



Adopt-a-Drain & Stormwater Management

ESPM 4041W: Problem Solving for Environmental Change



Report Number 9/9

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Executive Summary

The City of West St. Paul is a tight-knit community actively working towards being environmentally conscious and sustainable. Many organizations and independent groups are already working within the City of West St. Paul to engage residents and create opportunities for public involvement in sustainable projects. To better understand how the city government can further engage residents, we partnered with the City of West St. Paul as part of our undergraduate senior capstone project. There are eight other reports which supplement this report and aim to address environment and sustainability within the City.

The Adopt-a-Drain program aims to promote resident participation in improving and maintaining stormwater quality by cleaning a storm drain near where they live. Encouraging residents to participate in the Adopt-a-Drain program in the City of West St. Paul is an important opportunity for community members to improve stormwater quality and to learn more about local environmental issues.

Our report was completed over the Fall semester, 2021. We integrated four data collection methods. These methods included informative interviews with stakeholders, a survey that targeted West St. Paul residents who have adopted drains, spatial analysis of drains and elevations in West St. Paul to identify drains most susceptible to debris collection, and a literary analysis on stormwater education practices.

Through these combined methods, we discovered that word of mouth and existing relationships are a powerful tool for encouraging new participants to sign up for environmental behavior change initiatives like Adopt-a-Drain. We also learned that Adopt-a-Drain provides many resources for municipalities to use, such as yard signs, interactive kiosks, and other handout materials. Additionally, we learned that targeted communication is key to motivating residents to participate in programs like Adopt-a-Drain by demonstrating to them the connection between water quality and the quality of their community.

There are many options for increasing local participation in the Adopt-a-Drain program through city resources. Listed below are three possible options for West St. Paul:

1. Utilize Adopt-a-Drain resources such as yard signs, door hangers, and informational kiosks to spread awareness about the program.

2. Leverage the community strengths by using existing city communication resources, building relationships with local groups and institutions, and creating community events or competitions to increase awareness of the program and provide an incentive for participating.
3. Target messages based on local values or water features to connect drain adoptions to improving the quality of the community and its resources.

Integrating any of the three recommendations above would improve community engagement with the Adopt-a-Drain program and potential future water quality projects. By adapting these accessible and effective methods of community engagement, the City of West St. Paul can continue to utilize the Adopt-a-Drain program for future project

Introduction

Overview

Proper stormwater management and storm drain maintenance in urban settings are important for maintaining the quality of water resources across a watershed. One of the City of West St. Paul's goals is to increase public awareness of stormwater management best practices among its residents. The City identified the Adopt-a-Drain program as a tool to accomplish increased public awareness of stormwater management. Adopt-a-Drain is a non-profit initiative from Hamline University that encourages people to adopt and regularly clean storm drains. West St. Paul city officials want Adopt-a-Drain to be expanded throughout the city. To increase participation in Adopt-a-Drain, West St. Paul formed a partnership with the capstone course Problem Solving for Environmental Change at the University of Minnesota. This report is a result of our work in that capstone class.

Issue Description

Storm drain maintenance is of the utmost importance to protect a city's water resources. In most cities, including West St. Paul, storm drains connect directly to local lakes and streams, meaning that various materials flowing from the street are deposited directly into local water bodies. These materials, such as plastic, leaf litter, sediment, or any other type of waste that builds up in storm drains, can be particularly damaging because they can include pollutants like heavy metals (Lloyd, 2021). As these materials collect in storm drains, pollutants adhere to them. Once pushed into the drain by stormwater, the pollutants can disperse into lakes and streams. Additionally, these impediments can block flow in the drain network, which will contribute to flash flooding and cause the drains to back up onto the streets. Sediments that enter the waterbody as suspended solids carry phosphorus. This nutrient results in the growth of algae and undesirable aquatic weeds, which lead to the eutrophication of the water bodies they enter. Fallen leaves from deciduous trees will also leach dissolved organic carbon (DOC) into the water body, which will affect the water quality, stratification, and aquatic plant growth (Duan, 2014).

In addition to storm drain maintenance, home sewer maintenance is especially important because of the Metropolitan Council's regulations about inflow and infiltration (I/I). The Metropolitan Council defines I/I as "clear water, stormwater, and groundwater that enters the wastewater system." (Metropolitan Council, n.d.). The additional treatment of these water sources adds costs to the City. If West St. Paul cannot meet the requirements of the Metropolitan Council; they are assigned a work plan, costing the City

valuable time and resources. The term “work plan” refers to the document a city receives regarding specific issues that need to be addressed to meet I/I regulations. The work plan asks the City to raise money through mitigation or monthly surcharges on water bills. Next, it describes what the money is to be put towards, which can be public infrastructure, like maintenance of holes and sewers, or private infrastructure, including sump pumps disconnections, rain leader disconnections, and more (Metropolitan Council, 2020). Reducing the amount of waste collected in storm drains, thereby reducing I/I non-compliance, will allow the city to consistently meet the goals set by the Metropolitan Council.

To reduce the amount of waste collected by storm drains, West St. Paul began to encourage resident involvement by enrolling in the Adopt-a-Drain program in 2019. Founded in 2014, this program encourages residents to “adopt” a drain, meaning that they volunteer to clean out waste collected at the top of storm drains when they are able (Water Environmental Federation, 2019). Cities and watersheds enrolled in the program give residents the ability to name the drain they clean and report the type and quantity of debris they clear. Adopt-a-Drain also publicly reports which drains are adopted and cleaned. Each of the adopted storm drains within West St. Paul has been identified on the Adopt-a-Drain website; however, the program has yet to gain traction, as only 4.0% (98 of 2,446) storm drains have been adopted. An increase in this program’s use will help meet the City of West St. Paul’s water quality goals.

Visions

West St. Paul Vision

The city of West St. Paul strives to provide citizens with a safe, pleasant, affordable city that prioritizes green space and quality infrastructure (City of West St. Paul, 2020). The 2040 West St. Paul Comprehensive Plan also notes that creating a safe, walkable, and friendly city is part of the city’s goals. Adopt-a-Drain will contribute to the vision by protecting city stormwater infrastructure and prioritizing the quality of parks, lakes, and ponds.

Class Vision

Through collaboration with the City of West St. Paul and our independent research, the values of conservation, equity, and community engagement were integrated to develop solutions that are effective and innovative. With these integrated values as a guide, West St. Paul can promote safe and sustainable public growth to serve the community and its future generations.

Report Vision

This report will act as a tool for the City of West St. Paul to successfully implement the Adopt-a-Drain program and other stormwater education strategies. By educating the public about stormwater best

management practices, the city can continue reducing the negative impacts to the watershed and improve its compliance with the Metropolitan Council's I/I requirements, aligning with West St. Paul's goal of prioritizing green space and infrastructure.

Goals & Objectives

This report aims to provide the City of West St. Paul with educational strategies that can be used to promote community engagement with the Adopt-a-Drain program, and overall stormwater management awareness. To accomplish these goals, our team identified the following objectives:

- Evaluate methods used by nearby cities to increase utilization of Adopt-a-Drain, as well as other stormwater education programs when applicable. We will research city websites and conduct key informant interviews with employees,
- Conduct a short literature review of peer-reviewed research to discover what elements are necessary for a successful public education program, and
- Propose stormwater education strategies for existing programs within the City of West St. Paul. Some of these strategies would include modifying the city's main website to create more accessibility for residents surrounding stormwater education and creating a clear map of the storm drains in the city available for adoption.

Methods

Site Description

West St. Paul is a Twin Cities suburb located just south of St. Paul, Minnesota and bordered on the north by the Mississippi River (Figure 1). It has a population of 20,615 as of the 2020 census and covers about five square miles (U.S. Census Bureau, 2021). One-third of the population has a bachelor’s degree or higher. The median household income is about \$57,000 per year, an estimated two-thirds of the median household income in the Twin Cities Metro area (U.S. Census Bureau, 2019). West St. Paul’s population is majority White (U.S. Census Bureau, 2019). And according to Dave Schletty, West St. Paul’s assistant parks, and recreation director, the community is “close-knit,” and many residents are involved in local government processes or demonstrate concern for the well-being of the West St. Paul community.

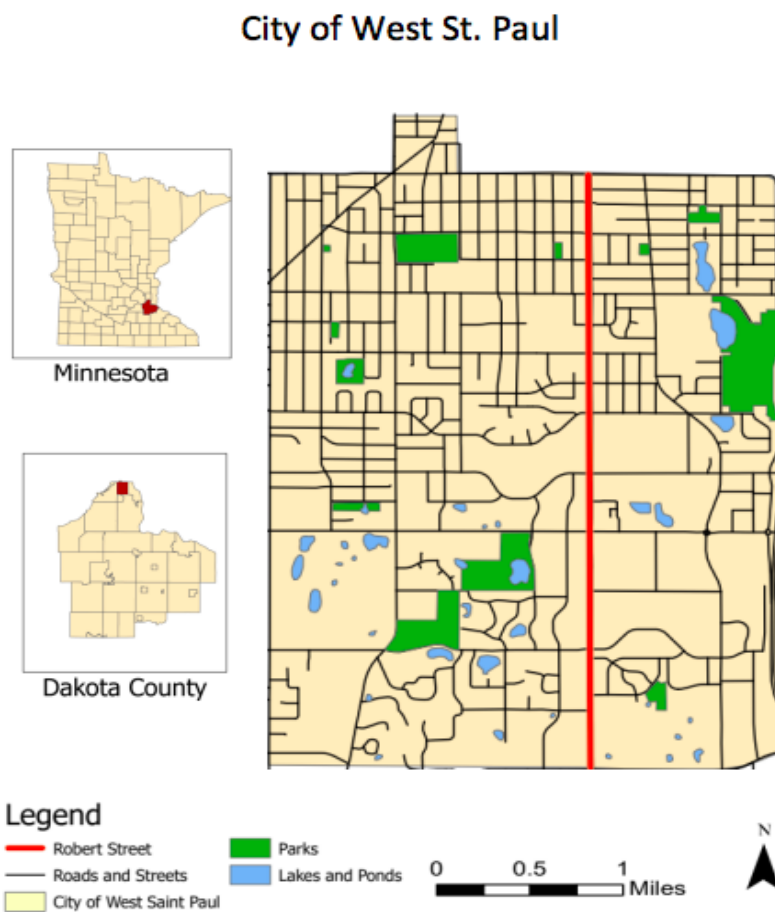


Figure 1: Map of the City of West St. Paul. (Source: ESPM 4041W Class)

The physical features of West St. Paul are relevant to this project as well. In addition to its proximity to the Mississippi River, the City contains several smaller water bodies, including Thompson Lake and Stark Lake. It is part of the Lower Mississippi River Watershed. The City is home to 14 parks which provide a large amount of green space. There is also a thriving commercial district along Robert's St. that covers the ground in concrete and other impervious surfaces that lead to excess amounts of runoff into storm drains.

Study Methods

This project aims to increase enrollment in the Adopt-a-Drain program and awareness of water resource management for residents of West St. Paul. To do this, we chose methods that would be the most beneficial to achieve these goals. We used interviews of education coordinators in surrounding Minneapolis suburbs and West St. Paul residents enrolled in the Adopt-a-Drain program, a survey, data analysis of the topographic map of West St. Paul, and a review of environmental communication literature.

Key Informant Interviews

To better understand the status of the City of West St. Paul's overall stormwater quality and the kinds of public education programs that are most effective for promoting stormwater best management, we conducted interviews with key informants. Possible interviewees were determined by reading through the position descriptions of City of West St. Paul employees and other municipalities and watershed organizations that are members of Adopt-a-Drain. Our goal was to identify possible strategies, both successful and unsuccessful, used by other cities or watershed organizations to increase participation in Adopt-a-Drain (Table 1).

Table 1: Key informant interviews

Name	Title of Person Interviewed	Organization
Jenni Abere	Public Education and Outreach, Adopt-a-Drain Liaison	Center for Global Environmental Education, Hamline University
Madeline Seveland	Education Coordinator	Carver County Water Management Organization
Sage Passi	Watershed Education Specialist	Ramsey-Washington Metro Watershed District
Gael Zembal	Education and Outreach Coordinator	Nine Mile Creek Watershed District
Kris Meyer	Community Engagement & Education Coordinator	Freshwater
Alex Van Loh	Education & Program Coordinator	Freshwater

To standardize our methods across these interviews, we developed a list of questions surrounding public outreach strategies and stormwater management:

1. If relevant: how has Adopt-a-Drain been used in your city/watershed/county?
2. What do you wish residents knew about stormwater management best practices?
3. What do you think are useful strategies for getting residents to adopt new management practices, like cleaning drains?
4. What are the challenges or barriers you've noticed while trying to share information about water resources and management with the public?
5. Is there any feedback you frequently receive on your messaging to the public?
6. Are there any public information campaigns you've worked on that you thought were particularly successful? Or unsuccessful?
 - a. What made them successful or unsuccessful?
7. Who else do you recommend we talk with about Adopt-a-Drain or community education strategies?

Survey

To better understand the motivations that guide residents' decisions to adopt storm drains and continue to clean them, we designed a survey and emailed it to residents in West St. Paul who are registered as drain adopters with Adopt-a-Drain. The survey (Appendix A) addressed residents' knowledge of stormwater management, how often they clean their adopted drain(s), and their motivations for adopting a drain. The

population of drain adoptees in West St. Paul is small (54 people). In anticipation of many non-responses, the survey was designed with open-ended questions to allow nuance and detail in the responses. Analyzing open-ended questions takes more time than analyzing questions with discrete answers. However, given the low expected number of respondents, we did not expect this extra time to be challenging. Survey respondents were also asked if they would volunteer for a short follow-up interview. We sent the survey on two different dates at different times of day to maximize the response rate. The first was sent on October 12th at approximately 4 PM, and the second on October 19th at approximately 12 PM. Overall, 21 people responded to the survey, which represents a 38% response rate.

The survey was drafted and distributed using Google Forms. This online survey tool is free and easy-to-use because it can be shared electronically. Also, the survey draft was evaluated using a “think aloud” where people who did not create the survey voice their thought process out loud as they complete the survey in front of the survey writers. This approach helped us catch misleading or confusing questions before the survey was distributed.

After respondents returned the survey, they were invited to submit their information to be contacted for a follow-up interview. The interviews consisted of 6 questions (Appendix B) and were conducted by phone for an average of 15 minutes each. Three follow-up interviews were conducted.

Survey responses were brief, consisting of a few words, so the responses to each question were categorized for patterns of similar responses for each question. Responses were visualized using DataWrapper.

Data and Mapping

The Adopt-a-Drain staff provided backdoor access to their software so we could see the total number and location of drains in West St. Paul, number and location of drains adopted, frequency and timing of reported drain cleanings, the weight of the waste collected at each cleaning, and the time to clean each drain. From the dataset, each drain was cataloged by its latitude and longitude point. Each drain was then added to a topographical relief of the map of West St. Paul (Figure 7).

By identifying the adoption status from Adopt-a-Drain’s data, we pinpointed drains in West St. Paul that would reasonably receive the most waste. Using publicly sourced data from the Department of Natural Resources (DNR) website, we obtained the 1-meter Light Detection and Ranging (LiDAR) Digital Elevation Model (DEM) for the city of West St. Paul. We then uploaded the DEM to a Geographic

Information System (GIS) database to pinpoint the locations on the landscape that are most likely to collect water from a large storm event and where minor stream channels would materialize based on existing hydrology. These spots on the map were identified as locations where most of the leaf litter, sediment, and other waste products would collect. We also assumed that these locations would receive the greatest amount of water from rain events, and these drains would be the most prone to backups that can cause flooding. By overlaying the coordinates of the existing “non-adopted” drains in West St. Paul, we identified 227 of the 2,348 unadopted drains closest to these locations that would benefit the most from the Adopt-a-Drain program.

Literature Review

An important step in the project was conducting a review of existing literature on stormwater education practices. This review aimed to identify variables that influence a stormwater education program’s likelihood of success. To find relevant studies, we utilized the scientific database Web of Science. Using the search function, we entered the keywords “stormwater education,” which yielded 837 results. We refined our search by only including studies published in the last fifteen years, either an article or review article, and in the “education” category of the site, which yielded 152 results. The primary focus of most of the articles was information other than education, so most results were inapplicable to this report. We were able to identify a handful of articles that provided useful information about stormwater education.

The research gathered during the literature review served several purposes throughout the project. First, we used this information as a foundation for creating the questions included in the survey sent to Adopt-a-Drain members. The results of our literature review were also used to identify whether stormwater education tools used by nearby communities are likely to be effective and worth suggesting to the City of West St. Paul.

Findings

These findings are the direct result of the survey, interviews, mapping and modeling, and supplemental literature review conducted for this report. The following sections provide an in-depth and complete summary of the information we gathered.

Literature Review

The literature review was conducted to gain supplemental information to prepare for and understand the content of our informational interviews and survey. Specifically, the information gathered was either used for designing a framework for the Adopt-a-Drain campaign within the City or for understanding how demographics impact willingness to participate in stormwater education programs.

Designing a Campaign Framework

Conducting the literature review allowed us to build a framework for what is involved in creating a successful stormwater education campaign and provide a foundation for the questions asked during interviews. A successful campaign is ongoing, participatory, responsive, and tailored to local characteristics. Programs that take these variables into account measure a 58% likelihood of attendees partaking in some type of desirable behavior related to the topic at hand (Taylor et al., 2007).

An “ongoing” campaign persists over time and is not just a single event. It will likely vary in intensity as time progresses, but it will consistently offer participants opportunities for involvement (Taylor et al., 2007). Many successful campaigns begin with a large event, with smaller events in the months and years to follow and utilize prompts in between. Prompts are small reminders that participants can physically see to keep them engaged over time (Giacalone et al., 2010). Examples of prompts include door hangers, social media posts, an email, or anything that brings the campaign back to the attention of a participant.

It is important to note that the use of prompts often is not enough to achieve success (Taylor et al., 2007). Programs that ensure that the bulk of the information is given through in-person presentations, conversations, or interactive online modules are considered participatory. Though non-participatory campaigns require less time and resources, it is difficult to build a connection between a participant and the topic at hand. Therefore, non-participatory campaigns lead to low success rates (Taylor et al., 2007).

A successful campaign is also responsive to the participant, meaning that the campaign organizers can tailor their message to the audience and location. Often, it is beneficial to collect information (knowledge, attitudes, and behavior) about the audience prior to campaign events (Taylor et al., 2007 & Giacalone et al., 2010). Collecting this information allows campaign leaders to understand what motivates their audience. A responsive campaign will connect the audience's motivation to the program (Giacalone et al., 2010). It is especially important to craft messages depending on the age of an audience, as programs for adults should look much different than programs for children, even if they are presenting the same information. For example, the University of Nebraska-Lincoln has a variety of programs that present information about the importance of rain gardens (Shelton et al., 2015). For adults, they provide workshops that teach participants how to create their own rain gardens using minimal resources. For children, however, they created two mascots for water quality (Figure 2). The University provides free access to a booklet, which tells children the story of "Stormwater Sleuth's" and "Running Rain's" journeys to improve water quality (Shelton et al., 2015). Hundreds of participants have signed up for the workshops and the booklet has been downloaded over 30,000 times, which speaks to the importance of creating a responsive program.



Figure 2: University of Nebraska's Water Quality Mascots

Similarly, a campaign should also be tailored to local characteristics. Connecting the program to local characteristics allows learners to build on existing knowledge of features within the community and shows them that they can be active participants (Barbanell et al., 2018). One way of doing this is including powerful imagery of recognizable features in local media, such as a city's social media page or local news sources such as the newspaper, radio station, or TV news (Giacalone et al., 2010). Attaching

this powerful imagery to a task residents can do to help resolve the issue allows a campaign to create a connection between a topic and community pride (Taylor et al., 2007).

Another important aspect of a successful environmental behavior change campaign is to leverage social diffusion. Social diffusion is the process by which a behavior change is adopted first by a small group of people and then spreads through a larger community as individuals observe others performing that behavior (McKenzie-Mohr, 2017). Behaviors that are visible, like cleaning a storm drain, are more likely to be spread through social diffusion because people can see their neighbors or friends doing the action before they try it themselves (McKenzie-Mohr, 2017). Also, behavior changes are more likely to spread when information is distributed through personal connections rather than impersonal means, such as a flyer or brochure (McKenzie-Mohr, 2017). These insights suggest that any opportunity to promote a behavior change opportunity like Adopt-a-Drain through personal interaction is important.

Demographics

Along with providing an outline for successful campaigns, much of the literature includes information on how demographics play a role in an individual's willingness to participate in stormwater education programs. Though most individuals state that they are willing to participate in efforts to protect local waterways, the specific percent of the population indicating this fluctuates depending on race, income, and location (Giacalone et al., 2010).

In a study of three cities where Adopt-a-Drain has been launched, researchers found that higher socioeconomic status is positively associated with the likelihood of adopting a drain (Saywitz & Teodoro, 2021). Also, racially marginalized individuals, people with lower education levels, and women reported a higher concern for water quality issues than their white, male, and higher educated counterparts. Interestingly, though an increased concern for water quality is an important pathway to utilize to increase one's willingness to participate, the increased concern alone does not correlate with an increase in willingness to participate in these programs (Scarlett et al., 2021). This is likely indicative of increased barriers to participation among disadvantaged individuals.

Aside from willingness to participate, the actual and perceived barriers that people experience when approaching an environmental program or issue vary by race and background. For example, a study of Black, Indigenous, and People of Color (BIPOC) in Minneapolis who participated in Adopt-a-Drain found that, for many, the program was not culturally significant to them. For example, some immigrant

participants in the study had difficulty connecting to the relevance of the program because in their first languages, there is no word for “stormwater.” (Pradhananga, 2019).

Key-Informant Interviews

Adopt-a-Drain Interview

To better understand the Adopt-a-Drain program, we interviewed Jenni Abere, the Adopt-a-Drain Coordinator with the Hamline Center of Global Environmental Education. The program’s main objective is to create behavior change among individuals by taking sustained action for improving water quality within their communities. To encourage this behavior change, Adopt-a-Drain provides the adopters with promotional materials such as door hangers, yard signs, and a postcard for the participants to fill out once a year to record their cleanups. Abere informed us that although the postcards have not been as successful in receiving user data as the program would like, the other promotional materials have helped recruit new drain adopters. The Adopt-a-Drain program has also had great success in gaining new adopters through social media, and Abre recommends others utilize similar platforms to recruit participants.

When asked about other strategies for gaining new participants, Abre recommended creating a community partnership. A partnership can be accomplished by connecting with local schools through science lessons or Earth Day events and sending students home with starter packages to encourage drain adoption. The biggest challenge that she has found with the program is maintaining long-term engagement. The most apparent reasons for this challenge include reaching communities in rural areas and having to rely on watershed or city contacts to implement the program in the long-term.

Watershed & County Staff Interviews

Three interviews were conducted with watershed and county leaders: Madeline Seveland of Carver County, Sage Passi of Ramsey-Washington Metro Conservation District, and Gael Zembal of Nine Mile Creek Watershed District. These interviews provided a different perspective on Adopt-a-Drain implementation, resulting in variability within the recommendations received.

Madeline Seveland, the Education Coordinator for Carver County, began implementing Adopt-a-Drain in the Spring of 2019. She first attempted to reach citizens by using postcards and door hangers supplied by Adopt-a-Drain, distributing door hangers to one-half of Waconia and postcards to the other half. Though thousands of materials were sent, this campaign only brought in 8 new adopters. Since this initial

campaign, she has found more success by creating Adopt-a-Drain booths at city events (allowing for interpersonal communication), using a kiosk provided by Adopt-a-Drain, and sending out regular updates in the local newspaper about Adopt-a-Drain. Seveland said that her most successful strategy has been to create community partnerships with schools and churches, a technique in which she has seen immediate success on multiple occasions, especially when targeted at youth.

When asked which strategies she recommends, Seveland said that she often relies on community-based social marketing, such as asking adopters to pledge to clean their drain a certain number of times, and she has seen success in using a “Putt-Putt for Water Quality” mini-golf game used by Minnehaha Creek. She believes there are challenges to implementation as well. In her experience, it is difficult to compete with all the other information people encounter daily, and if you are able to gain someone’s attention, it is difficult to turn attention into motivation, which is key in participant-led programs such as Adopt-a-Drain.

Another informant interview was conducted with Gael Zembal, the Education and Outreach Coordinator for Nine Mile Creek Watershed District. Unlike Seveland, Zembal has found success in using signs, postcards, and door hangers to promote Adopt-a-Drain, as one of these campaigns was able to get 272 new adopters in the City of Bloomington. Like Seveland, Gael has also seen success in using booths at city events and farmers’ markets, creating community partnerships (especially with schools), and utilizing the local newspaper to send out Adopt-a-Drain updates. She also has seen a lot of interaction with the city’s social media posts about Adopt-a-Drain.

In terms of recommendations, Zembal believes an important aspect of a successful campaign is to target messages to a specific audience. For example, if flyers are given to people who live near a certain lake, that lake should be the focal point of the flyer. Also, she finds that it is beneficial to launch programs during specific times of the year, specifically fall for Adopt-a-Drain, as residents are able to see the impairments that fallen leaves cause in storm drains. In terms of challenges, she finds that a lot of programming is geared towards homeowners, making it difficult for renters to get involved. Another common comment she receives is that residents believe it is the city’s job to clean storm drains, so program leaders must be able to explain to community members why this is not always feasible for the city to manage.

Another watershed contact who was interviewed is Sage Passi, the Environmental Education Specialist for Ramsey-Washington Metro Watershed District. Like Seveland and Zembal, Passi has used the Adopt-a-Drain resources (door hangers and flyers), but she has had mixed results. One initiative in St. Paul was

very effective in gaining new adopters but she has not seen the same success in other communities, which she believes is due to the close-knit nature of the successful neighborhood, where people were already partaking in stormwater BMPs. Passi also said that sending out thank you cards to the adopters, delivering yard signs in person, and other methods of staying in contact with adopters helps maintain involvement. Passi has also found success by handing out program flyers at different city events. Importantly, Passi notes that these flyers are available in various languages to ensure an equitable outreach campaign.

In terms of recommendations, Passi said word of mouth between community members is the most effective way to get citizens to participate, and to do this, it is beneficial to locate a local Adopt-a-Drain steward. Also, she touched on the importance of timing events to launch during certain parts of the year, creating activities for children, and incorporating Adopt-a-Drain into other existing city programs. In terms of challenges, Passi shared a similar belief to Zembal, as she finds it difficult to find ways to get information in front of people and build engagement. Passi also emphasized the challenge of creating programs that are equitable and using resources in an equitable manner.

Freshwater Society Interview

An interview was conducted with Alex Van Loh and Kris Meyer, the Education and Program Coordinator and Community Engagement and Education Coordinator, respectively, for the Freshwater Society. They spoke about the Minnesota Water Stewards Program, which teaches basic hydrology principles, community engagement, and policy, and includes a capstone project on physical water improvements along with education and outreach. Many of these stewards participate in Adopt-a-Drain in connection with their volunteer hours or capstone projects. Because of this pre-existing involvement, a community can be created around the stewards, as they are knowledgeable on water systems and are active in their community. Unfortunately, Van Loh and Meyer said it is unlikely that there are any water stewards in West St. Paul, though many may live in nearby cities.

Some recommendations were centered around messaging and framing. For example, centering messaging around fear or guilt does not work. Letting people know how easy it is to participate and connecting them to the water in their own community and environment are also helpful. Additionally, a small connection now can lead to greater participation down the road. More specifically, getting local school children involved can create future community members who are likely to be involved in environmental programs. Some challenges come from getting non-homeowners involved, as they may feel like they do not have the tools to participate. There is also the issue of some streets not being safe to be on in order to clean drains.

Table 2: Summary of Interview Findings

Name	Recommendations	Challenges
<p>Jenni Abere <i>Public Education and Outreach, Adopt-a-Drain Liaison</i></p>	<ul style="list-style-type: none"> - Adopt-a-Drain resources (door hangers, signs) - Social media - Community partnerships (schools) - Focus on certain times (Fall, Earth Day) 	<ul style="list-style-type: none"> - Difficulties in rural areas - Maintaining long-term engagement - Reliance on city/watershed contacts
<p>Madeline Seveland <i>Education Coordinator at Carver County Water Management Organization</i></p>	<ul style="list-style-type: none"> - Interpersonal communication - Community partnerships (schools, churches) - Creating incentives - City events/newsletters 	<ul style="list-style-type: none"> - Door hangers/postcards unsuccessful - Creating motivation
<p>Sage Passi <i>Water Education Specialist at Ramsey-Washington Metro Watershed District</i></p>	<ul style="list-style-type: none"> - Interpersonal communication - Adopt-a-Drain resources (door hangers, signs) - City events - Community partnerships (schools, water stewards) 	<ul style="list-style-type: none"> - Equitable distribution of resources - Turning awareness into engagement
<p>Gael Zembal <i>Education and Outreach Coordinator at Nine Mile Creek Watershed District</i></p>	<ul style="list-style-type: none"> - Adopt-a-Drain resources (door hangers, flyers) - Interpersonal communication - Focus on certain times (Fall) - City/Watershed partnerships - Community partnerships (schools, farmers markets) 	<ul style="list-style-type: none"> - Difficulty creating a targeted message - Community pushback
<p>Alex Van Loh and Kris Meyer <i>Community Engagement Coordinator and Education & Program Coordinator at Freshwater Society</i></p>	<ul style="list-style-type: none"> - Find a message that engages without any guilt or shaming - Gamify the process or have a way of displaying participation 	<ul style="list-style-type: none"> - People think they need to be knowledgeable to participate - Involving non-homeowners - Creating cultural significance

Across all interviews, water education professionals were clear that interpersonal communication, existing relationships, and engaging children are successful strategies for getting the public to participate in Adopt-a-Drain and related programs (Table 1). Overall, interview data suggests that building partnerships with existing groups or institutions, such as schools and churches, is key to getting residents to commit to a program like Adopt-a-Drain. However, these interviews largely reflected people who work with majority white communities and may be less relevant to minority populations. Some of the

interviewees provided unique insight on connecting with immigrant and minority populations or renters, such as providing tools to clean drains or changing messages to reflect non-Western values about water. Some strategies that have been less effective, according to interviewees, include relying on printed materials like door hangers. Successful Adopt-a-Drain campaigns in other Minnesota communities have been reliant on interpersonal interaction and existing relationships, both through neighbors convincing other neighbors to adopt drains or through central institutions like schools or churches.

Survey

Twenty-one drain adopters out of 57 total drain adopters in West St. Paul completed the survey, a 37% response rate. Of these respondents, 75% reported being somewhat or very knowledgeable about watersheds and stormwater management. The remaining 25% reported having little or no knowledge about stormwater management.

The two most frequent motivations for adopting drains among the respondents were improving water quality or wanting to take responsibility for general environmental quality. Only about 20% reported that they adopted their drain because someone else encouraged them to do so (Figure 3).

Primary Motivations for Adopting a Drain in West St. Paul

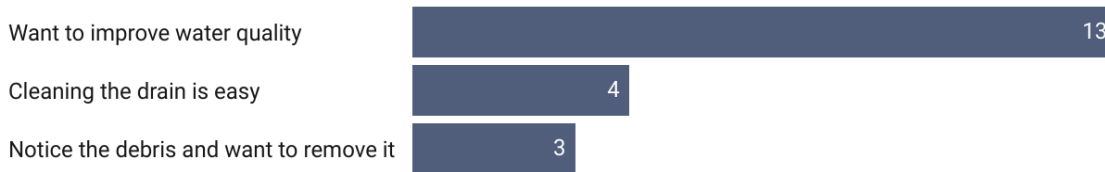


Created with Datawrapper

Figure 3: Reported Motivations for Adopting Drains in West St. Paul (n=21)

The survey respondents were also generally engaged with regularly cleaning their drains. About one-third clean their drain every month, while the rest clean their drain several times per year. The respondents' primary reported motivation for continuing to clean their drains was a desire to improve environmental quality (Figure 4).

Motivations for Continuing to Clean the Drain



Created with Datawrapper

Figure 4: Reported Motivations for Continuing to Clean Storm Drains (n=21)

The respondents also reported that the primary barriers other residents of West St. Paul face that prevent them from adopting drains are lack of knowledge about Adopt-a-Drain, lack of awareness about the water cycle, lack of investment in water quality issues, and lack of homeownership (Figure 5).

Perceived Barriers to Adopting a Drain in West St. Paul



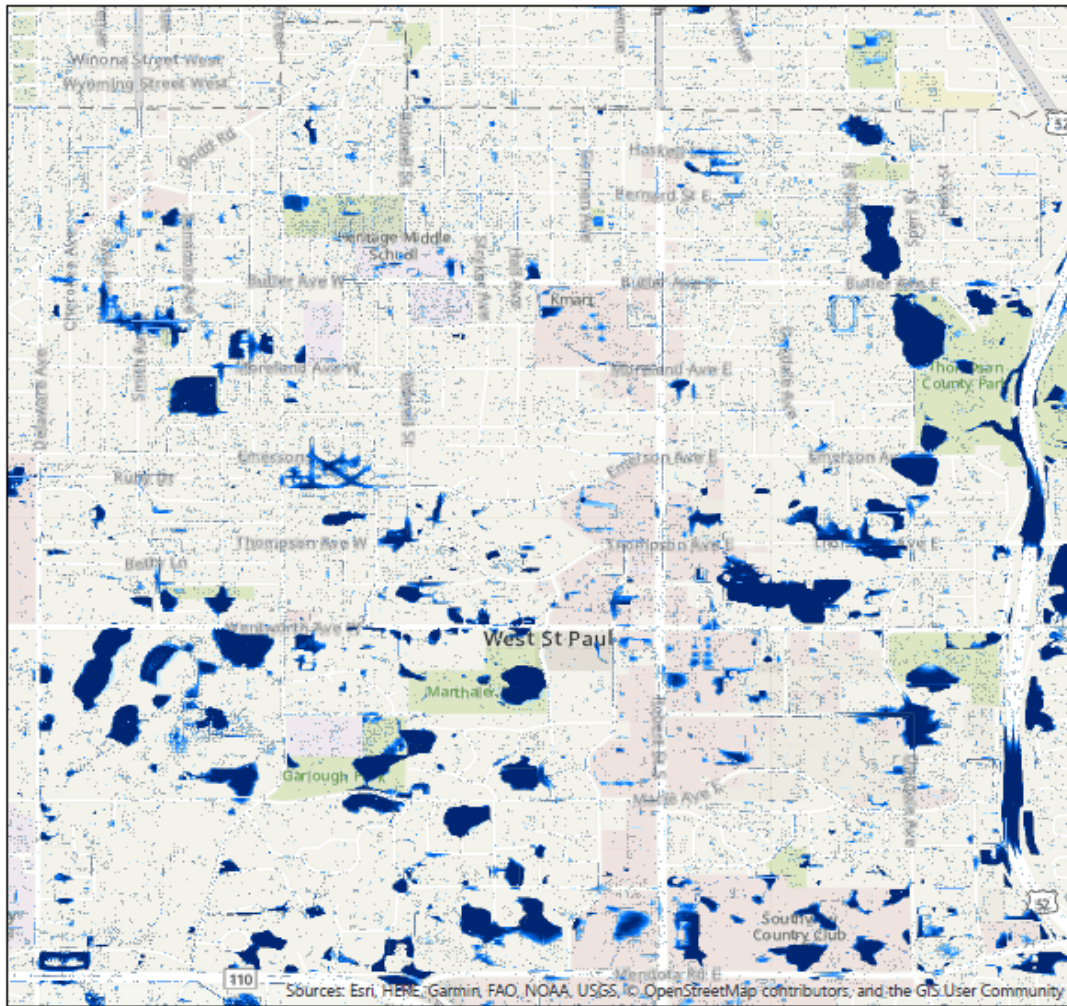
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Figure

5: Number of Respondents Who Reported Each Barrier to Drain Adoption. (n=21)

Mapping and Modeling

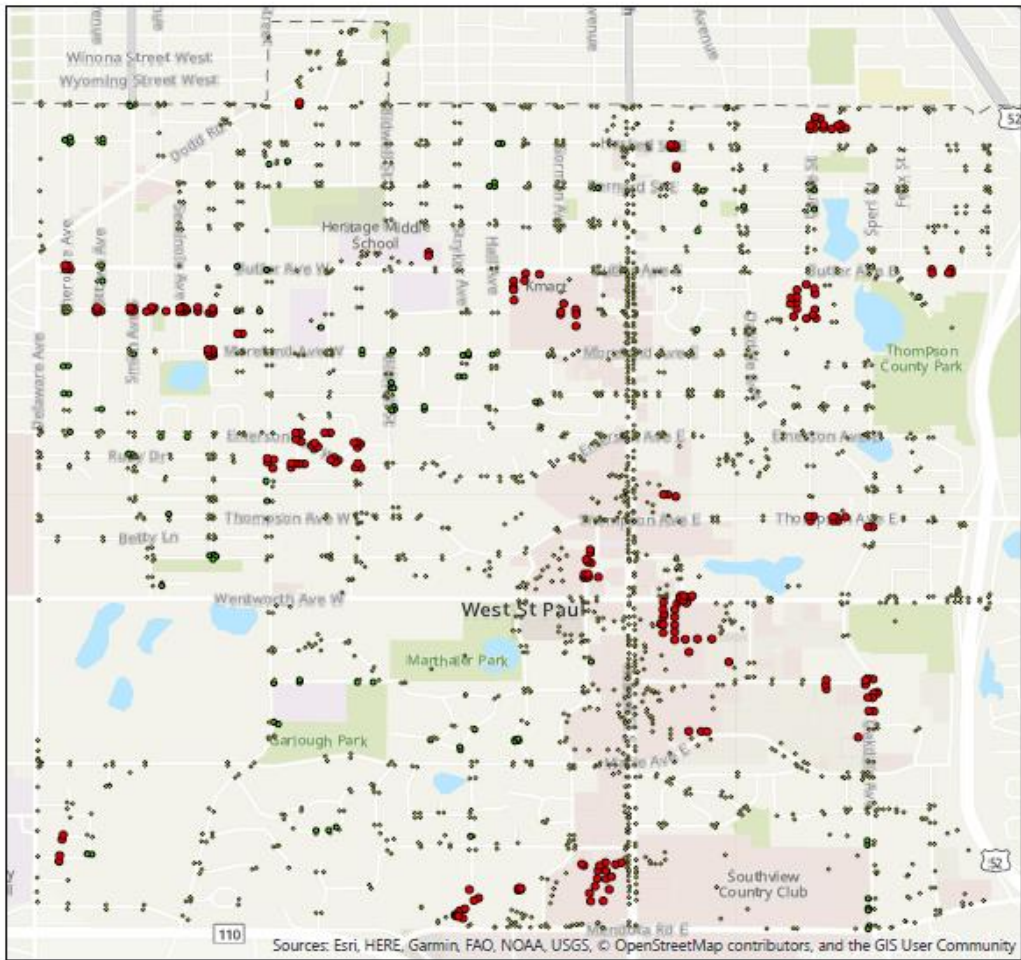
By adding the local depressions and stream channels to the existing map of West St. Paul, we determined that there are many more locations besides the existing surface waters in which water can collect on the land surface (Figure 6). Therefore, storm drain adoption should be prioritized next to surface water and in areas where water tends to collect due to elevation and existing hydrology.



Locations Where Water Collects



Figure 6: Map of West St. Paul with existing surface water, local depressions, and stream channels. Areas shown in blue are based on filling the sinks in the 1-meter LiDAR digital elevation map downloaded from the Department of Natural Resources Website. Created by Michael Gurrieri. (Source: ESRI, HERE, Garmin, FAO, NOAA, USGS, OpenStreetMap contributors, and the GIS User Community).



West St. Paul Storm Drains

- Unadopted
- Adopted
- Targeted Drains



Figure 7: Locations of the 2,446 registered storm drains in West St. Paul. Created by Michael Gurrieri. (Source: ESRI, HERE, Garmin, FAO, NOAA, USGS, OpenStreetMap contributors, and the GIS User Community.

Of the 2,466 registered storm drains in West St. Paul (Figure 7), 98 are already Adopted Storm Drains. Two hundred and twenty-seven storm drains are located on or close to local depressions and stream channels and are designated as Targeted Drains. Most of the suggested targeted locations are clustered around eight distinct points around the city.

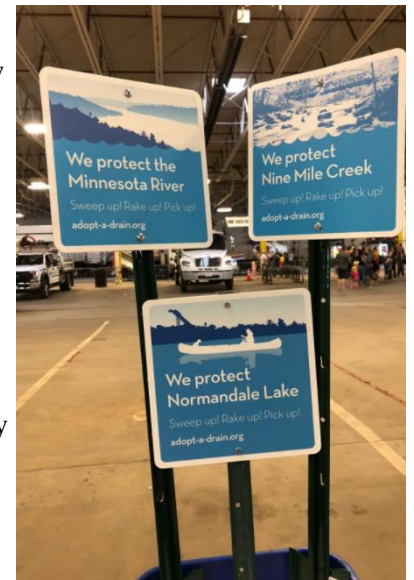
Recommendations

The following list of options supports the City of West St. Paul’s desire to increase Adopt-a-Drain participation, based on an analysis of information gathered from a literature review, key informant interviews, survey, and mapping/modeling. We hope these recommendations provide a strong foundation for the successful implementation of Adopt-a-Drain within the city.

Recommendation 1: Use Adopt-a-Drain resources to inform residents about the program

Many of the interviewees shared the importance of including materials related to Adopt-a-Drain at city events. One of the most successful examples is Madeline Seveland’s work in Carver County, using a kiosk provided by Adopt-a-Drain to help people sign up at city events. She finds that the kiosk is most successful when she provides some activities for children near the kiosk. This proximity allows parents to interact with the kiosk information while their children are focused on whatever activity she provides. Many of the interviewees also mentioned that they provide Adopt-a-Drain materials whenever possible, not just at environmental-related events, allowing them to reach a large portion of the community.

Other popular tools provided by Adopt-a-Drain are their yard signs and door hangers. Yard signs are distributed to adopters and placed in their yards to show that they protect local water quality. The signs are an effective way to connect the campaign to local water bodies, and they are also great conversation starters for other members of the community. Another tool often used is a door hanger provided by Adopt-a-Drain. These door hangers are distributed to houses throughout a community; and introduce community members to the program. These should be used with caution, as they rarely lead to substantial results. Still, they can be an effective way to introduce people to the program, especially in neighborhoods that already have high rates of environmentally friendly behaviors or a strong connection to nearby water bodies. Door hangers can also be used as prompts to remind adopters about the program and to keep cleaning their drains.



Nine Mile Creek Watershed District

Recommendation 2: Leverage the community to engage residents in Adopt-a-Drain

The City of West St. Paul can take advantage of tools they already have at their disposal, such as existing infrastructure and their close-knit community, to enhance participation in Adopt-a-Drain. These recommendations are especially important, as using existing attributes will save the City both time and resources.

Using Existing City Resources

Data collected from the literature review, survey, and interviews show the importance of using existing resources and communication channels in a community to increase participation in an environmental behavior change program. West St. Paul is already using many platforms to communicate with its residents, which can be used to relay Adopt-a-Drain-related information to the public.

Recommendations from the informant interviews show the importance of using resources such as the city newsletter and social media. In Carver County, Madeline Seveland has had success highlighting Adopt-a-Drain in newsletters and local papers. The West St. Paul Reader is a good resource for sending out Adopt-a-Drain information, as it is updated regularly and widely accessible. Also, information about the campaign can be included in the city newsletter, which is easily accessible on the city's website. Similarly, it is important to relay information via social media, as many residents likely use the City's social media to learn about community updates. Facebook was mentioned by several interviewees as a place where they often go to get information from the City and where they would like to see more posting about Adopt-a-Drain.

Building Relationships with Local Groups and Institutions

Many sources suggested that campaigns are more likely to succeed in close-knit communities. Fortunately, West St. Paul takes great pride in the strong connection that residents feel towards their city and the close bond they share with one another. This close-knit community within West St. Paul will allow the campaign to reach community groups easily, find neighborhood champions, and create a targeted, equitable message for different parts of the City.

West St. Paul has many groups that have the potential of becoming involved with Adopt-a-Drain. One of the most important groups to contact is Garlough Environmental Magnet School. The school already provides a curriculum about cleaning storm drains, and at least one teacher at the school has adopted several drains for her students to clean during class time. Another frequently recommended regional group is the Freshwater Society. Many cities and watersheds have found local members of the Freshwater

Society's Minnesota Water Stewards to be an integral part of their campaign's success. These members go through watershed education training and complete community service hours. There are likely Minnesota Water Stewards near West St. Paul who would assist in campaign work as part of their volunteer and outreach requirements. Also, Adopt-a-Drain partnerships with community organizations can extend to different schools, farmers' markets, churches, after-school programs, boy/girl scout troops, and other community groups.

Often, working with community groups can help identify "neighborhood champions." These are people who are passionate about a program, like Adopt-a-Drain, who take on projects of their own to increase program participation. Kimberly Benton, a teacher, is already acting as an Adopt-a-Drain advocate within the community. She is a specialist educator for iNature at Garlough Elementary, and she frequently cleans storm drains with her students. She also educates students on the importance of stormwater management best practices, inspiring many of them to adopt storm drains of their own. During our discussion, she seemed especially interested in working with the City. A first step would be reach out to Kimberly and her colleagues at Garlough. Hopefully, as Adopt-a-Drain becomes more interwoven within the community, more champions such as Benton will help increase involvement in the program over time.

Creating Community Events or Competitions

A frequent recommendation across all of the residents and staff communicated with for this report was to use community events to build participation in Adopt-a-Drain. Possibilities include:

- A competition at a local school. Encourage students to adopt drains with their families. Whichever grade or class adopts the most drains is the winner. Prizes can also be awarded for the most creative names.
- Source community art related to stormwater and drain cleaning. Put a call out on social media or in other city communications for people to submit artwork about some aspect of the stormwater cycle or drain cleaning. This is a good opportunity to spread awareness about the opportunity to clean storm drains. With permission, art can be used in city promotion of Adopt-a-Drain to give this communication a more personal touch.
- Host a social media photo contest. Put a call out on social media for people to submit photos of themselves cleaning drains. Share these submissions on city social media pages. This is a good opportunity to reinforce the idea that cleaning storm drains is something that community members are doing and to enhance social diffusion.

Recommendation 3: Use specific messaging to build connections between water and community

The pride citizens feel towards where they live can be leveraged to increase involvement in Adopt-a-Drain by creating a targeted message based on local characteristics. For instance, Sage Passi mentioned that residents living near Mud Lake Park participate in a variety of activities to improve and preserve water quality because they care about the lake's health and understand how lake quality is connected to their cleanup actions. By creating outreach materials that show a connection between cleaning storm drains and improving conditions within the parks, residents will be more likely to become adopters. West St. Paul can disseminate these materials through social media, door hangers, or signage in parks. For neighborhoods that are not directly attached to a body of water, creating a more general message, possibly one that creates a connection between community pride and drain adoption, has been successful in other communities as well (Taylor et al., 2007). Regardless of neighborhood location, key informant interviewees were clear about the importance of connecting drain adoptions to tangible impacts in the community. These impacts include reduced I/I charges, healthier lakes and streams, and more aesthetic streets.

Aside from connecting drain adoption to real-world impacts, understanding community demographics is also essential when creating targeted materials. For example, key informant interviewees suggested creating materials in a variety of languages to ensure that no one is left out of the program. Inclusiveness helps widen the audience that can receive the messages encouraging participation in Adopt-a-Drain, and the neighborhoods and communities where Adopt-a-Drain is implemented.

Conclusion

This report focuses on recommendations for successfully implementing the Adopt-a-Drain program within the City of West St. Paul. These recommendations were developed using key informant interviews, citizen surveys, a literature review, and mapping/modeling methods. With the implementation of these recommendations, residents of West St. Paul can play an important role in mitigating stormwater contamination by participating in Adopt-a-Drain. The recommendations provided here are low-cost, leverage existing infrastructure and institutions, and can be implemented soon for quicker results. West St. Paul's close-knit community has the potential to improve water quality and stormwater management through widespread participation in Adopt-a-Drain.

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Appendices

Appendix A: Survey to Adopt-a-Drain Participants

Adopt-a-Drain Questionnaire

Thank you for taking the time to answer this short questionnaire about your participation in the Adopt-a-Drain program. Your responses will remain anonymous.

1. On a scale of 1 to 5, how would you rate your knowledge about watersheds and water management? 1 is “no knowledge” and 5 is “very knowledgeable.”

1 2 3 4 5
2. What motivated you to adopt a drain (ex: a friend or neighbor told you to, you care about water quality, etc.)?
3. What barriers do you think prevent others in West St. Paul from participating in Adopt-a-Drain?
4. How often do you clean the drain you adopted?
 - Every month (*if selected, proceed to question 5*)
 - A few times per year (*if selected, proceed to question 5*)
 - Once per year (*if selected, proceed to question 5*)
 - Drain? What drain? (*if selected, proceed to question 6*)
5. What makes you continue to clean your drain? (*proceed to question 7*)
6. What made you stop cleaning your drain?
7. Are you interested in a short follow-up interview (15-20 minutes)?
 - Yes (*if they respond yes, proceed to a field that asks the respondent for contact information*)
 - No

Appendix B: Interview Guide

Interviewer: *Thank you for participating today, we appreciate your time! Your responses will be kept anonymous.*

- 1) How did you find out about Adopt-a-Drain, and do you think many of your neighbors know about the program?
- 2) Why do you think your neighbors don't adopt drains? What would need to be done for them to adopt a drain?
- 3) Where are you most likely to go to find information from the city?
- 4) What resources, tools, or guidance would you need to more effectively clean your drain?
- 5) Are there any other more time-intensive water resource programs that you would be interested in participating in?
- 6) Anything else you'd like to share?

Interviewer: *Thank you for your time. If you have any follow-up questions, please feel free to reach out.*

Appendix C: List of Targeted Storm Drains in West St. Paul

ID	Latitude	Longitude	Watershed	Subwatershed
251540	44.884403	-93.08791096	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251539	44.88423303	-93.08808695	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251538	44.88419705	-93.08806601	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251516	44.88449597	-93.08767899	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251512	44.88496398	-93.08709895	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251508	44.88534101	-93.08530099	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251507	44.88531302	-93.08541403	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251501	44.88417296	-93.08801899	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251500	44.88408001	-93.08775897	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251499	44.88416896	-93.08795801	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251498	44.884866	-93.08729302	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251497	44.88533603	-93.08748804	Lower Mississippi River	Lock and Dam No 2-Mississippi River
251459	44.88753102	-93.10479902	Lower Mississippi River	City of St. Paul-Mississippi River
251458	44.88772502	-93.10474904	Lower Mississippi River	City of St. Paul-Mississippi River
251453	44.88657598	-93.10492102	Lower Mississippi River	City of St. Paul-Mississippi River
251452	44.88682396	-93.10489703	Lower Mississippi River	City of St. Paul-Mississippi River
251251	44.90375999	-93.09209601	Lower Mississippi River	City of St. Paul-Mississippi River
251250	44.90377204	-93.09233104	Lower Mississippi River	City of St. Paul-Mississippi River
251249	44.90395204	-93.09222301	Lower Mississippi River	City of St. Paul-Mississippi River
251248	44.90464604	-93.09224198	Lower Mississippi River	City of St. Paul-Mississippi River
251247	44.90459297	-93.09406798	Lower Mississippi River	City of St. Paul-Mississippi River
251246	44.90473399	-93.09419502	Lower Mississippi River	City of St. Paul-Mississippi River
251245	44.90468301	-93.09392399	Lower Mississippi River	City of St. Paul-Mississippi River
251244	44.90483697	-93.09406901	Lower Mississippi River	City of St. Paul-Mississippi River
251243	44.90409303	-93.09305496	Lower Mississippi River	City of St. Paul-Mississippi River
251242	44.904208	-93.09323605	Lower Mississippi River	City of St. Paul-Mississippi River
251241	44.90398996	-93.09318097	Lower Mississippi River	City of St. Paul-Mississippi River
251240	44.904106	-93.09338003	Lower Mississippi River	City of St. Paul-Mississippi River
251239	44.90392498	-93.09450098	Lower Mississippi River	City of St. Paul-Mississippi River
251238	44.90392498	-93.09471802	Lower Mississippi River	City of St. Paul-Mississippi River
251237	44.90393698	-93.09489905	Lower Mississippi River	City of St. Paul-Mississippi River
251236	44.90376998	-93.09506098	Lower Mississippi River	City of St. Paul-Mississippi River
251235	44.90394998	-93.09506201	Lower Mississippi River	City of St. Paul-Mississippi River
251234	44.90490102	-93.09464703	Lower Mississippi River	City of St. Paul-Mississippi River
251233	44.90501704	-93.09486396	Lower Mississippi River	City of St. Paul-Mississippi River
251172	44.90374404	-93.09583897	Lower Mississippi River	City of St. Paul-Mississippi River
251171	44.90411596	-93.09580303	Lower Mississippi River	City of St. Paul-Mississippi River
251170	44.90400098	-93.09607399	Lower Mississippi River	City of St. Paul-Mississippi River
251169	44.90416802	-93.09607395	Lower Mississippi River	City of St. Paul-Mississippi River
251065	44.89896597	-93.08260498	Lower Mississippi River	City of St. Paul-Mississippi River
251064	44.89899198	-93.08260502	Lower Mississippi River	City of St. Paul-Mississippi River
251063	44.89897104	-93.08244802	Lower Mississippi River	City of St. Paul-Mississippi River
251062	44.89900803	-93.08244797	Lower Mississippi River	City of St. Paul-Mississippi River

251061	44.899126	-93.08259801	Lower Mississippi River	City of St. Paul-Mississippi River
251056	44.89721996	-93.07925302	Lower Mississippi River	City of St. Paul-Mississippi River
251055	44.89783599	-93.07865398	Lower Mississippi River	City of St. Paul-Mississippi River
251054	44.89817297	-93.07851595	Lower Mississippi River	City of St. Paul-Mississippi River
251049	44.89689296	-93.07876402	Lower Mississippi River	City of St. Paul-Mississippi River
251048	44.89809001	-93.07808796	Lower Mississippi River	City of St. Paul-Mississippi River
251047	44.89796902	-93.07850899	Lower Mississippi River	City of St. Paul-Mississippi River
251046	44.89816898	-93.07802102	Lower Mississippi River	City of St. Paul-Mississippi River
251045	44.89807201	-93.07847603	Lower Mississippi River	City of St. Paul-Mississippi River
251044	44.89807997	-93.07854298	Lower Mississippi River	City of St. Paul-Mississippi River
251042	44.89785102	-93.07826497	Lower Mississippi River	City of St. Paul-Mississippi River
251039	44.89796604	-93.07839996	Lower Mississippi River	City of St. Paul-Mississippi River
251038	44.89816803	-93.078369	Lower Mississippi River	City of St. Paul-Mississippi River
251035	44.89959701	-93.08231199	Lower Mississippi River	City of St. Paul-Mississippi River
251030	44.89693997	-93.07936897	Lower Mississippi River	City of St. Paul-Mississippi River
251029	44.89757797	-93.07875597	Lower Mississippi River	City of St. Paul-Mississippi River
251027	44.89724298	-93.07876502	Lower Mississippi River	City of St. Paul-Mississippi River
251022	44.89690901	-93.07924497	Lower Mississippi River	City of St. Paul-Mississippi River
251021	44.89737398	-93.07921803	Lower Mississippi River	City of St. Paul-Mississippi River
251020	44.89757403	-93.079258	Lower Mississippi River	City of St. Paul-Mississippi River
251019	44.89789103	-93.07924099	Lower Mississippi River	City of St. Paul-Mississippi River
251014	44.90002504	-93.08235302	Lower Mississippi River	City of St. Paul-Mississippi River
250989	44.89912701	-93.08244605	Lower Mississippi River	City of St. Paul-Mississippi River
250988	44.89898998	-93.08200804	Lower Mississippi River	City of St. Paul-Mississippi River
250987	44.89964101	-93.082459	Lower Mississippi River	City of St. Paul-Mississippi River
250986	44.89975104	-93.08252297	Lower Mississippi River	City of St. Paul-Mississippi River
250985	44.90018497	-93.08235701	Lower Mississippi River	City of St. Paul-Mississippi River
250975	44.90250402	-93.07871998	Lower Mississippi River	City of St. Paul-Mississippi River
250974	44.90258604	-93.079061	Lower Mississippi River	City of St. Paul-Mississippi River
250870	44.90258898	-93.07924201	Lower Mississippi River	City of St. Paul-Mississippi River
250817	44.89395592	-93.07015389	Lower Mississippi River	City of St. Paul-Mississippi River
250816	44.89390335	-93.0701521	Lower Mississippi River	City of St. Paul-Mississippi River
250815	44.89391032	-93.07030857	Lower Mississippi River	City of St. Paul-Mississippi River
250790	44.89409904	-93.07232501	Lower Mississippi River	City of St. Paul-Mississippi River
250783	44.89527501	-93.07646399	Lower Mississippi River	City of St. Paul-Mississippi River
250776	44.89571101	-93.07815701	Lower Mississippi River	City of St. Paul-Mississippi River
250775	44.89658497	-93.07876402	Lower Mississippi River	City of St. Paul-Mississippi River
250749	44.89624404	-93.07876199	Lower Mississippi River	City of St. Paul-Mississippi River
250748	44.89626604	-93.07830804	Lower Mississippi River	City of St. Paul-Mississippi River
250747	44.89628403	-93.07779801	Lower Mississippi River	City of St. Paul-Mississippi River
250746	44.89628301	-93.07718498	Lower Mississippi River	City of St. Paul-Mississippi River
250744	44.89655304	-93.07925398	Lower Mississippi River	City of St. Paul-Mississippi River
250743	44.89429196	-93.07066	Lower Mississippi River	City of St. Paul-Mississippi River
250742	44.894291	-93.07234102	Lower Mississippi River	City of St. Paul-Mississippi River
250714	44.89371398	-93.07035196	Lower Mississippi River	City of St. Paul-Mississippi River
250713	44.893727	-93.07055102	Lower Mississippi River	City of St. Paul-Mississippi River
250706	44.89449703	-93.072323	Lower Mississippi River	City of St. Paul-Mississippi River
250705	44.89452401	-93.07033498	Lower Mississippi River	City of St. Paul-Mississippi River
250704	44.89454898	-93.07056998	Lower Mississippi River	City of St. Paul-Mississippi River

250703	44.89447197	-93.07066001	Lower Mississippi River	City of St. Paul-Mississippi River
250652	44.88616298	-93.08202198	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250651	44.88615998	-93.08168701	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250650	44.88483197	-93.08233395	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250616	44.88643901	-93.08127496	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250615	44.88651701	-93.08170203	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250612	44.88518097	-93.08238196	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250611	44.88581401	-93.08205197	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250610	44.88579898	-93.08167595	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250609	44.88589796	-93.08145598	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250608	44.886388	-93.08262697	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250606	44.892246	-93.07762903	Lower Mississippi River	City of St. Paul-Mississippi River
250605	44.89225598	-93.07816695	Lower Mississippi River	City of St. Paul-Mississippi River
250586	44.88638102	-93.08195003	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250583	44.88644797	-93.08271404	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250582	44.88548499	-93.08214704	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250581	44.88484	-93.08180104	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250580	44.88534402	-93.08154803	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250579	44.88651596	-93.08102405	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250570	44.88540096	-93.08540497	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250569	44.88539897	-93.085297	Lower Mississippi River	Lock and Dam No 2-Mississippi River
250500	44.89223204	-93.07738204	Lower Mississippi River	City of St. Paul-Mississippi River
250454	44.89199203	-93.07096796	Lower Mississippi River	City of St. Paul-Mississippi River
250420	44.89312296	-93.07029704	Lower Mississippi River	City of St. Paul-Mississippi River
250419	44.89313597	-93.07051395	Lower Mississippi River	City of St. Paul-Mississippi River
250383	44.90117997	-93.07034299	Lower Mississippi River	City of St. Paul-Mississippi River
250382	44.901436	-93.07182599	Lower Mississippi River	City of St. Paul-Mississippi River
250363	44.90117903	-93.07054196	Lower Mississippi River	City of St. Paul-Mississippi River
250331	44.90160298	-93.07150096	Lower Mississippi River	City of St. Paul-Mississippi River
250330	44.90143597	-93.07202495	Lower Mississippi River	City of St. Paul-Mississippi River
250329	44.90160301	-93.07187998	Lower Mississippi River	City of St. Paul-Mississippi River
250328	44.90161498	-93.07202497	Lower Mississippi River	City of St. Paul-Mississippi River
250327	44.90143499	-93.07300097	Lower Mississippi River	City of St. Paul-Mississippi River
250326	44.901641	-93.07285595	Lower Mississippi River	City of St. Paul-Mississippi River
250325	44.90164105	-93.07307299	Lower Mississippi River	City of St. Paul-Mississippi River
250315	44.90480004	-93.09211595	Lower Mississippi River	City of St. Paul-Mississippi River
250314	44.90487698	-93.09224298	Lower Mississippi River	City of St. Paul-Mississippi River
250313	44.90486399	-93.092387	Lower Mississippi River	City of St. Paul-Mississippi River
250306	44.90528798	-93.09340001	Lower Mississippi River	City of St. Paul-Mississippi River
250305	44.90528698	-93.09363502	Lower Mississippi River	City of St. Paul-Mississippi River
250304	44.90528703	-93.09466605	Lower Mississippi River	City of St. Paul-Mississippi River
250303	44.90528596	-93.09486503	Lower Mississippi River	City of St. Paul-Mississippi River
250262	44.913165	-93.08921705	Lower Mississippi River	City of St. Paul-Mississippi River
250261	44.91301398	-93.08922204	Lower Mississippi River	City of St. Paul-Mississippi River
250240	44.91960699	-93.09471004	Lower Mississippi River	City of St. Paul-Mississippi River
250165	44.91972004	-93.09470103	Lower Mississippi River	City of St. Paul-Mississippi River
250126	44.90961803	-93.09713399	Lower Mississippi River	City of St. Paul-Mississippi River
250125	44.90961804	-93.09733497	Lower Mississippi River	City of St. Paul-Mississippi River
250118	44.90866996	-93.09837898	Lower Mississippi River	City of St. Paul-Mississippi River

250117	44.90865904	-93.09852196	Lower Mississippi River	City of St. Paul-Mississippi River
250116	44.90877201	-93.09839398	Lower Mississippi River	City of St. Paul-Mississippi River
250115	44.90878202	-93.09858004	Lower Mississippi River	City of St. Paul-Mississippi River
250114	44.90891404	-93.09839402	Lower Mississippi River	City of St. Paul-Mississippi River
250113	44.90892403	-93.09859396	Lower Mississippi River	City of St. Paul-Mississippi River
250094	44.91052296	-93.09855397	Lower Mississippi River	City of St. Paul-Mississippi River
250093	44.91052301	-93.09839697	Lower Mississippi River	City of St. Paul-Mississippi River
250092	44.910625	-93.098368	Lower Mississippi River	City of St. Paul-Mississippi River
250091	44.91072596	-93.098397	Lower Mississippi River	City of St. Paul-Mississippi River
250090	44.91059302	-93.09902698	Lower Mississippi River	City of St. Paul-Mississippi River
250089	44.910767	-93.09902697	Lower Mississippi River	City of St. Paul-Mississippi River
250088	44.91057201	-93.099801	Lower Mississippi River	City of St. Paul-Mississippi River
250087	44.91057299	-93.09960002	Lower Mississippi River	City of St. Paul-Mississippi River
250086	44.91062402	-93.09950003	Lower Mississippi River	City of St. Paul-Mississippi River
250085	44.91072497	-93.09954304	Lower Mississippi River	City of St. Paul-Mississippi River
250084	44.91078597	-93.09967205	Lower Mississippi River	City of St. Paul-Mississippi River
250083	44.91073502	-93.09978697	Lower Mississippi River	City of St. Paul-Mississippi River
250082	44.91060202	-93.10037401	Lower Mississippi River	City of St. Paul-Mississippi River
250081	44.91062199	-93.10099005	Lower Mississippi River	City of St. Paul-Mississippi River
250080	44.91074504	-93.10087598	Lower Mississippi River	City of St. Paul-Mississippi River
250079	44.910765	-93.10100503	Lower Mississippi River	City of St. Paul-Mississippi River
250078	44.91059201	-93.10120497	Lower Mississippi River	City of St. Paul-Mississippi River
250077	44.91073399	-93.10176398	Lower Mississippi River	City of St. Paul-Mississippi River
250076	44.91061196	-93.10174904	Lower Mississippi River	City of St. Paul-Mississippi River
250075	44.91061101	-93.10190698	Lower Mississippi River	City of St. Paul-Mississippi River
250074	44.91074403	-93.10190701	Lower Mississippi River	City of St. Paul-Mississippi River
249947	44.91055102	-93.08295501	Lower Mississippi River	City of St. Paul-Mississippi River
249880	44.91092504	-93.08348297	Lower Mississippi River	City of St. Paul-Mississippi River
249879	44.91067602	-93.08296595	Lower Mississippi River	City of St. Paul-Mississippi River
249878	44.91044904	-93.08295497	Lower Mississippi River	City of St. Paul-Mississippi River
249850	44.91221402	-93.08450795	Lower Mississippi River	City of St. Paul-Mississippi River
249849	44.91225103	-93.08509404	Lower Mississippi River	City of St. Paul-Mississippi River
249848	44.91193904	-93.08514498	Lower Mississippi River	City of St. Paul-Mississippi River
249847	44.91191403	-93.08561105	Lower Mississippi River	City of St. Paul-Mississippi River
249846	44.91165104	-93.08561599	Lower Mississippi River	City of St. Paul-Mississippi River
249845	44.91152603	-93.085611	Lower Mississippi River	City of St. Paul-Mississippi River
249844	44.91107999	-93.08559195	Lower Mississippi River	City of St. Paul-Mississippi River
249843	44.90994701	-93.08295696	Lower Mississippi River	City of St. Paul-Mississippi River
249842	44.91045603	-93.08361402	Lower Mississippi River	City of St. Paul-Mississippi River
249841	44.91056404	-93.083603	Lower Mississippi River	City of St. Paul-Mississippi River
249658	44.91134996	-93.07279802	Lower Mississippi River	City of St. Paul-Mississippi River
249657	44.91066999	-93.07281001	Lower Mississippi River	City of St. Paul-Mississippi River
249656	44.910293	-93.07275699	Lower Mississippi River	City of St. Paul-Mississippi River
249655	44.91042999	-93.07289599	Lower Mississippi River	City of St. Paul-Mississippi River
249654	44.91028797	-93.07316803	Lower Mississippi River	City of St. Paul-Mississippi River
249653	44.91036799	-93.073713	Lower Mississippi River	City of St. Paul-Mississippi River
249652	44.91068903	-93.07357395	Lower Mississippi River	City of St. Paul-Mississippi River
249651	44.91097703	-93.073581	Lower Mississippi River	City of St. Paul-Mississippi River
249650	44.91091998	-93.07384699	Lower Mississippi River	City of St. Paul-Mississippi River

249649	44.91118901	-93.07381997	Lower Mississippi River	City of St. Paul-Mississippi River
249648	44.91120798	-93.07357503	Lower Mississippi River	City of St. Paul-Mississippi River
249647	44.91153298	-93.07356803	Lower Mississippi River	City of St. Paul-Mississippi River
249646	44.91159502	-93.07283103	Lower Mississippi River	City of St. Paul-Mississippi River
249645	44.91177004	-93.07317002	Lower Mississippi River	City of St. Paul-Mississippi River
249635	44.91243199	-93.06702799	Lower Mississippi River	City of St. Paul-Mississippi River
249629	44.91226703	-93.06701098	Lower Mississippi River	City of St. Paul-Mississippi River
249628	44.91226696	-93.06712798	Lower Mississippi River	City of St. Paul-Mississippi River
249627	44.91241999	-93.067843	Lower Mississippi River	City of St. Paul-Mississippi River
249626	44.91225503	-93.06782599	Lower Mississippi River	City of St. Paul-Mississippi River
249546	44.91902002	-93.07256699	Lower Mississippi River	City of St. Paul-Mississippi River
249545	44.91890305	-93.07279899	Lower Mississippi River	City of St. Paul-Mississippi River
249533	44.91859597	-93.07149904	Lower Mississippi River	City of St. Paul-Mississippi River
249532	44.91855704	-93.07171505	Lower Mississippi River	City of St. Paul-Mississippi River
249531	44.91876198	-93.07171499	Lower Mississippi River	City of St. Paul-Mississippi River
249530	44.91868502	-93.07186001	Lower Mississippi River	City of St. Paul-Mississippi River
249529	44.91855698	-93.07209398	Lower Mississippi River	City of St. Paul-Mississippi River
249528	44.91858197	-93.072437	Lower Mississippi River	City of St. Paul-Mississippi River
249527	44.91873596	-93.07243698	Lower Mississippi River	City of St. Paul-Mississippi River
249526	44.918582	-93.07281603	Lower Mississippi River	City of St. Paul-Mississippi River
249525	44.91855604	-93.07301502	Lower Mississippi River	City of St. Paul-Mississippi River
249524	44.918723	-93.07299695	Lower Mississippi River	City of St. Paul-Mississippi River
249523	44.91908198	-93.07278104	Lower Mississippi River	City of St. Paul-Mississippi River
249400	44.91683403	-93.07869901	Lower Mississippi River	City of St. Paul-Mississippi River
249399	44.91694896	-93.07869896	Lower Mississippi River	City of St. Paul-Mississippi River
249343	44.91774397	-93.078935	Lower Mississippi River	City of St. Paul-Mississippi River
249342	44.91774502	-93.07871801	Lower Mississippi River	City of St. Paul-Mississippi River
249341	44.91786002	-93.078754	Lower Mississippi River	City of St. Paul-Mississippi River
249340	44.91785998	-93.07893495	Lower Mississippi River	City of St. Paul-Mississippi River
249285	44.91060999	-93.10313898	Lower Mississippi River	City of St. Paul-Mississippi River
249284	44.91055899	-93.10331104	Lower Mississippi River	City of St. Paul-Mississippi River
249283	44.91065101	-93.10336803	Lower Mississippi River	City of St. Paul-Mississippi River
249282	44.91076302	-93.10331099	Lower Mississippi River	City of St. Paul-Mississippi River
249273	44.912421	-93.10444603	Lower Mississippi River	City of St. Paul-Mississippi River
249272	44.912431	-93.10463303	Lower Mississippi River	City of St. Paul-Mississippi River
249271	44.91257403	-93.10451797	Lower Mississippi River	City of St. Paul-Mississippi River
249270	44.91259396	-93.10467595	Lower Mississippi River	City of St. Paul-Mississippi River