426 or kim@metroblooms.org

Appendix B

Sustainable Landcare Guide
2018

Sustainable Landcare Guide

Sustainable Landcare Guide
Weed Identification

Developed by
Metro Blooms & Blue Thumb

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A special thank you to our sponsors for their spupport:
Bassett Creek Watershed Management Commission
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Table of Contents

Introduction

This guide will introduce you to Vegetative Stormwater Best Management Practices and the necessary maintenance to keep them functioning properly.

Section One: What is Being Done to Manage Stormwater on this Site?
You will learn to evaluate stormwater management on a site, identify what is being done to treat stormwater, and why, and make an initial assessment of how it is functioning.

Section Two: Observe the Site
You will need to look for patterns and develop a working diagram to begin your evaluation.

Section Three: Understanding Weed ID Resources
This guide has its own weed ID guide, but it does not cover every weed. Knowing what resources are available to you is crucial for complete weed identification.

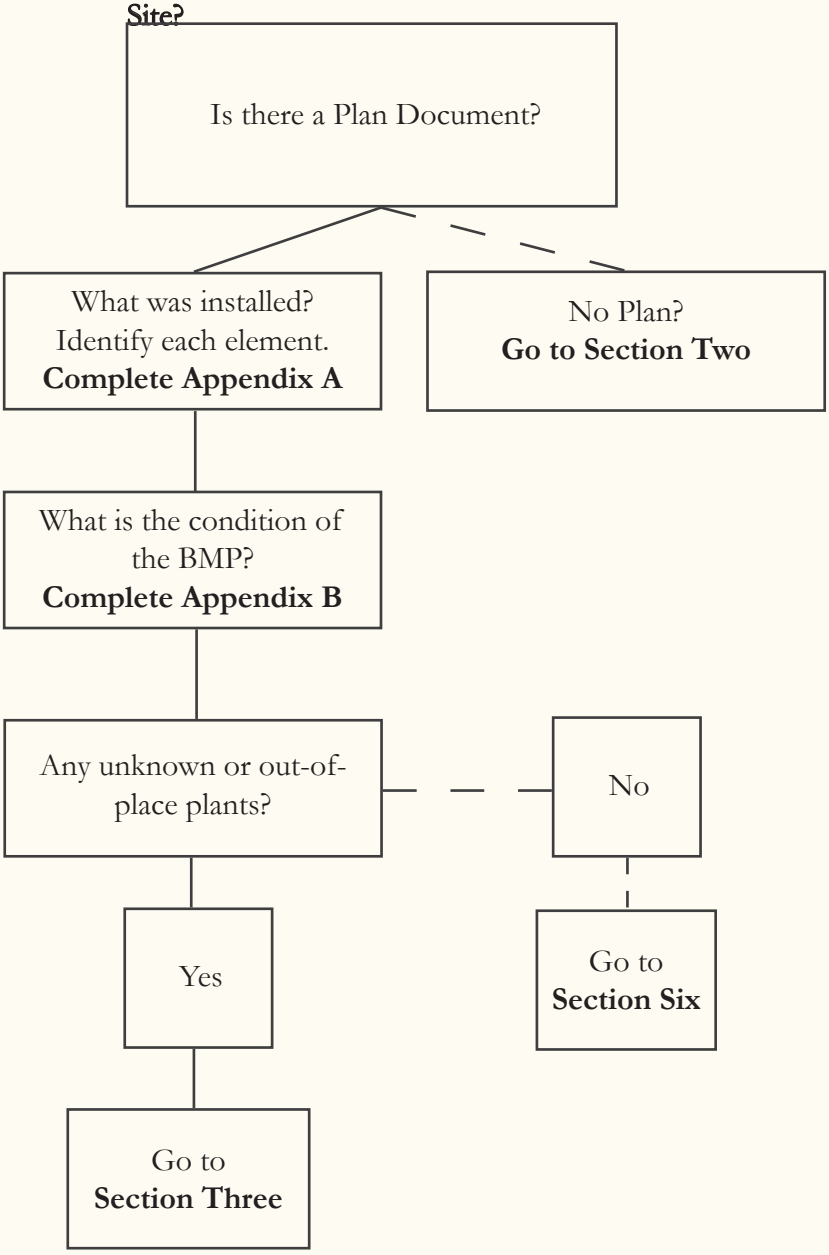
Section Four: Learning Weed Identification
Weed identification takes patience and perseverance. Although weed ID is a skill developed over a lifetime, this section will give you the information you need to be get started successfully, including weed morphology, terms and recommended removal methods.

Section Five: Weed ID in the Field
This section will help you practice identifying common weeds using plant identification "keys".

Section Six: Determining Maintenance Regimen and Documenting Work
Here you will find detailed explanations of the weed removal methods and weeding tools recommended in **Section Four**.

Section One

What is Being Done to Manage Stormwater on this Site?



Section Two
Observe the Site

Getting Started

These steps will guide you toward identifying weeds.

1) Review your plan to **identify** site structural elements (**Appendix A**).
2) Identify patterns in the planting.
3) Recognize weeds:

- **ID trees** and **shrubs** starting with **leaf shapes** and **arrangements.**
- **ID grasses** and **sedges** next by starting with the **stem shapes, growth form and seed heads.**
- **ID forbs** last by observing **the growth form, leaves and flower color.**

Section Two
Observe the Site

Take measurements and draw a plan diagram.
Complete Appendix C

What are the structural elements? Identify and label them on the plan diagram.
Complete Appendix A

What is the condition of the BMP?
Complete Appendix B

Are there recognizable patterns in the planting? Assess and determine the intended style.

Identify all weeds.
Go to Section Three

Section Two
Looking for Patterns

Look at the project site to see if there are recognizable patterns in the planting.

Make the most of plant ID resources including the Blue Thumb website, guidebooks and experts that can help you learn weeds.

Identify trees and shrubs first, as they tend to be easier than other weeds to identify. Do they have opposite or alternate leaves? What are the leaf shapes?

Identify grasses (round stems) or sedges (triangular stems) next by observing their growth form and seed heads.

Identify flowers (forbs), by looking at their growth form, leaves and flower color.

Section Two
Looking for Patterns

Common Planting Design Patterns

Many projects are designed with patterns. Look for these patterns during site visits. Design patterns will guide weed removal efforts.

1. Plant Masses:

- Individual species planted in groups for aesthetic reasons and to make it easier to ID weeds that are establishing in the planting.
  PLANTING AREA: small gardens and raingardens

2. Linear Plantings:

- Individual species planted in rows; most common on edges where low-growing species were planted to help define the edge.
  PLANTING AREA: small - moderate

3. Grass Matrix:

- Large plantings tend to have less order and are often planted with seed. Grass and sedge seed mixes are often used as overall base for the planting.
  PLANTING AREA: large

4. Random Plantings:

- Very large sites are often planted with seed. They have a natural prairie appearance and there is no specific order to the planting.
  PLANTING AREA: very large

Section Two
Looking for Patterns

Why Weeds Show up in Plantings

Common Reasons:

1. **Weed seeds in the soil -** Large numbers of weed seeds may be in the soil just waiting for their chance to germinate. As soon as the garden is dug out and the seeds are exposed, they start to germinate.
2. **Plant roots in the soil or spreading from surrounding areas -** Just like weed seeds, weed roots may regrow once the soil is dug up or tilled, or they may spread into the garden from surrounding soil.
3. **Weed seeds in compost or mulch -** High-quality compost and mulch should have few weed seeds in it. If it hasn't been produced carefully, it may contain weed seeds that can be brought into your garden.
4. **Seed rain from surrounding plants -** Weed seeds can blow into gardens from nearby areas, or wash into gardens in stormwater runoff.
5. **Transport by animals -** Animals, most often birds, can also drop unwanted seeds in gardens.

Yard overrun with weeds

Section Two
Looking for Patterns

Where Weeds Are Likely to Establish

Weeds tend to show up first where bare soil is present, where mulch is thin or missing, or along the edges or inlets where water drains into gardens.

When Weeds Start to Appear

Weeds can show up at any stage of a project. For raingardens, if good site preparation is done and wood mulch is placed over the ground surface after planting, there should not be many weeds establishing for a year. As the wood mulch breaks down, more weeds will start establishing from the soil or from weed seeds or roots coming in from surrounding areas.

Section Three
Understand Weed Identification Resources

Section Four of this guide includes basic plant morphology and a plant identification key for some of the most common weeds found in Minnesota.

There are additional sources of information to help you ID and remove weeds. See Appendix E.

Other Guide Books:

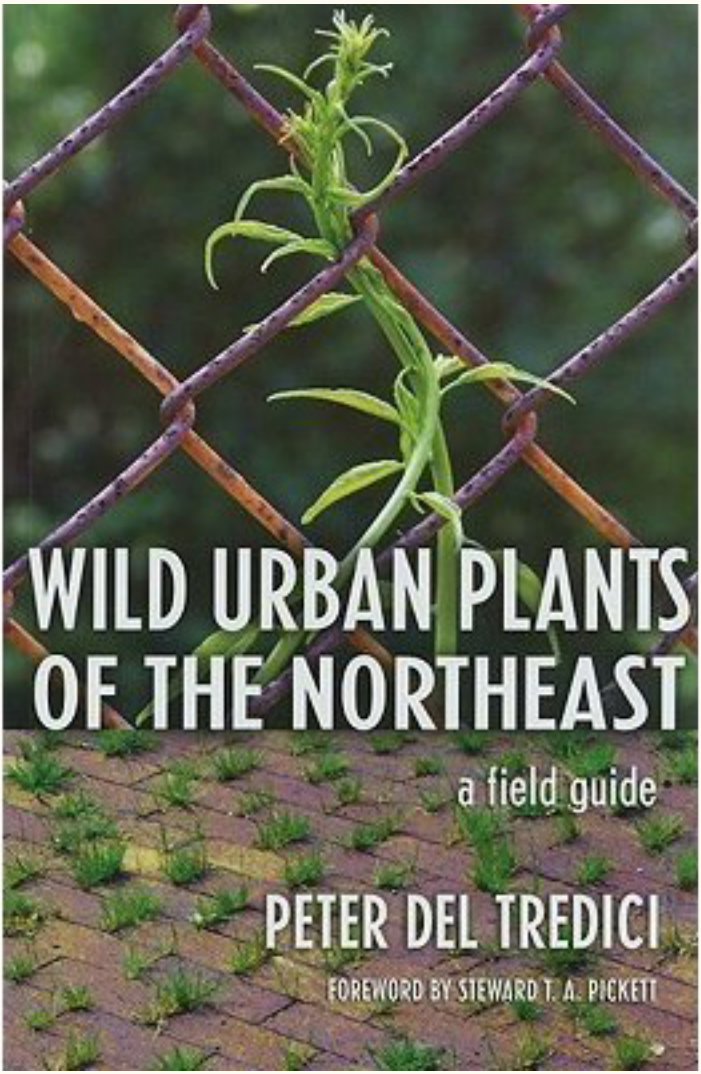
Wild Urban Plants of the Northeast: A Field Guide includes the **major weeds** that will be found in urbanized areas.

The Lake Phalen Shoreland Restoration Walking Tour and Plant Guide includes the major native plants that will be found in raingardens and shoreline plantings.

Online Resources:

https://www.minnesotawildflowers.info/
http://www.extension.umn.edu/garden/yard-garden/weeds/
https://www.forestryimages.org/
http://www.blue-thumb.org/plants/
http://oak.ppws.vt.edu/~flessner/weedguide/
http://www.bwsr.state.mn.us/wetlands/plantid/
https://www.dnr.state.mn.us/invasives/index.html

Section Three
Understand Weed Identification Resources



One of many helpful plant identification books.

Section Four
Learning Weed Identification

To become proficient at identifying weeds, follow these steps:

Start by understanding general concepts, basics of botany and weed morphology. Then practice optional learning activities in **Appendix D** to gain familiarity with weed terms. Next, apply the field guide principles on the site where you are working. Ultimately, test weed identification skills on a large scale.

Vegetation Type

Grass

Jointed, hollow stems, narrow leaf blades and leaf sheaths.

Sedge

Gass-like but triangular, quite solid stems, no leaf sheaths. Grows in wet areas.

Rush

Round, solid, tubular stems with few leaves. Grows in wet zones.

Forb

Broad-leaf fowering plants that are not woody. Commonly referred to as flowers.

Fern

Flowerless plant with feathery or leafy fronds. Uses spores for reproduction. Grows in shady, woodland areas.

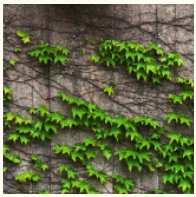
Tree

Woody plant with one or a few stems. Can grow above ten feet high.

Shrub

Woody plant with a few to many stems. Usually grow less than ten feet high.

Vine



Both woody and non-woody plants. They climb on other structures or plants for support.

Complete Appendix D:
"Sharp Eyes"

What are the basics of botany and weed anatomy?
Complete Appendix D:
"Defining and Finding Plant Anatomy Terms"

Practice observing plants and gain familiarity with plant terms.
Complete Appendix D:
"Learning from Observation"

Put your new skills and field guide to work.
Complete Appendix D:
"Using the Plant ID Key"

Test your skills on a larger scale.
Go to Section Five

Section Four

Basics of Botany and Plant Morphology

Definitions: Weeds are plants that are not planted intentionally or are unwanted in their location.

1. Types of Herbaceous Plants

Annual

Completes life cycle and dies in one year.

Biennial

Commonly forms basal leaves the first year and then dies the second year after it sends up flowers.

Perennial

Lasts many growing seasons.

2. Woody vs. Herbaceous Plants / 3. Compound vs. Simple Leaves

Hard tissue

Don't die back to the ground each winter.

Soft tissue

Compound

Group of leaves above a bud on the stem.

Simple

A bud at the base of each leaf.

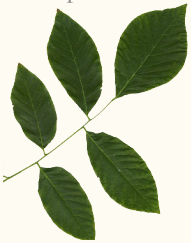
4. Leaf Arrangements

Basal

Basal leaves extend out of the ground. They grow out from the base of the plant.

Alternate

Alternate leaves are arranged back and forth on alternate sides up the stem.

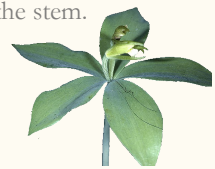


Opposite

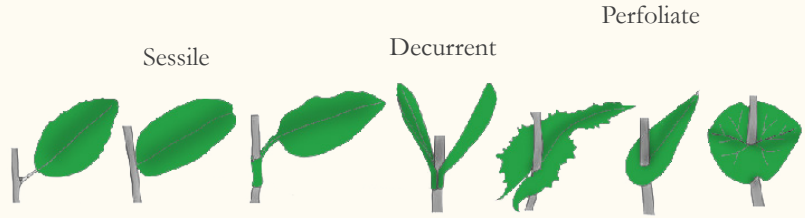
Opposite leaves are located directly opposite each other along the stem.

Whorled

Whorled leaves grow in groupings (extending from one node) up the stem.



5. Leaf Attachments to Stems



6. Root Structures

Tap root
One main central root.

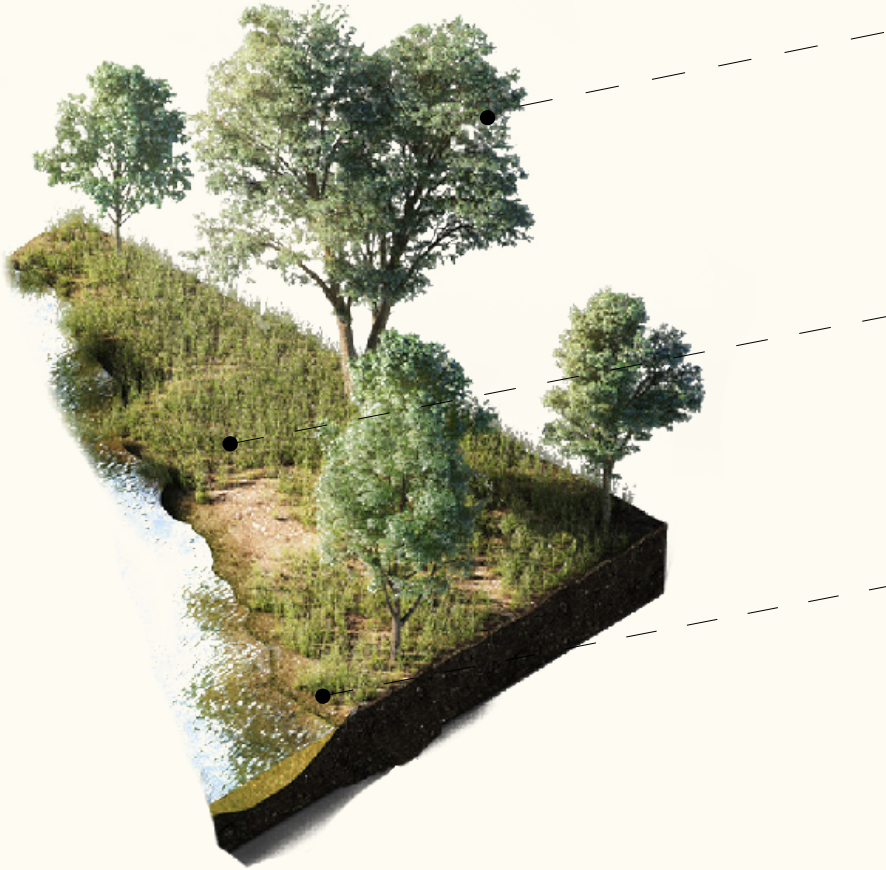
Fibrous root
Many fine roots.

Roots spread laterally underground and produce new shoots at nodes.

Rhizomes

7. Inflorescence Shapes

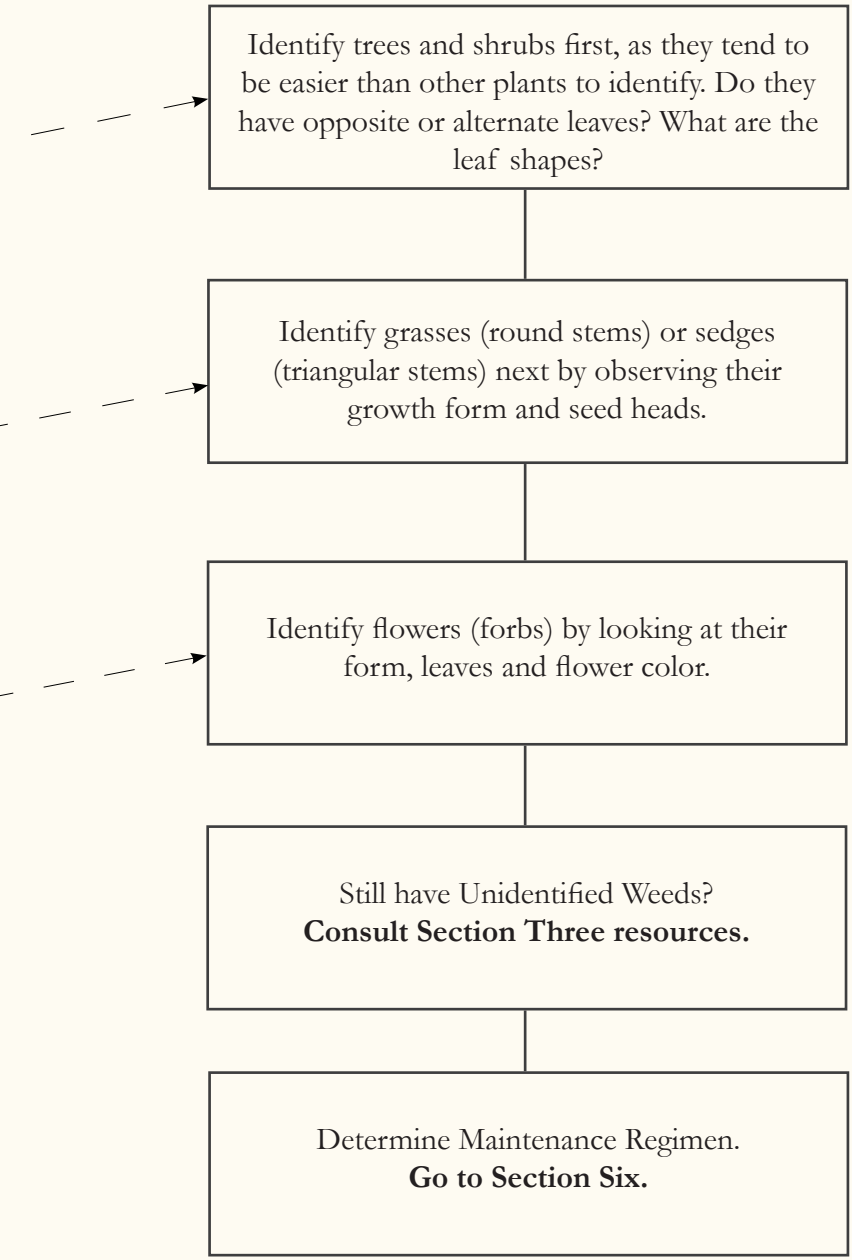
Section Five
Steps to ID Weeds in the Field



Practice Optional Learning Activity in Appendix E

Section Five

Steps to ID Weeds in the Field



Section Six

Determining Maintenance Regimen and Documenting Work

Introduction to Maintenance Regimen

This section describes methods to control the most common weeds that may take root in your garden. With routine care, the weeds will be easier to control and the garden will remain attractive. Refer to the plant key to identify the weeds in the garden. Protect the desirable plants and eliminate the weeds following the maintenance steps.

The important final step to caring for a project is to document the work that was completed, including the weeds that were controlled, the methods used and any other maintenance activities that were conducted such as sediment removal or adjustments to the inlets or outlets of the raingarden. It is also helpful to make notes about what other maintenance activities may be needed for future dates that have been scheduled for weed management.

Section Six

Determining Maintenance Regimen and Documenting Work

1. Discuss the planting with people that are familiar with its design and past management.

2. Identify intentional plants and unwanted weeds.

3. Identify weeds that are the highest priority for control, based on catching problem plants before they mature to disperse viable seed. This can be surprisingly fast for annuals and biennials.

4. Develop a schedule for management.

5. Plan your removal methods based on your target weeds.

6. Determine how to dispose of weeds.

7. Gather tools and health and safety gear.

8. Start removal of target weeds followed by lower priority weeds.

Section Six
Determining Maintenance Regimen and Documenting Work

Weed Control Basics

Why worry about weeds? First, weeds can make gardens look unattractive. In addition, they can harm the health of the desirable plants by crowding, shading, or growing over them, and by using up nutrients in the soil.


Well-Maintained Garden


Garden Overrun with Weeds

Weeds come in all plant types. Each weed has effective strategies to outcompete neighboring plants, making the weeds difficult to control. For example:

- Deep tap roots that will allow the plant to grow back even if most of the plant is removed.
- Long, spreading roots or rhizomes that can cause new plants to sprout up all along the root system.
- Thick woody roots that can be difficult to pull when the plants are large.
- Vines that wrap around good plants, strangling them and making the vine hard to pull out.
- Many weeds produce lots of seeds, so it is important to cut or remove them before they can be dispersed.

Section Six

Determining Maintenance Regimen and Documenting Work

Weeds tend to grow on disturbed soil; they grow fast and spread quickly, and many put out lots of seeds. Your job is most effective when you know the best time to intervene. The general guidelines in this section will help control most weeds, especially when they are small. Use the information from Sections Three & Four of this field guide to identify the specific weeds and best control methods for each.

Below are typical weed control methods applicable to most gardens and weeds. Overall, keep in mind the four basic keys to controlling weeds:

- Remove them early while they are small.
- Weed on a regular schedule until the desirable plants fill in the spaces in the garden.
- Keep bare soil covered with mulch until the desirable plants fill in the spaces in the garden.
- Remember that it is much easier to do light weeding every 2–4 weeks rather than a heavy weeding once a year. In the long run, it is more effective and takes less time.

Seeding vs. Adult Plant

Siberian Elm Seeding

Siberian Elm

Which weed would you rather pull?

Section Six
Determining Maintenance Regimen and Documenting Work

Removal Methods

Weeds can be pulled, dug or cut out of the ground. These steps are effective early in the growing season or by capturing them before they can set seed. Sometimes larger weeds, especially woody trees and shrubs, need to be cut off and the stump treated with an herbicide to kill the roots that are left in the ground. If you are working in gardens that are maintained on a regular basis, you will only need the simpler methods. See the following for details.

Hoeing and Cutting Small Weeds

A simple weeding method in gardens that only have small, young weeds (say, 2–3 inches tall) is to cut them off using a hoe or similar scraping tool. Hoes come in many styles: long-handle or hand-held, some you push, some you pull. All contain a narrow blade that scrapes and cuts off weeds at the surface of the soil.

Hoeing only works when you weed the garden on a regular schedule and continue to remove new weeds on a weekly basis. When hoeing, make sure to stay away from the desirable plants, and then cover up bare soil with mulch to help prevent new weeds from sprouting in the disturbed soil.

The mattock is similar to a hoe, but has a much heavier blade. It is not used for routine weeding, but is sometimes used to break up hard soil or help clear an area that is overgrown with weeds.


Long-handled Hoe


Mattock


Hand Draw Hoe

Dig Them Out - Way Out!

If weeds are larger than a few inches tall or wide, it is often necessary to pull or dig them out to make sure the roots come out with the weeds. Dandelions and thistle plants, for example, have a long tap root (a root shaped like a carrot). If you just cut or break them off at the surface, they will grow back from the root left in the ground.

If the soil is soft (sandy or damp), small weeds can be pulled by hand, using a trowel or small shovel to dig or pry out larger weeds. Shake the dirt off the roots and toss the weeds out of the garden. For weeds with a long tap root, pry them out using a dandelion popper (like the one in the photo) or a soil knife. Push it about 6 inches deep into the soil right next to the weed and then pry out the root. A tilling fork is useful to work into the soil; lift gently to pull weed and then push soil back down.


Trowel


Dandelion Popper


Soil knife


Shovels

Weeds with deep roots or woody stems (thistle, burdock, and trees and shrubs such as buckthorn or honeysuckle) can be pulled out with larger tools that have a long handle with a clamp and a pry bar on the bottom. You clamp around the base of the trunk and pry the plant out of the ground by pulling down on the handle. Many such products are on the market with fun names like Up-rooter, Extractigator, Puller Bear, Root Talon, Weed Wrench, etc. It is better to check sites regularly for small seedlings than to wait. But if you miss one, these tools are essential.

Section Six

Determining Maintenance Regimen and Documenting Work

Whenever digging or pulling weeds out of a garden, remember a few points:

- Remove the weeds, seed heads, berries, and roots from the garden.
- Fill in any holes left after digging.
- Cover the bare area with mulch to keep new weeds from quickly growing back into the disturbed soil.
- Properly dispose of the weeds.
- Be careful to minimize damage to neighboring desirable plants.

Image by Goodhue County Extension Master Gardeners

Note: Whenever using digging, chopping, and cutting tools, wear gloves to protect your hands and prevent blisters.

When to Use Herbicides - Cutting and Treating Woody Plants

Herbicides are your very last option for weed control. Use rarely, in small amounts and locations, and only if staff have been trained in the safe use of chemicals. Herbicides can kill desirable plants and will harm animals and people if not used correctly. While raingardens, bioretention gardens, and bioswales are made to collect and fill up with rainwater, runoff is directed to creeks and streams; herbicides sprayed in stormwater management gardens can spread beyond the original site and discharge 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 applications the herbicide amounts used are small and are applied only to the stump of the tree or shrub.

Herbicides should only be used if there is no standing water in the garden, it is dry, and the weather forecast is for dry weather for at least two or three more days after application. Also, there are only a few herbicides, such as Rodeo, Aquamaster, or Glypro, that are approved for use in and around water. Even these cannot be applied when foliage is wet or when a rain event is predicted in the next 48 hours after application.

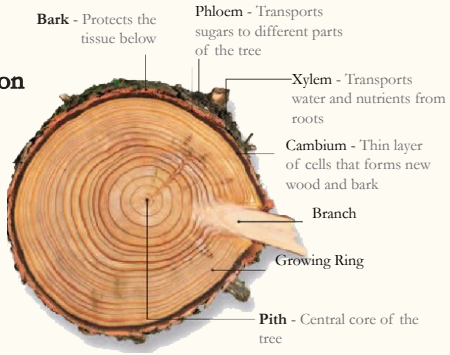
Occasionally, gardens will be invaded by very aggressive weed species that have dense, extensive root systems, such as reed canary grass, quack grass, cattails, or giant reed grass. If they are not controlled early, the invaders can form dense mats that are diffcult to control without herbicides. In this situation, follow the guidelines in **Section Four** if you have been trained in the proper use of herbicides.

Section Six

Determining Maintenance Regimen and Documenting Work

When trees and shrubs are too big to pull or dig out, cut them off 2–3 inches above the ground with loppers or a pruning saw and remove the vegetation from the garden. Make sure to remove berries that may fall off branches. Treat the cut stump with herbicide by applying it with a sponge paint brush or using a small bottle with a drip applicator tip or sponge tip. Apply the herbicide to the part of the trunk called the cambium. This is the outer ring of the trunk just inside the bark. This part of the trunk tissue will move the herbicide down into the roots (the tissue in the center of the trunk does not do that). Apply the herbicide carefully only to the trunk. Avoid dribbling it on the ground or getting it on the leaves of other plants.

Tree tunk cross-section



Stump-treating with herbicides

Use a 15–25% solution of glyphosate in a product that is approved for use near water, such as Redeo, Aquamaster or Glypro. Other herbicides are used for treating cut stumps in dry land areas and may require specialized training beyond the scope of typical maintenance. Often, a dye is added to the herbicide to make it easy to see where it is applied. 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. Other herbicides such as 2-4-D, Dicamba or Garlon can kill plants by moving through the soil to be absorbed by plant roots.

Removal Technique Examples:

1. An effective approach for tree trunks greater than an inch in diameter is to **girdle** the bark all the way around the trunk base, allowing the stem to remain standing until it is dead, usually over one growing season.

2. Use loppers to cut off stems, then treat with a 15% solution of Glyphosate that is brushed onto the stump. This technique uses the smallest amount of herbicide. It is quite effective if you are able to coat the stump soon after cutting, while the stump is still moist with sap.

Section Six
Determining Maintenance Regimen and Documenting Work

Disposal of Cut and Pulled Vegetation

Weeds that are cut or pulled from the garden, plus seed heads or berries that may have fallen off, must be bagged up and removed from the garden site. Some weeds left on the ground can root into the soil and grow back, and seeds can produce new weeds. Composting of weeds may not be sufficient to kill seeds and berries, and different cities' regulations vary on yard waste disposal. Ask for guidance on these waste rules from your local project leader.

Health and Safety Gear

- For general weeding, wear a pair of leather or cotton work gloves to help prevent blisters. Wear leather gloves when using saws, loppers, or cutting tools, working in heavy brush, or removing plants with thorns to protect your hands from cuts.
- Long-sleeved shirts and pants prevent scratches and contact with poisonous plants. Boots protect your feet better than running shoes.
- If using any power tools such as a weed whacker, or working in heavy brush, wear safety glasses or goggles to protect your eyes and ears.
- When working with herbicides, wear nitrile or rubber gloves, long-sleeved shirts, and safety glasses. Remove gloves when done and wash your hands before eating or drinking.
- Apply sunscreen to prevent sunburn, and use bug spray in the summer to limit mosquito and tick bites.

Restoring an Overgrown Garden

What do you do if the garden you are working on is overgrown?

It may not be as bad as it first looks. Try the following steps:

1. Ask the property owner if there is a garden plan that shows where plants were planted.
2. If you don't have a garden plan, you can still figure out which plants to keep by looking at the garden. In this one, all the plants are in big groupings and planted in rectangles – all the red plants are together, and all the sedges are together. After you start seeing the pattern, it is easier to identify plants to keep, and the weeds, using the information in **Sections Two, Three, and Four.**
3. Start with the obvious weeds and see if you can pull them out. It may be easy to pull out many of the weeds.
4. Pull out or cut and treat the weedy trees.
5. Use a hoe or mattock to clear the shorter weeds that are too dense to pull individually.
6. Bag and remove all the weeds, seed heads, and berries.
7. Come back in two weeks and pull weeds or hoe again in the disturbed areas. Then apply new mulch to cover up the bare or disturbed areas.

Appendix

A – *definitions*

Basin - a depression in the surface of the land that holds water.

Best Management Practice (BMP) - one of many different structural or non–structural methods used to treat runoff, including such diverse measures as ponding, street sweeping, filtration through a raingarden and infiltration to a gravel trench.

Bioretention - a soil- and plant-based best management practice (BMP) used to filter runoff.

Buffers - a vegetative setback between development and streams, lakes, and wetlands to physically protect and separate the waste resources from future disturbance or encroachment.

Catch Basin - an inlet to the storm drain system that typically includes a grate or curb inlet.

Cistern - a technique which captures and temporarily stores rooftop runoff at confined sites, gradually releasing it over pervious areas, into the parent soil, for example.

Erosion - the wearing down or washing away of the soil and land surface by the action of water, wind or ice.

Infiltration - flow of water from the land surface into the subsurface.

Impervious Surface - a constructed hard surface that either prevents or slows down the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, gravel roads, or even compacted soil, especially heavy clay.

Appendix

A – *definitions*

Impaired Waters - streams or lakes that do not meet their designated uses because of excess pollutants or identified stressors.

Low-Impact Development (LID) - an approach to stormwater management that emphasizes conservation and mimics a site's natural processes.

Native Vegetation - plants that are adapted to or occur naturally in a specific location.

Permeable Paver - a range of products that enable some fraction of rainfall to be infiltrated into a porous gravel sub-base underneath the pavement. The paved area will support vehicles even when wet.

Rain Barrel - a container used to collect and store rainwater, usually placed below or connected to the downspout of a roof gutter. Collected water is used to water the landscape. Rain barrels are usually much smaller than the volume of water running off rooves, so plan for overflow (using a spout as large as the one carrying water into the barrel), and empty barrels before the next rain.

Raingarden - a landscaping feature planted with native perennial plants that is used to manage stormwater runoff from impervious surfaces such as rooves, sidewalks and parking lots. A raingarden reduces runoff through infiltration,

Appendix

A – *definitions*

Biofilter

Bioretention

Raingarden

Permeable Paver

Appendix
B – *inspections*

Defining Performance Criteria:

A wide variety of techniques are used to help decrease problems from stormwater runoff. These can be easily compromised. Inspection allows easy detection and prompt repair to keep them functioning as designed.

1. Pretreatment: a structure, placed at the inlet of a BMP, which collects and prevents excess sediment and debris from entering the BMP. The pretreatment structure is different at each BMP and can range from a pretreatment chamber to a strip of sod.

- The inspection team evaluates the BMP's pretreatment device. Full, clogged, bypassed, or eroded pretreatment conditions would result in a "Poor" rating. This would indicate a non-functioning pretreatment device that needs "Repair". A "Fair" rating would indicate a need for cleaning of sediment, though the device is still functioning. A "Good" rating would apply to any pretreatment device that has been regularly maintained and requires little to no additional maintenance.

2. Inlet: an inlet where the water enters the BMP. An inlet is different from a pretreatment device and could include the end of an inlet pipe, a rock rip rap opening, a curb cut, pop-up inlet, a dry creek bed and others. The inspection team looks for issues such as erosion, sediment, plugged pipes, and cracked structures of pipe or concrete.

- The site would receive a "Poor" rating if the inlet is not functioning (thereby not allowing the water to enter the BMP), is plugged, needs to be replaced, or is eroding or contributing to erosion. A "Fair" rating would apply if the inlet is functioning but needs maintenance to prevent future failures. A "Good" rating would apply to inlets with minimal or no maintenance required. Sometimes maintenance can be as simple as removing trash or plant debris.

3. Standing Water: Standing water may be required or desired in some sites, but not in others.

- For infiltration BMPs, standing water is an indicator of a non-functioning BMP and would automatically receive a "Poor" rating, requiring "Repair". In this situation, the inspection team would determine if the site is not working (i.e., not infiltrating), or if a constant flow of water entering the garden is not allowing the BMP to dry out. For ponds, sedimentation basins, and other BMPs where standing water is required, an observation of standing water is needed to receive a "Good" rating. In this instance, if the basin is dry, the BMP would not be functioning and would receive a "Poor" rating. The inspection team should check if there is a leak or other issue allowing the water to escape. Repairs to either of these problems are more involved.

4. Side Slopes: Side slopes are part of most basin structures, including grass waterways and other swale systems. The side slopes are important for protecting the basin from the detrimental effects of erosion. The inspection team looks primarily for erosion, gullies or slumping of soils. The severity of the erosion indicates a "Good," "Fair," or "Poor" rating. A "Good" rating has no or insignificant erosion, "Fair" needs minor maintenance and "Poor" requires a major "Repair".

5. Vegetation: Vegetation is the primary element in the most common BMPs such as raingardens and buffers. The inspection team looks at plant health and weed presence. A BMP receives a "Poor" rating if weeds entirely displace the planted species, and if the planted species have perished (possibly due to a lack or surplus of water), requiring a new planting. A "Fair" rating implies the BMP is in need of weeding and/or planting, but would still be considered functional following maintenance. A "Good" rating indicates a BMP that requires very little or no maintenance.

6. Erosion/Sediment: The presence of erosion or sediment, which is a cause for many failures, especially immediately after construction, is evaluated for all BMPs. Unexpected water flows, changes in land use or land cover, and temporary changes (e.g. construction), can cause erosion. This can result in upstream sedimentation which, in turn, can cause major problems for any BMP. Erosion/Sediment is to be addressed in the pretreatment, side slopes, inlet and outlet criteria as well, but this specific criterion is focused on the whole BMP. A "Poor" rating is given for major erosion and/or sedimentation when it results in significant destruction throughout the BMP. A "Fair" rating is given to erosion/sedimentation issues that are reasonably repairable. A "Good" rating indicates nothing beyond regular maintenance is required.

7. Outlet: An outlet is located where the water exits the BMP. The inspection team looks to make sure that the integrity of the BMP's outlet is not compromised, which would allow pollutants, erosion, sediment, etc. to exit. Additionally, the team should verify that the outlet is set at the correct elevation to maximize the function of the BMP. Ratings are based on condition and severity. A "Poor" rating is given for the presence of major erosion at the outlet. (This requires new energy dissipation elements such as rip rap. Otherwise an outlet will not function to retain water and pollutants, resulting in a discharge to the downstream waterbody.) The BMP would receive a "Fair" rating for minor issues and a "Good" rating if there are no problems to report.

Appendix

B – *inspections*

Checklist	Y/N	Maintenance Task
Is there garbage or debris present?		Remove as needed.
Can water easily enter the garden?		Remove debris or sediment from pretreament or inlet to ensure water can enter the garden.
Is there erosion present on side slopes?		Determine cause of erosion. Mulch or replant area accordingly.
Are there weeds or bare areas on side slopes or in basin?		Pull weeds, invasives, and tree seedlings out completely, getting all roots and bagging all seed heads. Replant and mulch where weeds are removed.
Is there sediment present in the basin?		Remove sediment with shovel. Determine if further maintenance is needed to prevent sediment accumulation.
Can water freely exit the garden?		Keep outlet free of debris or sediment.
Is there standing water more than 48 hours after a rainfall?		If water is not draining, observe garden to establish cause and determine repair needs.
Can water easily enter the trench drain or basin?		Remove any debris or garbage clogging entrance.
Is there sediment in the trench?		For trench drain, remove top grate and shovel out sediment completely. Securely replace top grate. For catch basin, remove cover, shovel out sediment, and securely replace cover.
Is the trench graded in the right direction?		If water moves in the wrong direction, check if complete reconstruction is needed.
Is the drain in good condition or are there broken sections?		Note damage and determine replacement needs.

Appendix

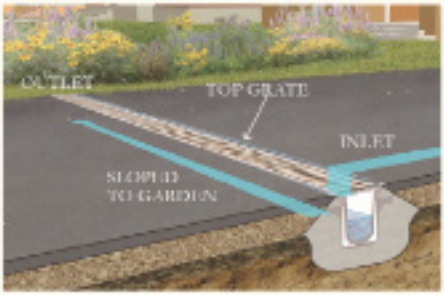
B – *inspections*

Project Examples:

These photos depict a variety of raingarden and infiltration designs to reduce downstream pollution following a rain event.

Commercial

Residential



Trench Drain

Catch Basin

Date

Location

Inspector

Date of Last Rainfall

Appendix

C – *site plan*

Take Measurements to Create a Site Sketch

To create an accurate depiction of the site, you need the following tools. You can also use your body if you record your measurements below.

Tools needed:  + 

Length of Shoes:

Wingspan:

Vertical Reach:

Length of Hand from Base of Palm to Fingertip:

Distance from Ground to Knee:

Distance from Ground to Waist:

Appendix

C – *site plan*

Critical Measurements And Site Characteristics:

Appendix

C – *site plan*

Draw the Site Sketch

Appendix

D – *optional learning activities*

Sharp Eyes

Objective: weed identification depends on your ability to see small details and determine very small differences between plants. This group exercise is a warm up for detailed observations

Materials: None needed

Time: 5 - 10 minutes
Season: Any

Activity Description:

Divide the class into two equal teams and have them face each other about four or five feet apart.

At a signal, each person looks carefully at the player opposite them, noting as much as possible about their appearance.

At another signal, both lines turn around so they face in opposite directions. Each person then alters something in his appearance (untie a shoelace, fasten a button, take off a shoe, fold lip a pant leg, etc.).

At a third signal, the two lines turn and face each other again, and each player tries to spot the changes in the player opposite them.

The team with the greatest number of correct answers wins.

Appendix

D – *optional learning activities*

Defining And Finding Plant Anatomy Terms

Working with a partner, familiarize yourself with this Field Guide by finding the following terms in your book. Once you have found all of the examples, go into the field and see how many samples you can find in 15 minutes.

Sessile

Stigma

Panicle

Rhizome

Whorl Leaf

Basal Leaf

Compound Leaf

Herbaceous

Appendix

D – *optional learning activities*

Learning From Observation

Plant characteristics help you identify the plant you are looking at. Some plants have very specific characteristics, others will be more difficult to identify. Your instructor will present you a plant specimen. In small groups, use the following sheet to record the trait of your plant sample.

Life form:

Height of life form:

Color of stem:

Color of leaves:

Size of leaves:

Veins in leaves:

Leaf orientation:

Color of flowers or fruit:

Size of flowers or fruit:

Number of flowers or fruit:

Shape of flowers or fruit:

Number of petals:

Number of stamen:

Any other defining characteristics:

replacement text for paragraph:

Plant characteristics help you identify the plant you are looking at. Some plants have very specific characteristics, while others will be more difficult to identify. Your instructor will present you with a plant specimen. In small groups, use the following sheet to your plant sample's traits.

Learning From Observation Continued

Draw a picture of your plant sample:

Appendix

D – ***optional learning activities***

Using The Weed Identification Key

On page 5 of your Guide book, there is a plant key to help walk you through identifying unknown weeds. This work will require you to look very closely, read your text closely, and be patient. Don't forget to use outside resources if you need additional help.

- Instructors will have marked several plants in the field.
- In small groups, work to successfully identify 3 of the plants marked. if you are struggling, ask an instructor for help.
- Make a small sketch of the 3 plants you find and give its Latin and Common Name.

Replacement text:
Using the Weed Identification Key
Use the plant guidebook to help walk you through idenitifying unkn
weeds. You will need to look very closely, read your text carefully an
patient. Use outside resources if you need additional help.
- Instructors will mark several plants in the field.
- Work in small groups to identify three of the marked plants. If nee
ask an instructor for help.
- Make a small sketch of the three plants and give their Latin and com
names.

Appendix

E – *optional weed identification activity*

Survey Of Plant Species

One portion of determining the health of the BMP is to know the proportion of Undesirable plants. This exercise will builds upon past activities and will test yout plant identification knowledge. Start by walking off a 5x5 area and complete the following table to determine the overall health of the planting.

Species Name	Where did you find it? What kind of environment does it like?	Can you tell how it spreads?	Is it weed?	how should it be managed?

Appendix

E – *Weed identification resources*