DANE COUNTY

LAND&WATER RESOURCES DEPARTMENT

Fee-in-lieu & Stormwater Volume Credit Trading Feasibility Report

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1.0 Introduction and Purpose

Stormwater management is a critical aspect of urban planning, addressing challenges such as flooding, erosion, and water quality degradation. Dane County has been one of the fastest-growing counties in Wisconsin for the past decade, and as urban development increases, so does flood risk. As a response to this increasing flood risk, the Stormwater Technical Advisory Committee was created to assess stormwater management and to provide recommendations for improvements based on their findings. A report published May 4th, 2017, and titled *Reducing Increased Risk of Flooding,* identified the establishment of a county-wide stormwater volume-trading and fee-in-lieu (FIL) program as a potential alternative to help increase infiltration and reduce flooding when onsite control would be costly, inefficient, or prohibited.

This stormwater Fee-in-lieu and Credit Banking and Trading report has been prepared for the Dane County Land & Water Resources Department and the Lakes and Watershed Commission to assess the feasibility of establishing a county-wide program.

2.0 Background

2.1 Definitions

2.1.1 Stormwater Fee-in-lieu

A stormwater fee-in-lieu program offers an alternative compliance strategy that allows property owners or developers to meet stormwater management requirements offsite. Instead of implementing on-site stormwater management practices to address runoff from their property, the property owner or developer pays a fee. The revenue generated from these fees is then used by the stormwater management agency to fund off-site infiltration practices or green infrastructure projects. The amount of the fee is typically calculated based on factors such as the size of the property, the extent of impervious surfaces (like pavement or roofs), and the potential for runoff, ensuring that the fee reflects the property's impact on stormwater management needs. The fee should be set to cover the full costs associated with off-site stormwater management. Such programs are usually managed by local governments, stormwater utilities, or other relevant authorities responsible for stormwater management within the municipality.

2.1.2 Stormwater Credit Trading and Banking

A stormwater volume credit trading and banking program allows developers and property owners to meet their stormwater infiltration requirements by purchasing credits generated through the installation of green infrastructure projects. These projects either exceed regulatory requirements on-site or are voluntarily installed off-site. The program typically sets specific criteria for earning credits based on the volume of stormwater runoff managed or mitigated by various practices such as green infrastructure, detention basins, or permeable pavement. Property owners who implement these practices and generate excess stormwater management capacity can receive credits proportional to the volume of runoff they manage, and then may sell these credits to developers who are looking to purchase an equivalent volume needed to meet offsite management requirements. Programs may also include a credit banking system where excess credits can be saved for future use or transferred to other developments within the same watershed.

2.2 Stormwater Regulatory Framework

The Clean Water Act (CWA) of 1972 established a regulatory framework at the national level to govern pollutant discharge into surface waters and set water quality standards. It addressed shortcomings in federal environmental regulations by requiring permits for point source pollution into navigable waters, setting standards for contaminant levels to protect fish and wildlife, promoting research and technology, and funding treatment systems. However, the CWA primarily focused on point sources and acknowledged, but did not directly regulate, nonpoint source pollution. State and local authorities have the delegated responsibility to enforce regulations, which can be stricter but not less stringent than federal standards.

Total Maximum Daily Loads (TMDLs), mandated by Section 303(d) of the CWA, regulate impaired waters by setting limits on pollutants from both point and nonpoint sources to meet water quality standards. In Wisconsin, the Department of Natural Resources (DNR) sets TMDL pollutant limits - including Waste Load Allocations (WLAs) for municipal wastewater treatment plants - as part of EPA requirements. Chapter NR 216 of Wisconsin's Administrative Codes governs stormwater discharge permits, specifying requirements for municipalities to prevent pollutant discharges into municipal separate storm sewer systems (MS4s) using best management practices (BMPs). Additionally, Chapter NR 151 outlines performance standards for treatment systems in Wisconsin, specifying technical criteria and procedures for system redesign if pollutant reduction goals are not met after implementation.

Section 281.33 of Wisconsin Statues directs the DNR to establish statewide standards for construction site erosion control and storm water management, and requires ordinances regulating these activities enacted by a local government to strictly conform with the uniform statewide standards. A local government may enact more restrictive ordinances to control stormwater quantity and flooding or to comply with a federally approved TMDL.

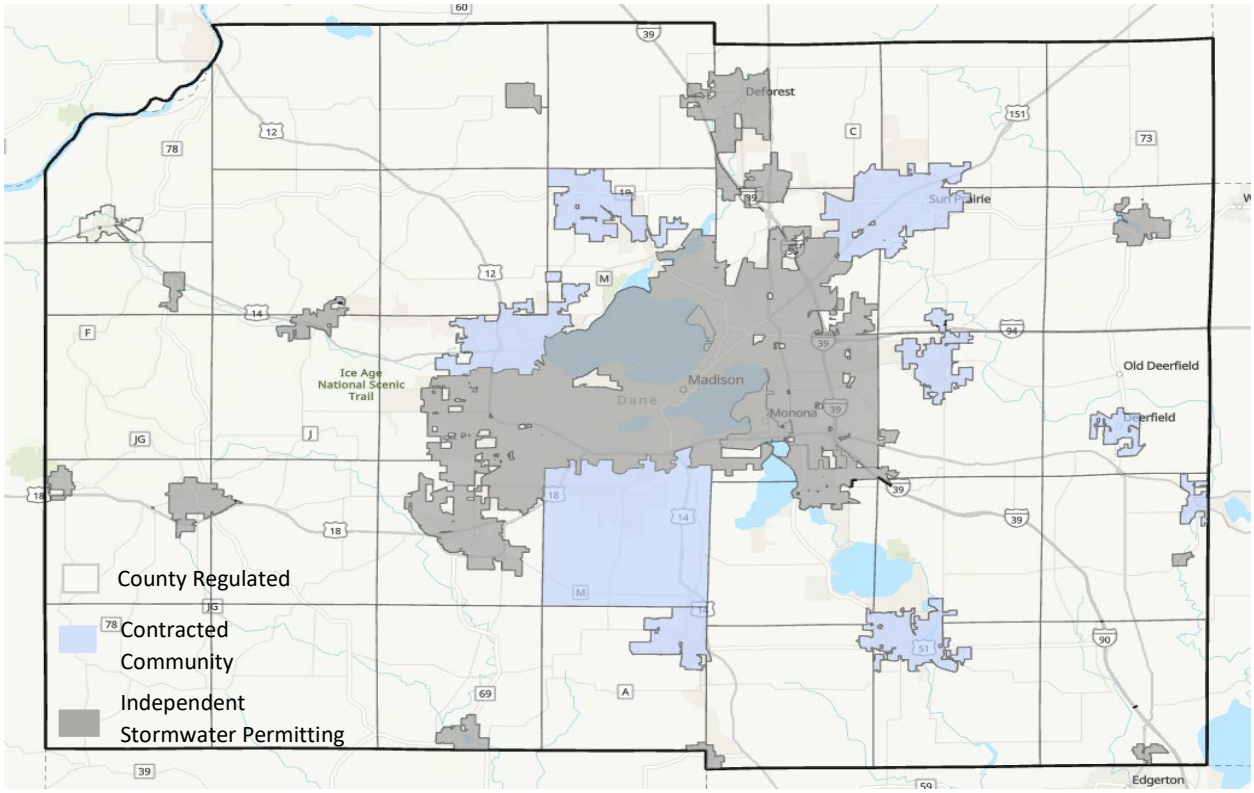
2.3 Dane County Stormwater Management

Dane County first adopted a stormwater and erosion control ordinance August 22, 2001, and stormwater regulation is currently implemented through *Chapter 14: Erosion Control and Stormwater Management*. Chapter 14 is applicable to all areas of Dane County, and administration in unincorporated areas is overseen by the Water Resources Engineering Division within the Land and Water Resources Department. Incorporated areas (cities and villages) may assume administration and regulation of soil erosion and stormwater control programs if they have adopted stormwater and erosion control ordinances that include standards at least as restrictive as those described in secs. 14.04, 14.06 – 14.14 and 14.16 – 14.18. Incorporated areas with independent ordinances are offered the option to enter into an Intergovernmental Contracted Agreement (ICA) with the County, where the County provides services (such as erosion control and stormwater permit review, approval, and inspections) on their behalf to help implement the ordinance. The following is a list of municipalities that currently contract with the County for services:

- City of Fitchburg
- City of Middleton
- City of Stoughton
- City of Sun Prairie
- Village of Cambridge

- Village of Cottage Grove
- Village of Deerfield
- Village of Oregon
- Village of Waunakee (Erosion Control Only)

Image 1: Map of Stormwater Regulatory Authority in Dane County



2.3.1 Stormwater Permit Requirements

Unless otherwise exempted by 14.08, property owners are required to obtain a stormwater management permit for any of the following activities:

- Any development(s) after August 22, 2001 that result(s) in the cumulative addition of 20,000 square feet of impervious surface to the site.
- Any development that requires a plat, as defined in applicable local land division ordinance(s).
- Any development that requires a certified survey map, as defined in the applicable local land division ordinance(s); for property intended for commercial or industrial use.
- Land disturbing activity in excess of 4,000 square feet on sites developed as commercial, industrial, institutional or multifamily.
- Other land development activities including, but not limited to, redevelopment or alteration of existing buildings and other structures, that the local approval authority determines may significantly increase downstream runoff volumes, flooding, soil erosion, water pollution or property damage, or significantly impact a lake, stream, or wetland area. All such determinations shall be made in writing unless waived by the applicant.

The Dane County Erosion Control and Stormwater Management Ordinance requires that all sites needing a stormwater plan and permit install practices that achieve compliance with the following standards:

- Runoff Rate Control
- Sediment Control
- Infiltration
- Stable Outlet
- Oil & Grease Control
- Thermal Control
- Redevelopment to Green Infrastructure

2.3.2 Infiltration

Infiltration (also commonly referred to as stay-on), in the context of stormwater management, refers to any precipitation that does not leave a site as surface runoff. It is the process by which precipitation or runoff water permeates into the ground surface and eventually moves downward through the soil layers. During infiltration, water enters from surface storage into soils via the combined effects of gravity and capillary forces. This natural process helps replenish groundwater resources and reduces the volume of stormwater runoff that flows into surface water bodies or sewer systems. Infiltration plays a crucial role in sustainable urban water management by mitigating flooding, reducing erosion, and improving water quality through natural filtration processes as water passes through soil and potentially into aquifers. However, successful infiltration depends on factors such as rainfall intensity, slope of the infiltrating surface, the permeability of soils and subsoils, soil moisture, content, vegetation, and temperature.

A FIL and Stormwater Credit Trading program that would be implemented in the county would be retention based, and would be based around the County's current infiltration standards which are modeled after the Wisconsin DNR standard. The standard is based upon requiring a percentage of precipitation infiltrated in the predevelopment condition (also known as predevelopment infiltration) to be infiltrated in the post development condition. 90% of the predevelopment infiltration must be infiltrated for all sites. The county utilizes the same 'stay-on' approach as the DNR for modeling. Stay-on is defined as all precipitation that does not runoff. Therefore, stay-on includes evaporation, plant transpiration, and recharge. While commonly referred to as an infiltration standard, it is technically a stay-on standard.

The county's regulatory approach differs from the DNR approach in two main ways. First, no event-based goals for infiltration are included in the county's standard. Dane County's standard is based solely on an average annual goal and requires the use of continuous flow modeling. Average annual modeling is based on the 1981 annual precipitation data, which is typically 28.81" in Dane County. Second, there are no limits or 'caps' placed on the amount of site area that must be dedicated to infiltration practices to meet the County's standard. If more than 2% of a development must be dedicated to meet the stay-on goal, the Dane County standard allows designers to alternatively achieve a target average annual recharge goal.

The intent of the infiltration standard in Ch. NR 151, Wis. Adm. Code, is to encourage infiltration of runoff. This requirement is tempered by a series of exemptions and exclusions for the purpose of

minimizing the risk of groundwater contamination and addressing the practicality of implementation. These exemptions and exclusions were never intended to be evasive tools for developers and designers to avoid infiltration altogether. Developers and designers need to seek practical and sometimes innovative methods to meet infiltration requirements. Where infiltration standards are unable to be fully realized, then developers and designers need to meet the standards to the Maximum Extent Practicable (MEP). MEP is a term that provides flexibility in meeting a standard (or requirement). However, there needs to be unique site-specific reasons why a project is unable to fully meet a standard. If full attainment of a standard is impractical due to unique site conditions, then the standard is to be achieved to the furthest degree practical.

Proper implementation of NR 151 will require that some land or parcels will be needed for storm water management. The economic considerations regarding the loss of developable land are not a reasonable justification to prevent full attainment of a standard. The developer and designer shall not skew data or sampling methods to realize a predetermined outcome or rely on the exemptions and exclusions identified in NR 151 to avoid infiltration, but rather they shall seek ways to maximize infiltration to the MEP.

2.3.3 Infiltration Exemptions and Prohibitions

The objective of Chapter 14 is not only to promote infiltration and groundwater recharge, but also to 'minimize sedimentation, water pollution from nutrients, heavy metals, chemical and petroleum products and other contaminants, flooding and thermal impacts to the water resources of Dane County'. In the interest of groundwater protection, there are specific cases where infiltration practices may not be installed in order to reduce the potential for groundwater contamination. These include:

- Areas associated with tier 1 industrial facilities identified in sec. NR 216.21(2)(a), Wis. Admin. Code, including storage, loading, rooftop and parking.
- Storage and loading areas of tier 2 industrial facilities identified in sec. NR 216.21(2)(b), Wis. Admin. Code.
- Fueling and vehicle maintenance areas.
- Areas within 1,000 feet up gradient or within 100 feet down gradient of direct conduits to groundwater.
- Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than five feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater or the top of bedrock.
- Areas within 400 feet of a community water system well as specified in sec. NR 811.16(4), Wis. Admin. Code, for runoff infiltrated from commercial, industrial and institutional land uses or regional devices for residential development.
- Areas where contaminants of concern, as defined in sec. NR 720.03(2), Wis. Admin. Code, are present in the soil through which infiltration will occur

In addition to prohibitions, there are also some sites where the installation of infiltration practices may not be feasible due to various conditions such as site constraints, or project types. The following activities are exempt from the infiltration standards of Chapter 14:

- Redevelopment.
- New development with less than 10% connected imperviousness, provided the cumulative area of all impervious surface is less than one acre.
- Agricultural facilities and practices.
- Areas where the infiltration rate of the soil is less than 0.6 inches/hour measured at the bottom of the proposed infiltration system where the soil layer is not easily removed or manipulated.
- Expansion of municipal or county roads.

2.3.4 Recent Stormwater Changes

As a part of the 2017 TAC report, there were multiple recommendations for changes to Chapter 14 to help reduce stormwater runoff. One such recommendation was to eliminate caps and implement a 100% infiltration standard. The ability for municipalities to require 100% of pre-development runoff volume to be infiltrated was superseded by state legislation, so the proposed change was unable to be made.

While infiltration standards could not be increased, in 2021 Chapter 14 was amended to include the following changes aimed at reducing flooding:

- Requiring peak rate control of the 200-year storm
- Added volume requirements for closed watersheds
- Redevelopment to green infrastructure

Most notably for the purposes of this report, redevelopment projects with proposed impervious surface area greater than 80% of existing now requires that the first 0.5 inches of runoff from impervious surfaces must be captured using green infrastructure. While not technically an infiltration standard, the requirement to treat runoff using GI has an infiltrative component which helps close the gap from redevelopment projects that was identified in the 2017 report.

3.0 Scope of Research

3.1 Evaluation of Existing Programs

In order to begin assessing the feasibility of implementing a program in Dane County, an evaluation of existing fee-in-lieu and stormwater credit banking and trading programs throughout the U.S. was completed. While not inclusive of all programs throughout the country, the evaluation was used to inform general program structure, potential challenges, and potential County needs for success. Seven stormwater programs, listed in the table below, were identified.

Program Location	**2020 Population** (U.S. Census Bureau)	**Program Name**	**Program Type**	**Year Established**	**Basis**	**Area**
Washington D.C.	689,545	Stormwater Retention Credit (SRC) Program	Stormwater ILF, Credit Banking and Trading	2013	Retention	68.35 sq mi
Chattanooga, TN* (has not been utilized)	181,099	In Lieu Fee and Credit Coupon Program	Stormwater ILF, Credit Banking and Trading	2013	Retention	150.08 sq mi
Park Ridge, IL	39,656	Stormwater Management Ordinance and Stormwater Detention Fee	Stormwater ILF	2011	Detention	7.13 sq mi
Aspen, CO	7,004	Fee-In-Lieu Program	Stormwater ILF	2008	Detention	3.858 sq mi
San Antonio, TX	1,434,625	Fee In-Lieu-of (FILO) Program	Stormwater ILF	1997	Detention	504.64 sq mi
Middleton, WI	21,827	Fee-In-Lieu	Stormwater ILF		Retention	9.07 sq mi
Grand Rapids, MI	198,893	Stormwater Credit Trading Program	Stormwater ILF, Credit Banking and Trading	2023	Retention	45.63 sq mi
Dane County	552,536	-	-	-	*Retention*	1,238 sq mi

These programs were implemented either on a detention basis, which would be the County's requirement for peak rate control, or a retention basis, which would be equivalent to infiltration standards. Since a FIL and credit banking and trading program in Dane County would be retention based to improve stay-on, further evaluation was focused on the four retention-based programs listed above.

3.2 Retention-based Programs

3.2.1 Washington D.C.

Program Overview

Washington D.C.'s Stormwater Retention Credit Program was first launched in 2013, and was pioneered by the District of Columbia's Department of Energy and Environment (DOEE). The program is a hybrid FIL and stormwater credit banking and trading program, and the lessons learned from D.C. have continued to inform other program evaluations and developments, particularly those of Grand Rapids which will be discussed later. Both the FIL and the Credit Trading elements are based on a stormwater retention credit (SRC), which is in the form of BMP capacity per year. One credit is equivalent to one gallon of capacity per year, and developers who want to meet retention requirements offsite are required to purchase their retention volume every year, for the lifetime of their development. They must purchase credits at least yearly, but may buy credits in bulk from willing sellers if they prefer.

Permitting Requirements

In Washington D.C., major property development – which is considered land disturbing activity greater than 5,000 ft^2 - is required to retain runoff created by a 1.2" storm. Less extensive 'substantial improvements' – projects with greater than 5,000 ft^2 of disturbance where the cost of improvement equals at least 50% of the assessed value prior to improvement - must retain runoff created by a 0.8" storm event. Sites that are subject to stormwater management must retain the first 50% of stormwater retention volume onsite if feasible, but are able to meet the remaining 50% of runoff requirements offsite by either paying a fee-in-lieu, or purchasing the equivalent stormwater retention credits (SRCs). Additionally, projects draining to Combined Sewer System (CSS) storage tunnels are allowed to achieve 100% of retention requirements offsite if purchasing credits that were generated in the municipal separate storm sewer system (MS4). This flexibility allows D.C. to incentivize the installation of green infrastructure in areas where infiltration will have a higher impact.

Fee-in-lieu

The Department of Energy and Environment (DOEE) funds FIL projects prior to receiving payments by utilizing the MS4 Enterprise Fund, and subsequent FIL payments are anticipated to reimburse this fund. Approved projects are eligible for FIL funding for up to 50% of their Stormwater Retention Credit (SRC) volume, with the remaining volume covered by FIL payments. As of 2019, four projects had been implemented by DOEE, costing a total of $575,584 and had generated $151,739.60 in FIL payments.

The current DOEE FIL price is $4.57 per gallon, which corresponds to an annual offsite compliance cost. This translates to an equivalent rate of $34.19 per cubic foot. The FIL serves as the price ceiling for stormwater management compliance. However, the Department of Energy and Environment (DOEE) recommends utilizing Stormwater Retention Credits (SRCs) as an alternative. Buyers have the option to

switch to SRCs at a later date if preferred. Payments for FIL must be submitted at least four weeks prior to the project's final construction inspection.

Below is a table detailing fee-in-lieu projects and revenue as of 2019.

Plan Number	DOEE Funding Provided	Retention Year	ILF Gallons Approved	ILF Gallons Used	ILF Revenue
3688	$450,858	FY2015	16,090	16,090	$56,315
		FY2016	16,090	16,090	$56,315
		FY2017	16,090	10,812	$38,916.84
5690	$50,000	FY2019	1,571	0	$0
6338	$25,976	FY2019	1,513	0	$0
		FY2020	1,513	0	$0
		FY2021	1,513	0	$0
6359	$48,750	FY2019	1,603	0	$0
		FY2020	1,603	0	$0

Stormwater Credit Trading and Banking

In this program, SRCs can either be generated through the installation of green infrastructure, or through the removal of existing impervious surfaces. The installation of new, voluntary GI in the MS4 generates what are considered high-impact SRCs, which provide the greatest water quality benefits to the District's waterbodies.

There are two options for credit generation on regulated sites. The first option involves installing green infrastructure (GI) within the site's regulated area, which retains stormwater beyond regulatory requirements up to the volume associated with a 1.7-inch storm. Developers are limited to 1.7-inch storm events due to the limiting returns for pollutant removal and Projects under this option are ineligible to participate in the price lock program, discussed more below. The second option involves installing GI outside the regulated area, on an adjacent part of the site. Such projects are eligible to participate in the price lock program, provided they are located within the Municipal Separate Storm Sewer System (MS4) area.

Property owners have the option to either generate SRCs directly on their property or establish an SRC-aggregating business. Many property owners choose to collaborate with SRC-aggregating businesses, who help property owners with installation and then maintenance of green infrastructure projects on their properties. A grant of up to $75,000 is available to support SRC-aggregating businesses.

To qualify for SRCs, the following requirements must be met:

- *Approval*: Obtain approval for the GI or impervious surface removal through the Department of Energy and Environment's (DOEE) Stormwater Management Plan (SWMP).
- *Location*: Projects must be located within the District of Columbia.
- *Application Deadline*: As of August 1, 2020, applications for SRCs must be submitted within three years of project completion.
- *Certification Lapse*: If SRC certification lapses for more than six months, SRC eligibility is forfeited.
- *Inspections*: Pass construction and maintenance inspections conducted by DOEE.
- *Maintenance*: Provide a maintenance contract or plan covering the duration of the SRC certification.

Once certified, credits can be listed on the SRC Registry maintained by the DOEE, and contracts are negotiated privately by the buyer and seller. When an SRC sale is negotiated, the seller submits the *Application to Transfer SRC Ownership* through the Surface and Groundwater System. Sale prices and quantities are published in the SRC and Offv Registry.

Projects that meet the SRC eligibility requirements can generate SRCs in up to 3-year certification periods once the project is built (DOEE will also certify SRCs in 1 or 2-year increments), though recertification requires an inspection from DOEE and a maintenance contract, and the SRC generator is responsible for ongoing maintenance and certification of their project.

Trading Boundaries

The District encompasses an area of 68.35 square miles and is divided into four Hydrologic Unit Code HUC10 watersheds. The majority of the District falls within two primary watersheds: the Rock Creek-Potomac River watershed and the Anacostia River watershed. However, approximately two-thirds of Washington D.C. is serviced by an MS4, while the remaining one-third is covered by a Combined Sewer System, and this distinction is what primarily impacts the distribution and management of credits within the District.

In D.C., project sites that drain to an MS4 are required to purchased SRCs generate from other projects that also drain to the MS4. Sites located within the Anacostia Waterfront Development Zone (AWDZ) should procure credits from projects generated within the Anacostia watershed, but if purchased from development outside of the AWDZ, a credit ratio of 1.25:1 is required for purchase. Requirements for CSS projects depend on project location and the amount of on-site retention achieved, though as previously mentioned, CSS areas that drain to CSO tunnels and purchase SRCs from the MS4 are allowed to achieve 100% of infiltration offsite.

Image 2: Washington D.C. Municipal and HUC10 Watershed Boundaries

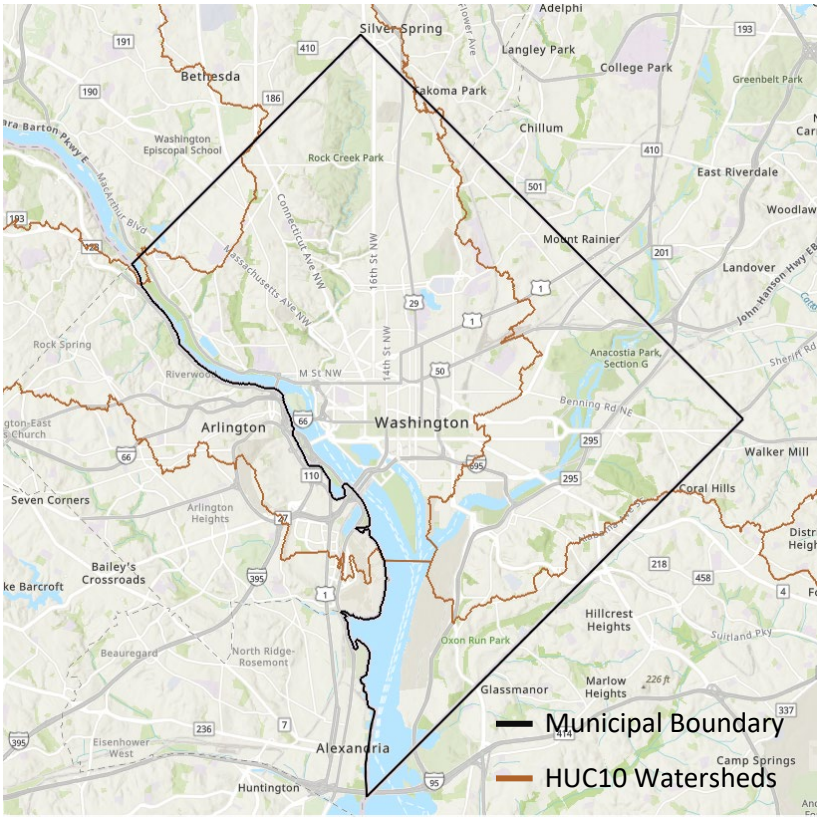
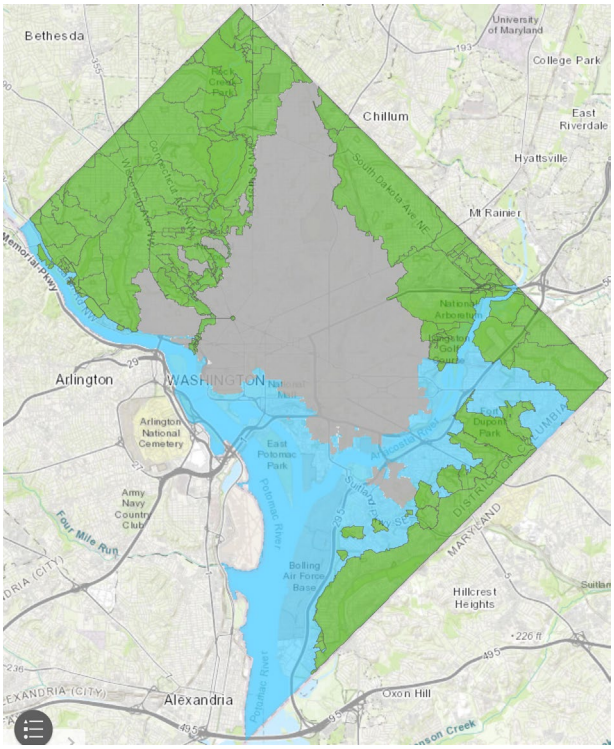


Image 3: Washington D.C. CSS (gray), MS4 (green) and AWDZ (blue)



Below is a table detailing SRC transactions for Washington D.C. from program inception until June 1st, 2024.

Year	Number of SRC Sales	Total SRCs Sold	Total Value of SRCs Sold Per Year	Average SRC Sale Price	SRC Price $/Cubic Feet
2014	1	11,013	$25,000.00	$2.27	$16.98
2015	1	11,013	$20,924.70	$1.90	$14.21
2016	8	24,972	$46,284.40	$1.85	$13.86
2017	15	108,537	$218,912.70	$2.02	$15.09
2018	20	119,290	$247,211.52	$2.07	$15.50
2019	29	254,490	$472,836.99	$1.86	$13.90
2020	45	576,454	$946,243.24	$1.64	$12.28
2021	47	381,490	$589,482.53	$1.55	$11.56
2022	51	419,112	$609,259.46	$1.45	$10.87
2023	66	426,686	$609,456.37	$1.43	$10.68
2024 (YTD)	30	162,677	$220,486.19	$1.36	$10.14

Price Lock Program

As previously mentioned, Washington D.C. has implemented a price lock program within its credit trading system to enhance market stability and facilitate the development of green infrastructure. This program, supported by an initial funding of $11.5 million, establishes a price floor for credits, ensuring reliable transactions for credit generators and fostering the participation of various entities, including non-profit organizations.

The price lock program is designed to stabilize credit trading by ensuring credit generators have a buyer prior to the construction of their green infrastructure projects. This initiative is particularly beneficial for non-profit entities such as churches and schools, enabling them to participate more effectively in credit generation. Under this program, SRC generators are able to sell high-impact credits to the Department of Energy and Environment (DOEE) at predetermined, fixed prices.

This arrangement supports new, voluntary green infrastructure projects within the Municipal Separate Storm Sewer System (MS4) area. The program permits these projects to engage in SRC purchase agreements with the DOEE before construction commences.

Prior to the construction of a GI project, SRC sellers enter into a purchase agreement with the DOEE. This agreement specifies a confirmed selling price set by the DOEE. Upon completion of the project, sellers have the option to either sell the credits to the DOEE at the contracted price, or sell the credits on the SRC marketplace at a price negotiated with a private buyer. If the credits are sold to a private buyer, the DOEE will subsidize a portion of the purchase price on behalf of the private buyer.

The price lock program is a strategic initiative aimed at stabilizing the credit trading market, ensuring financial predictability for credit generators, and supporting the development of green infrastructure projects. By providing fixed price guarantees and facilitating diverse participation, the program contributes to the overall efficacy and growth of Washington D.C.'s credit trading system, but required substantial funding in order to provide stability.

3.2.2 Grand Rapids, Michigan

Program Overview

The feasibility study for a hybrid fee-in-lieu and stormwater credit trading and banking program was completed in 2019, with the program officially launched in 2023. Under this program, one credit equates to one cubic foot of stormwater retention. A 2021 update to the City's MS4 permit mandated retention for a 2.56-inch storm event. Specifically, the updated requirement stipulates that retention must be achieved on-site for the increased runoff volume and rate between pre-development and post-development conditions, covering all storms up to and including the 2-year, 24-hour rainfall event.

In Grand Rapids, developers have two primary options for stormwater management compliance: achieving full onsite compliance or partial onsite compliance combined with one of the following alternatives:

- Offsite Mitigation/Credit Banking: Developers can construct equivalent green stormwater infrastructure (GSI) at an offsite location within the same watershed, provided the offsite location is controlled by the developer.
- Payment of Fee-in-Lieu (FIL): Developers can pay a fee to the City, which is used to fund GSI projects built by the city.
- Purchasing Credits: Developers have the option to purchase stormwater credits from the market, which are generated from offsite locations.

Additionally, for sites with limiting conditions such as poor soils, soil or groundwater contamination, shallow groundwater, or bedrock, an alternative approach using extended detention is permitted – but only when offsite options are not available.

In Grand Rapids, the credit ratio requirements for offsite mitigation differ from those in Washington D.C., where credit ratios apply only to specific zones. In Grand Rapids, all offsite mitigation must adhere to a standardized credit ratio. If a developer achieves onsite retention of 0.4 inches, any additional stormwater volume required to meet compliance must be addressed at a ratio of 1:1.5. This means that for every 1 cubic foot of stormwater volume needed for compliance, developers must either generate or purchase 1.5 cubic feet of offsite volume.

If onsite management cannot meet the minimum volume requirements, developers are required to generate or purchase credits at a 1:2 ratio, meaning that for every 1 cubic foot of stormwater volume needed, 2 cubic feet of credits must be acquired or generated offsite.

Additionally, developers who comply with permit requirements onsite have the option to install green stormwater infrastructure that captures more stormwater than required. This excess capacity allows for the "banking" of stormwater credits, which developers can either sell on the market or retain for future development projects.

Fee-in-lieu

The City of Grand Rapids charges developers an 'In Lieu Fee' for new and redevelopment projects that are unable to comply with stormwater regulations onsite and who do not wish to purchase credits on the market. The ILF is set on a case-by-case basis, though their manual states that it is structured to incorporate costs associated with publicly funded green infrastructure projects, and is designed to act as a price ceiling and incentive for participation in the credit trading market. The fee is structured so that developers pay a one-time fee for the volume of stormwater they are required to manage, and are then responsible for contributing annually to the maintenance and rehabilitation costs for the associated City-built GSI projects.

Credit Generation

In the current framework at the time of launch, only GI projects installed by the City's department were eligible for retroactive credit generation. Stormwater Credits are calculated based on the volume of stormwater runoff managed by the GI, with each credit representing one cubic foot of retention capacity.

To qualify for credit sales on the market, GI projects must retain a minimum of 250 cubic feet of stormwater. This threshold is designed to encourage the development of larger-scale GSI projects and to streamline administrative processes by minimizing the number of projects requiring review, approval, and inspection.

According to the City's website, there are currently 19 credit-generating sites, all of which are owned by the City of Grand Rapids. The focus now is on identifying existing projects with excess capacity that could potentially contribute additional credits to the market.

Trading Area

The City covers an area of 46 square miles and is entirely situated within a HUC10 watershed: the Rush Creek-Grand River watershed. Within this watershed, the City is divided into three distinct trading areas, based on geographic and watershed boundaries. The City developed these boundaries as a way to promote balanced green infrastructure and economic growth, and property owners must purchase stormwater credits from sellers within the same trading zone as their project site.

Image 4: Grand Rapids Municipal and HUC10 Watershed Boundaries

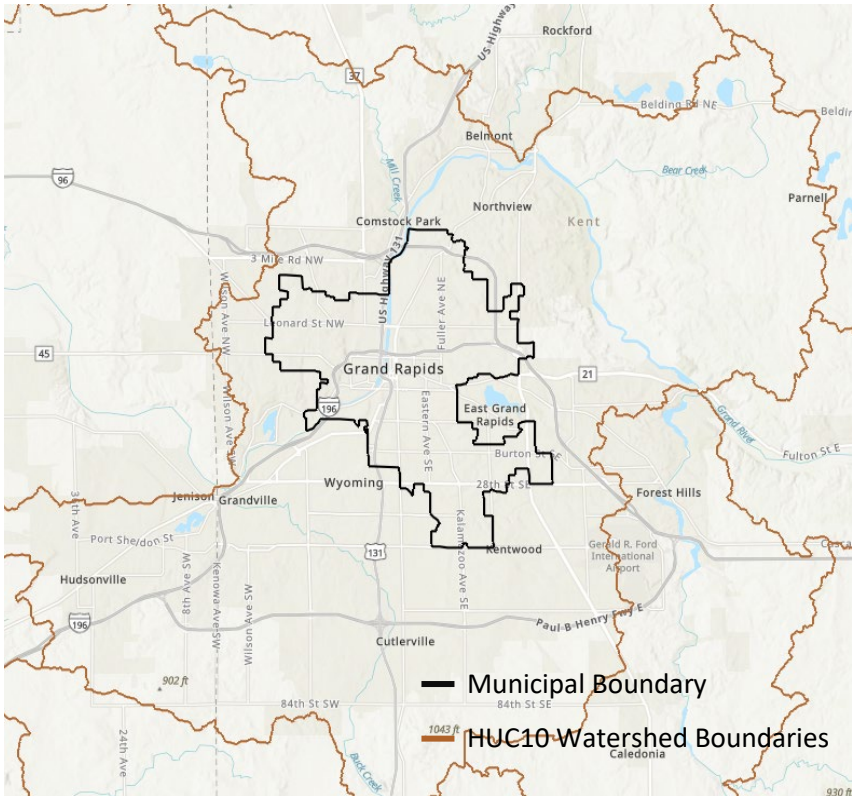
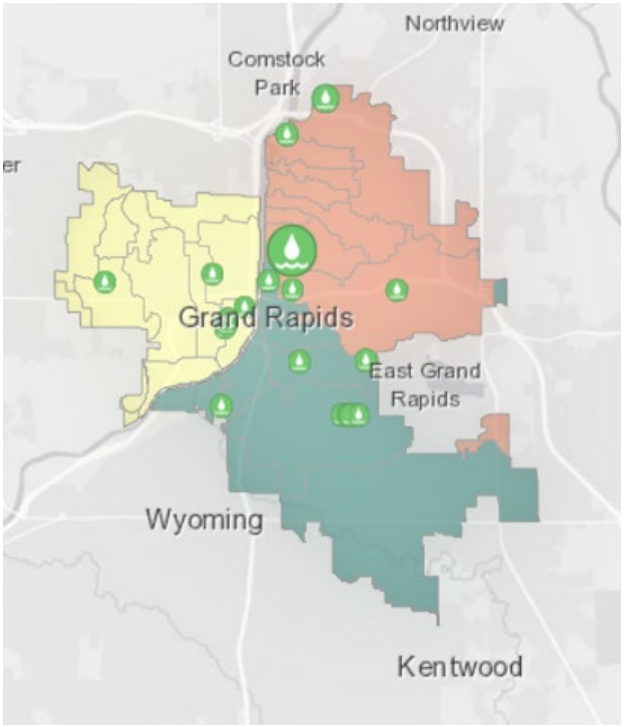


Image 5: Grand Rapids Trading Boundaries



3.2.3 Middleton, Wisconsin

For a local perspective within Dane County, the City of Middleton, Wisconsin was also briefly examined. The City currently only collects FIL for stormwater infiltration and recharge based on the amount of impervious area for a project. The fee is set at $0.20 per impervious square foot for new development, and $0.10 per impervious square foot for redevelopment projects. All FIL requests must receive approval from the Water Resources Management Commission (WRMC), who frequently requests the incorporation of additional green infrastructure, such as a lined biofilter or a green roof, to enhance evapotranspiration, even if formal infiltration or recharge is not feasible.

A brief evaluation provided by the City showed that between January 1, 2018, and April 1, 2021, there were 11 FIL requests associated with a total of 35 stormwater permits. The total fees-in-lieu collected during this period amounted to approximately $125,000, averaging about $38,500 per year.

These fee rates are notably lower than the typical costs associated with installation and maintenance of stormwater management systems, though are not necessarily atypical when compared with a program such as San Antonio, where the fees-in-lieu range from $0.15-$0.25 per square foot of impervious surface, but are combined with the City's stormwater utility fee revenue.

3.3 Lessons Learned

Exploring lessons learned from the evaluation of existing stormwater FIL and volume credit trading programs reveals valuable insights into both their effectiveness, and challenges they face with implementation. These initiatives strive to balance economic development with environmental sustainability, and existing programs can assist in identifying potential incentives and opportunities for success for implementation on a local level.

3.3.1 Trading Boundaries

Trading boundaries play a crucial role in stormwater FIL and volume credit trading programs by delineating where credits for stormwater management can be exchanged. These boundaries are vital for environmental protection, as they ensure that trades occur within areas where hydrological connectivity exists, thus minimizing risks such as localized flooding, erosion, or degraded water quality in unrelated areas. They also help programs comply with regulatory standards, such as Total Maximum Daily Loads (TMDLs), by focusing credit transactions within defined limits that support water quality objectives. Moreover, trading boundaries promote fairness and operational efficiency by clarifying where credits can be generated and traded, ensuring equitable distribution of benefits and facilitating program administration. Overall, these boundaries are essential for maintaining the balance between environmental sustainability and economic development in stormwater management efforts.

3.3.2 Regulatory Thresholds

The effectiveness of stormwater credit trading programs is significantly influenced by the regulatory thresholds set for offsite compliance. If these thresholds are overly restrictive, there may be insufficient demand for the program, potentially undermining its success. It is crucial to establish regulatory conditions that balance the need for offsite options with practical feasibility to ensure program viability.

One example of too restrictive thresholds comes from the City of Chattanooga, Tennessee. Chattanooga developed a credit trading program that, despite its establishment, did not result in any transactions.

This program allowed developers to make a one-time, upfront credit payment to meet stormwater management requirements. However, changes to the MS4 permit requirements severely restricted the circumstances under which developers could achieve compliance offsite, ultimately undermining the effectiveness of the program. This experience has been noted in other feasibility reports as a valuable lesson, highlighting how too restrictive of thresholds can lead to the collapse of a program.

3.3.3 Cost Considerations

Establishing and administering a FIL or stormwater credit trading program generally incurs higher costs for the regulatory agency compared to typical requirements of managing retention on-site. These costs include program development, administration, and ongoing oversight. Since the programs are typically managed by the regulatory authority within the municipality, it is important for agencies to consider these financial implications when designing and implementing a trading program, ensuring that the benefits outweigh the associated expenditures. Most programs do not appear to be self-sustaining, and therefore requiring ongoing funding for program operation.

In addition to administrative costs, setting an initial credit price is also essential to a successful program. When setting the initial rates for a FIL program, consideration of the full costs of BMPs is crucial. A key policy consideration is how fees should be structured, including whether to incorporate opportunity costs and ongoing expenses (such as capital and maintenance costs).

If the rate exceeds the construction costs, developers are incentivized to find innovative ways to meet requirements. Conversely, if the rate is lower than the construction costs, developers may seek exemptions by demonstrating site hardships. Conducting thorough upfront research and cost estimation is essential for administrators to effectively guide participants' actions in the program. FIL rates are often set higher than installation costs to encourage developers to implement measures on-site. In contrast, credit banking and trading programs operate on market-driven pricing, where credit holders compete to sell credits at competitive rates lower than FIL costs. Given that municipalities assume responsibility for stormwater management—including locating suitable sites and ensuring proper design, construction, and maintenance—it could be argued that private entities should bear some of these risks and responsibilities through higher fees.

For a stormwater credit trading program to be successful and robust, such as with Washington D.C., stormwater agencies may also want to consider options available to provide adequate incentives for participation in credit trading. Upfront investment into both incentive programs, as well as establishing projects which can be used for a FIL program, have fostered a robust marketplace in D.C. Without effective incentives, the program may fail to attract sufficient engagement from property owners and developers, limiting its overall impact and effectiveness.

3.3.4 Program Administration Needs

Effective administration of a stormwater credit trading program involves several critical components. Key aspects of a robust and successful program need to plan for management for the following when considering administrative needs:

- Permitting of projects, which requires establishing clear design guidelines and maintenance obligations to ensure compliance and functionality.
- Eligibility criteria for credit generation must be well-defined, along with conditions for off-site credit purchases.
- Credit certification processes need to be robust to verify the validity of credits issued.
- Inspection and enforcement are essential to ensure adherence to program requirements, while tracking credit purchases facilitates transparency and accountability. The presence of multiple municipalities can complicate program management, making coordination and standardization challenging.
- An online marketplace can streamline transactions and increase accessibility.
- Public and stakeholder education and outreach are crucial for fostering understanding and participation.
- Ensuring program equity involves balancing the costs to developers and the selection of installation locations to achieve fair and effective outcomes.

3.3.5 Common Program Goals

Existing programs have typically been implemented with the following common program goals listed:

- Maximize flexibility for property owners and developers
- Provide an option when onsite controls may be very expensive for property owners or may not be feasible due to site constraints
- Result in overall water quality and stormwater control benefits through installation of additional GI
- Allows municipalities to encourage/incentivize credit generation in areas where it will result in the greatest overall benefit

Most notably, Dane County's emphasis on requiring onsite infiltration to the maximum extent practicable in the case of exemptions or prohibitions is contrary to the goal of maximizing flexibility for property owners and developers. A FIL or volume credit trading may provide developers with the opportunity to preserve developable land instead of allocating it for stormwater management features with developers willing to pay higher FIL costs, but this structure may also result in the shifting of risk to the public sector in order to avoid handling the design, construction, and maintenance of stormwater management on their own sites.

4.0 Dane County Program Evaluation

In order to understand what the implementation of a program may look like on a local level, an evaluation of the existing stormwater management program in Dane County was conducted through evaluation the following:

- Establishment of a fee-in-lieu price
- Identifying previous permits issued with exemptions and prohibitions
- Reviewing the expected program demand
- Evaluating the program feasibility with consideration of lessons learned from existing programs

These evaluations help guide the considerations for implementing a local FIL and Stormwater Volume Credit Trading Program, and aim to create a framework that could be both practical and beneficial for the county.

4.0.1 Dane County Geographic Review

County Size

Dane County is a county located in southern Wisconsin, and has an area of approximately 1,238 square miles. According to the 2020 U.S. Census Bureau, it had a population of approximately 552,536 people, making it the second most populous county in Wisconsin. Within Dane County, there are 8 cities and 20 villages.

HUC Watersheds

A Hydrologic Unit Code (HUC) is a hierarchical system used in the United States to divide up geographic areas into nested hydrologic units based on watershed boundaries. The HUC system was developed by the United States Geological Survey (USGS) and the Natural Resources Conservation Service (NRCS) to facilitate water resource management and planning.

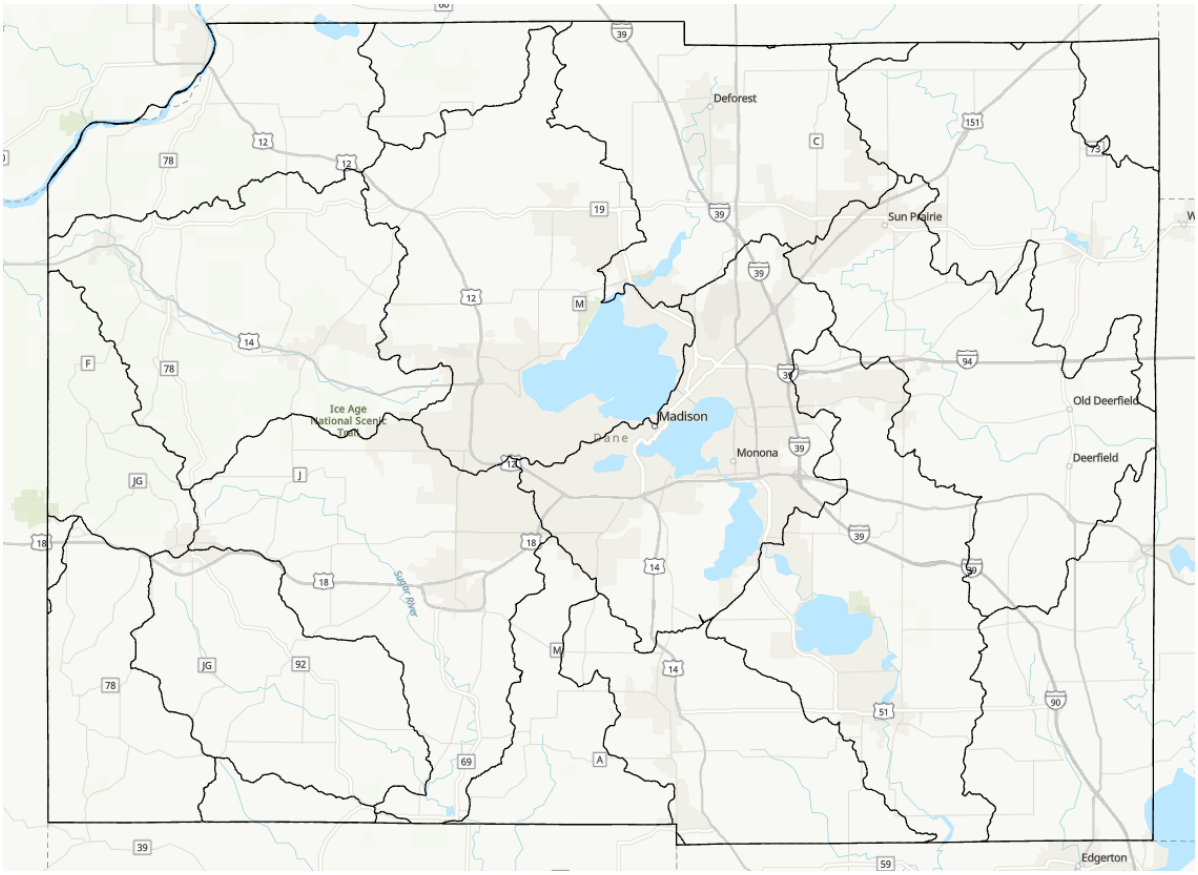
Watersheds are defined at multiple levels. The national watershed dataset assigns nested areas unique HUCs. Codes can be 2, 4, 6, 8, 10, or 12 digits. The largest watersheds have 2 digits. As more digits are added, the area is subdivided, and the watershed is smaller. For example, HUC 07 is the Upper Mississippi region.

Understanding this nested structure of watersheds helps put regional water quality issues in context. Issues identified at a local scale are influenced by upstream actions and, in turn, affect water quality downstream. Within Dane County, there are 21 HUC10 watersheds that are either partially or fully located within county municipal boundaries. The 21 HUC10 watersheds are listed and shown in the table and map below.

If a FIL and Volume Trading program were to be implemented in Dane County, trading boundaries should be limited to HUC10 watersheds in order to prevent potential negative water quality impacts that may result from trading boundaries that are too extensive.

Watershed Name	Watershed Code
Upper East Branch Pecatonica River	SP06
Allen Creek and Middle Sugar River	SP13
Upper Sugar River	SP15
Yahara River and Lake Kegonsa	LR06
Yahara River and Lake Monona	LR08
Lower Koshkonong Creek	LR11
Upper Koshkonong Creek	LR12
Mill and Blue Mounds Creek	LW15
Black Earth Creek	LW17
Little Sugar River	SP14
Yahara River and Lake Mendota	LR09
Roxbury Creek	LW18
West Branch Sugar River - Mt. Vernon Cr	SP16
Lake Wisconsin	LW19
Badfish Creek	LR07
Six Mile and Pheasant Branch Creeks	LR10
Honey Creek	LW16
Gordon Creek	SP05
Lower Crawfish River	UR02
Maunesha River	UR05
Upper Crawfish River	UR06

Image 6: HUC10 Watersheds within Dane County



4.1 Establishment of a Fee-in-lieu Price

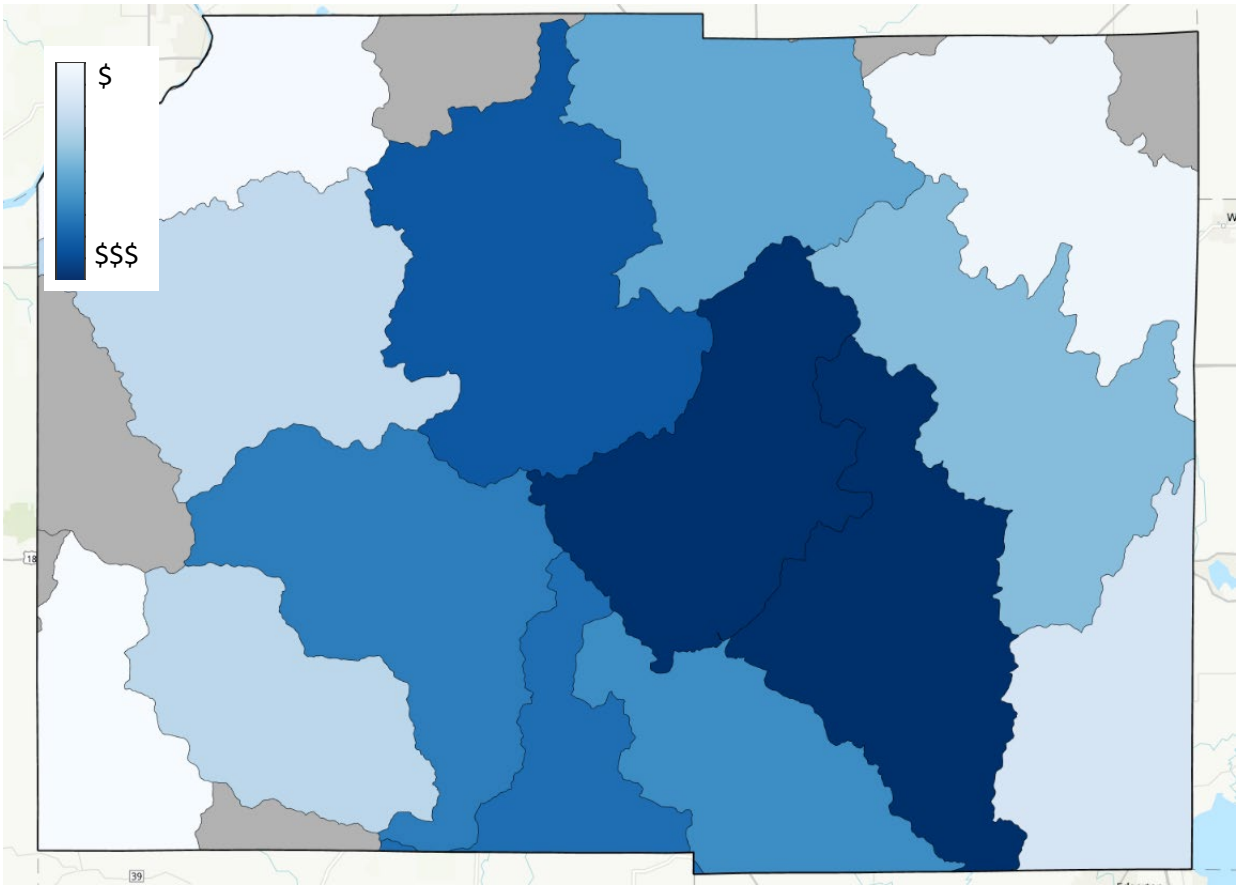
Setting an appropriately calculated FIL is crucial for equitable and fair urban development. This fee allows developers to contribute monetarily instead of providing the required onsite stormwater retention. It must accurately reflect the true cost to the municipality for both capital costs and ongoing costs for implementing GI on the developer's behalf. In Dane County, a FIL would be based on unmet onsite infiltration demand, so should be set in cubic feet per year. The following cost considerations were identified as the main items which would need to be accounted for when setting a fee-in-lieu price:

- Planning
    - Land and siting costs
        - Surveying, soil tests
    - Permitting
    - Engineering design and review
- Construction
    - Mobilization
    - Erosion Control
    - Materials
    - Labor
- Approval
    - As-builts, surveying
    - Permit approval
- County Administration
    - Yearly maintenance
    - Yearly inspections
    - Program administration
    - Tracking credits
    - Verifying payments

4.1.1 Land Costs

When beginning the evaluation, land costs were initially identified as potentially the most variable cost that would impact a standard, county-wide FIL price. In order to better understand how the price of land varies throughout the county, a rudimentary analysis of 958 for sale and recently sold lots/land in Dane County was completed. The analysis was filtered to include only lots ranging from 5,000 square feet to 5 acres. This filtering may skew the results, as costs per acre generally decrease with larger land purchases. However, for the purpose of installing infiltration practices, large plots may not be ideal due to increased maintenance costs for the municipality associated with managing larger land areas. The cost per acre for each lot was calculated, and each lot was mapped. The average cost per acre of developable land was then calculated for each HUC10 watershed.

Image 7: Mean Cost per Acre of Lots/Land in Dane County by Watershed [For Sale & Recently Sold]



The gray areas on the map indicate watersheds for which no data was available. While the actual average price per acre did not provide data for setting a FIL price, this map serves to demonstrate the variable land prices across different watersheds. As expected, land in highly populated areas and surrounding the Yahara chain of lakes is in high demand, and thus more expensive, which underscores the challenge of setting a standard fee-in-lieu for the entire county.

While a uniform, county-wide FIL price may not be appropriate due to the county size, it was still important to establish a baseline cost. To assess land acquisition costs from a different perspective, data from recent county land acquisitions was evaluated. Between 2020 and 2023, the County acquired 19 land parcels with an average cost of $77,394 per acre, giving an average cost of $1.78 per square foot.

4.1.2 Project Review and FIL Price Calculation

In order to standardize a project price, 12 recent stormwater management projects throughout the county that incorporate infiltration practices were evaluated. These projects were selected to represent a diverse range of site characteristics, with varying land use types, site area, impervious surface percentages, infiltration practices, native soil infiltration rates, and infiltration practices.

The approved stormwater management reports were used to determine the average performance of various BMPs. WinSLAMM modeling results, site plans, and cost estimates were used to determine the average infiltration footprint (bottom area), average land required (top area), average volume of infiltration per square foot of infiltration footprint, and average construction costs per square foot of infiltration footprint. This analysis is further broken down in the table below.

A	B	C	D	E	F	G
Infiltration Footprint (sqft)	**Infiltration from Device (cuft/year)**	**Infiltration Volume/sqft of Infiltration Footprint [B/A]**	**Stormwater Cost Estimate ($)**	**Cost/sqft of Infiltration ($/sqft) [D/A]**	**SM Practices Total Installation Area (sqft)**	**Installation Area Required per sqft of Infiltration [F/A]**
800	13,678	17.1	26547.75	33.18	1,800	2.25
1600	54,981	34.4	-	-	2,400	1.50
1800	52,496	29.2	32805.33	18.23	3,990	2.22
1025	9,659	9.4	28185	27.50	3,277	3.20
1500	43,527	29.0	23000	15.33	2,500	1.67
7553	144,281	19.1	-	-	11,785	1.56
17299.4	215,575	12.5	204316	11.81	19,099	1.10
18586	272,517	14.7	74042.34	3.98	29,860	1.61
3413	86,113	25.2	50760	14.87	20,180	5.91
1800	34,713	19.3	53500	29.72	6,242	3.47
4500	297,477	66.1	62853.35	13.97	57,723	12.83
55400	676,832	12.2	346695	6.26	144,053	2.60
9606.4	**158487.4**	**24.0**	**90270.5**	**17.5**	**25,242**	**2.63**

This data was used to extract the following key information:

Median Infiltration Footprint	2,606 sqft
Expected Infiltration Volume per Square Foot of Infiltration Footprint	24.0 cuft/sqft
Average Cost per Square Foot of Infiltration Footprint	$17.50
Average Land Area Required per Square Foot of Infiltration Footprint	2.63 sqft

Note that median infiltration footprint from column A was used instead of average, as some projects had large outliers and larger infiltration practices may only provide incremental benefit as size increases. Using this information, and assuming one credit in a county-wide program would equate to one cubic foot of infiltration capacity per year, it can be assumed that a 2,600 square foot project would generate 62,400 credits on an annual basis. Additionally, the following costs were assumed for the implementation of an infiltration project by the county:

Item	Unit Cost	Unit	QTY	Total Cost
Engineering Plan Design, Review, Approval	$5,000	LS	1	$5,000
Soil Testing	$800	LS	1	$800
Mobilization	$3,000	LS	1	$3,000
Erosion Control	$7,000.00	LS	1	$7,000
Construction Costs	$17.50	SQFT	2,600	$45,500
Construction Labor (Assume 30% project total)	$18,500.00	LS	1	$18,500
			Project Capital Cost	**$79,800**

These project costs and the following assumptions were all used to set a potential FIL price: a 20-year project lifespan before rehabilitation is required, a $5,000 annual maintenance cost (to incorporate program administration), a 0% return on investment for the county, and a land value of $3.00 per square foot to account for some land area surrounding the infiltration practice. These values were then entered into the Stormwater Credit Price Calculator developed by the City of Grand Rapids, which accounts for inflation as well as rehabilitation as a percentage of capital costs.

This format allows the seller, or in this case the county, to consider two potential payment structures: an initial credit price with a recurring annual maintenance payment or a single one-time payment. This approach aims to balance upfront costs with long-term financial sustainability for stormwater management initiatives. The following would be a potential recommendation for the FIL price for a county program based on previously permitted and implemented projects within the county:

FIL Price	
Initial Credit Price	$1.40
Ongoing annual credit price (to cover maintenance and rehabilitation)	$0.11
OR	
Total one-time (upfront) credit price	$4.12

Image 8: Map Showing 12 Project Locations

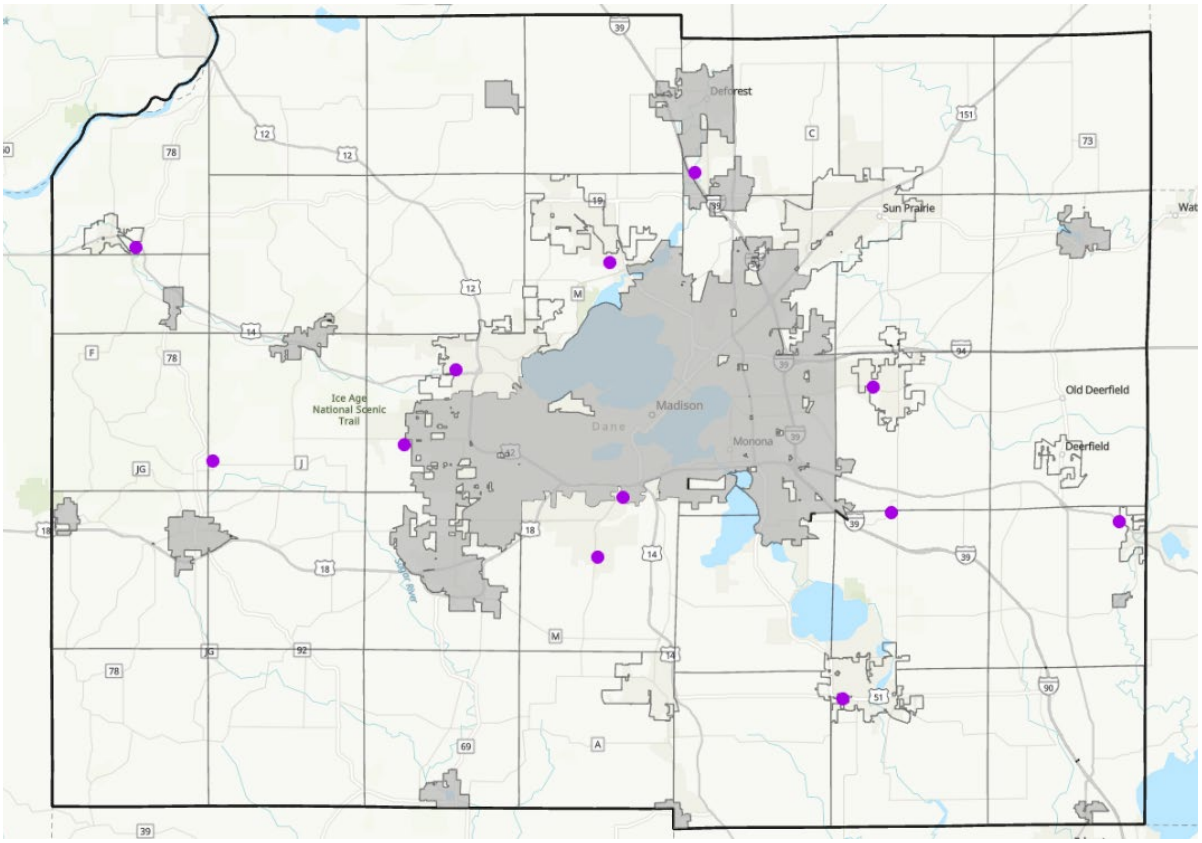
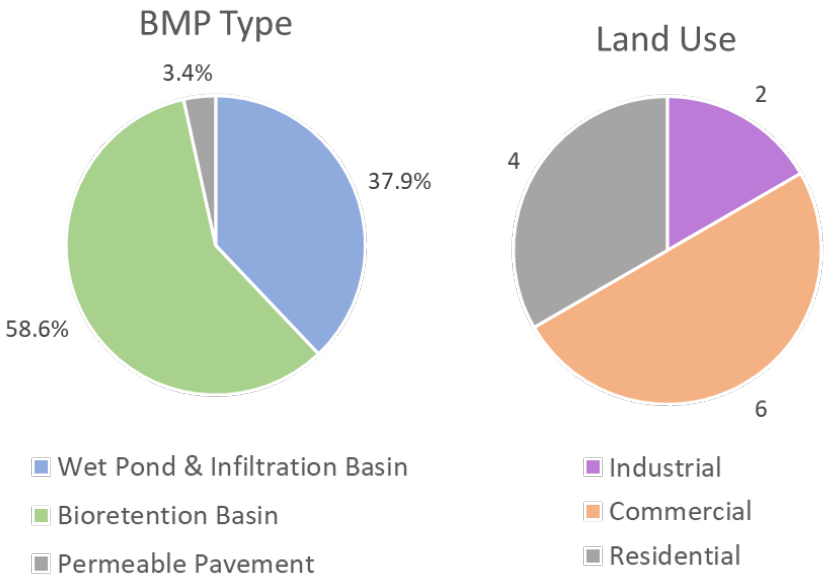


Image 9: Breakdown of BMP Types and Land Use Types for 12 projects



4.2 Review of Expected Program Demand

4.2.1 Overview of Stormwater Management Permits

An evaluation was conducted of all stormwater permits fulfilled between June 1, 2017, and June 7, 2023. This analysis focused on identifying permits that included exemptions or prohibitions. By reviewing the permits issued within this timeframe, we assessed the frequency and types of exemptions granted and any prohibitions imposed, providing insights into potential demand and program participation that a FIL and Stormwater Volume Trading program may expect.

The current database that is used for tracking erosion control and stormwater management permit currently lacks the functionality to systematically track permit exemption requests and prohibitions, which is a specific time period was used for analysis. This process involved reviewing all available stormwater permits to identify those with any form of exemption or prohibition. For the results, permits with the exemption for '10% of disconnected impervious surfaces' were not included, as these already meet the intent of the infiltration standard due to their limited imperviousness.

Overall, a total of 485 Stormwater Management permits were fulfilled by the Water Resources Engineering Division. It should be noted that this includes data from municipalities who have entered into an ICA contract with the county. ICA Municipality permit review is done by the County, though actually stormwater management permits are issued by the local municipality. The table below further details stormwater management permits issued during the evaluation time period.

Stormwater Management Permit Breakdown						
	All Permits		Dane County		ICA Munis	
	Total	%	Total	%	Total	%
Permit Requests Fulfilled	485	-	278	-	207	-
Exemptions & Prohibitions	176	36.3%	90	32.4%	86	41.5%
Redevelopment Only	92	19.0%	42	15.1%	50	24.2%

One thing to note is that exemptions and prohibitions are roughly equivalent across municipalities and the county, with redevelopment projects being slightly more prevalent in municipal areas, which is to be expected.

4.2.2 Evaluation of Permits Issued with Exemptions and Prohibitions

The permit evaluation from the previous section was further broken down to provide insight into sites with infiltration exemptions and infiltration prohibitions, with the results below.

Exemptions	
Redevelopment	92
10% Disconnected Impervious*	10*
Agricultural Facilities and Practices	15
Clay Soils	33
Expansion of Municipal or County roads	7
Roadway Within Commercial Development**	4
Total	**151**

**Removed from total count because the exemption meets the intent of the infiltration standard*
***Was a previous exemption that has since been removed from Chapter 14, included in total count*

Prohibitions	
Tier 1 Industrial Facilities	1
Tier 2 Industrial Facilities	0
Fueling and Vehicle Maintenance Areas	0
Gradient conduit to groundwater	0
Separation Distances	18
Wellhead Protection Area	2
Contaminated Soils	4
Total	**25**

Over the six-year period from June 1, 2017, to June 7, 2023, there was relatively low demand for prohibitions in stormwater permits, and most of these were due to separation distances. In contrast, there appears to be 8 demand for exemptions, especially in the context of redevelopment projects. However, it should be noted that since the 2021 ordinance amendment, redevelopment projects are now subject to green infrastructure requirements, and an average of 15 redevelopment permits per year may not be sufficient demand to develop a robust program. Additionally, it is important to note that implementation of a FIL or Volume Credit Trading program would require either the implementation of fees on sites who currently have blanket exemptions (such as Agricultural Facilities or Municipal Roads), or further evaluation of which sites are required to use FIL or stormwater volume credit trading to meet infiltration standards offsite.

Image 10: Permits Issued with Exemption and Prohibitions by Location and Relative Infiltration Gap

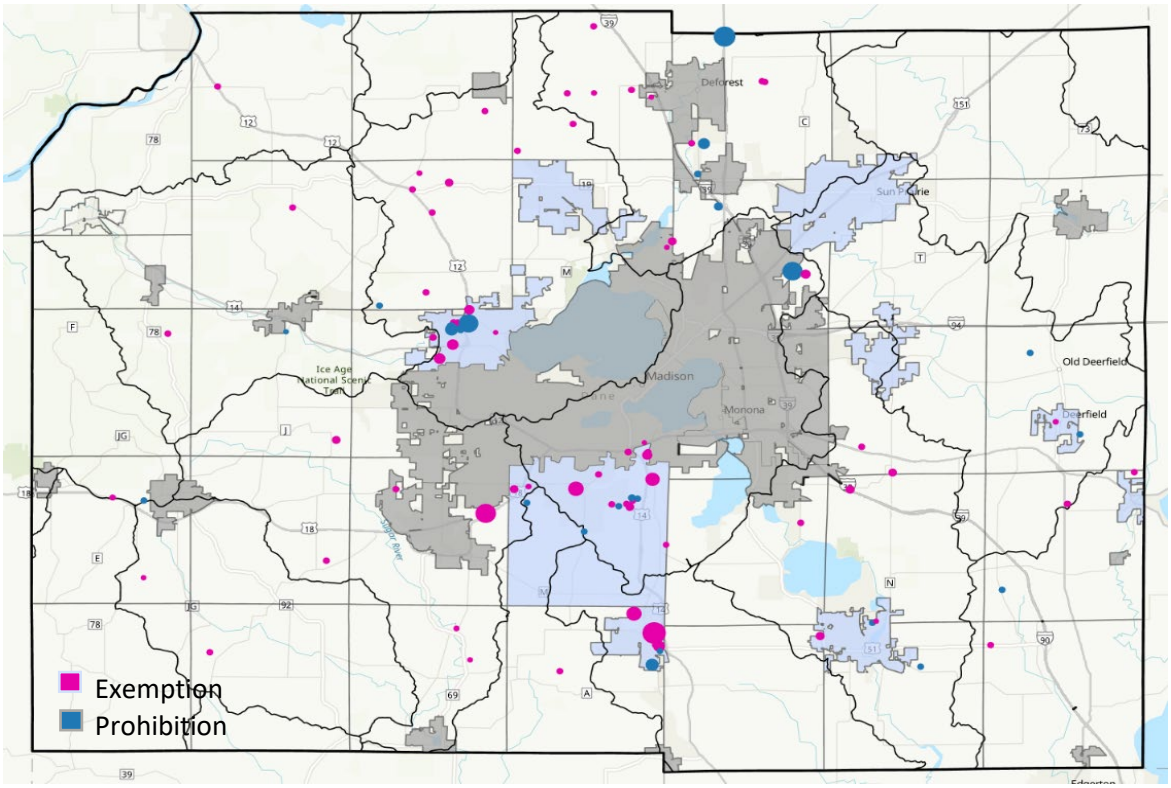
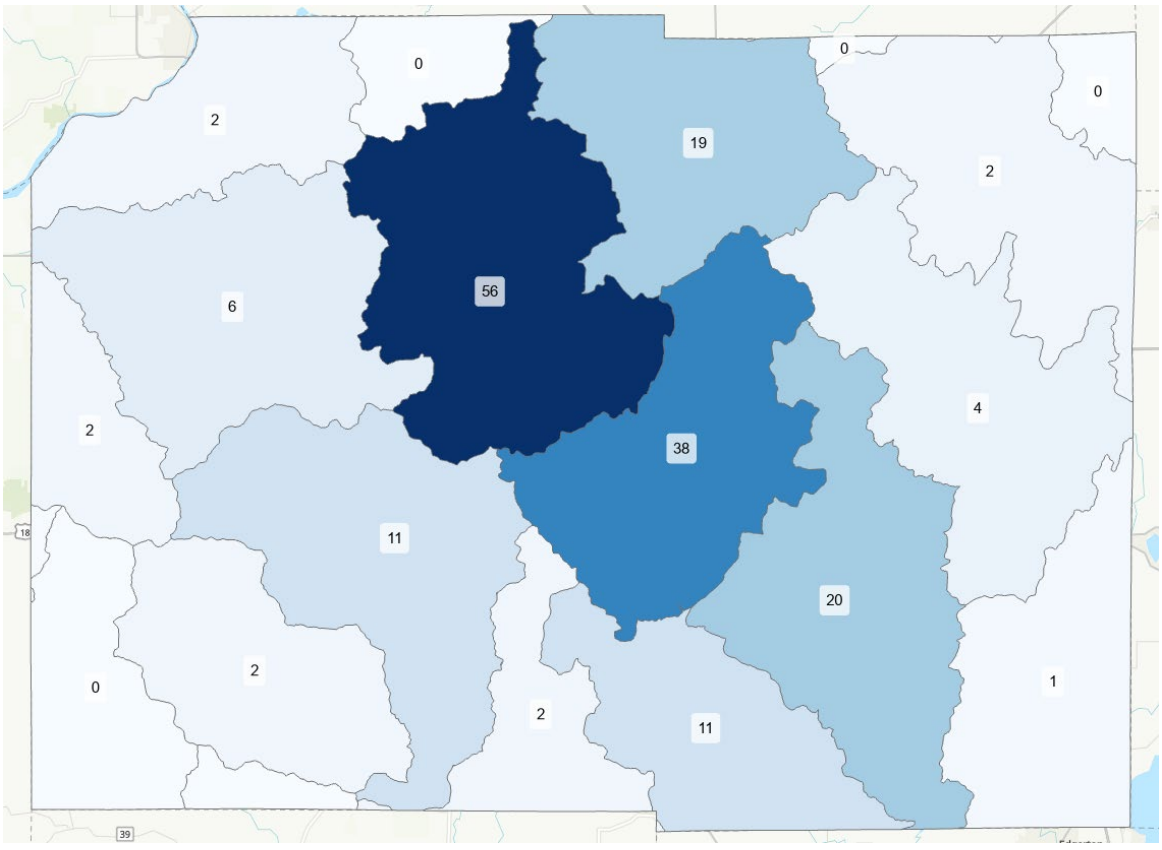


Image 11: Exemptions and Prohibitions Total County per HUC10 Watershed



4.2.3 Evaluation of Unmet Infiltration Demand

Once the initial review of stormwater permits since June 1, 2017 was completed, the identified exemptions and prohibitions were further analyzed in order to better understand the unmet infiltration demand that a FIL and Volume Trading program could help meet.

For the purposes of this analysis, sites that currently have a blanket exemption were not included in the calculations for unmet infiltration demand. Since these sites are fully exempt and were not required to implement infiltration practices in their stormwater plan, it is difficult to not only determine what percentage of the site may have had an unmet infiltration demand, but also whether or not they would have elected to participate in a FIL or Volume Credit Trading program. Many of the wholly exempt sites, such as agricultural facilities or municipal road projects, are already located in areas where it may be cheaper to implement onsite controls rather than purchase the equivalent credits for offsite management.

Redevelopment sites were also not included as there previously was no metric for them to meet (i.e. a 45% infiltration standard, and current redevelopment to GI standards have no exemptions. In order for there to be demand generated by redevelopment sites under the current county infiltration standards, the county would need to relax the 0.5" requirement to allow developers to meet a portion or all of it offsite, when 0.5" is already near the minimum established in other programs for onsite retention requirements.

This analysis was mainly focused on projects which would typically be required to meet infiltration standards, but were unable to fully meet requirements due to site constraints. In order to evaluate those projects, an initial plan review was conducted that identified the following information:

- Total site area
- Total impervious area
- Total area exempted
- Portions of the site subject to redevelopment standards
- Preexisting impervious area (pre-2001)
- Pervious Curve Number
- Project location

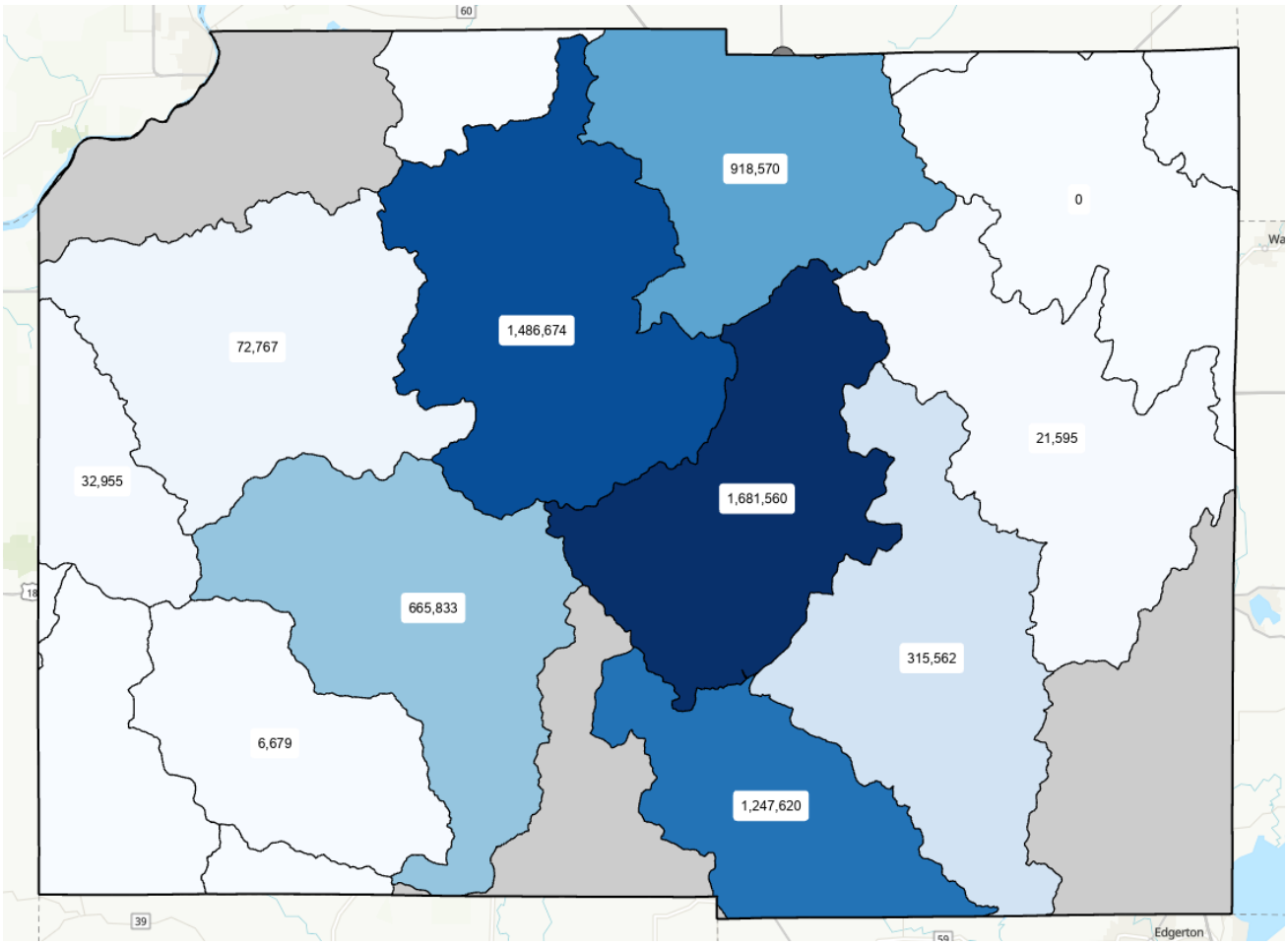
This information was then used to model each site in RECARGA v.2.3 to determine the anticipated stay on achieved for each site. When performing this analysis, the following assumptions were made:

- A 90% infiltration goal equivalent to 25.5" per year for each site
- A one square foot infiltration basin (Equivalent to none, you cannot run RECARGA with a 0 square foot infiltration practice. This allows a uniform, conservative assumption that the exempted portion of each site is not being routed to an infiltration practice.)

Once run, RECARGA outputs a stay-on achieved depth (in inches). The stay-on achieved subtracted from the 90% infiltration goal gives the depth of the unmet infiltration demand on site, or rather the depth of runoff that should be infiltrated to meet the 90% goal but is not. This unmet infiltration depth was then converted to feet, and applied over the exempted site area to give an unmet infiltration volume in cubic feet per year.

The calculated unmet infiltration demand was then mapped, and summed on a watershed basis. Over a six-year period, the total unmet infiltration demand was 6,449,819, for an average increase in 1,074,969 cubic feet per year. It should be noted that the Badfish Creek Watershed, which had 1,247,620 cubic feet of unmet demand, only had 7 permits with unmet demand but one large project located in the Village of Oregon was an outlier that accounted for roughly 500,000 cubic feet of the total unmet demand. Otherwise, results were expected with the highest demand watersheds being those surrounding the Yahara chain of lakes, where development rates are the highest.

Image 12: Sum of Unmet Infiltration Demand from 6/1/2017-6/7/2023, by Watershed [cuft]



To put unmet volume in context, if approximately 1,000 acres of impervious surfaces subject to infiltration standards were developed in Dane County each year, the amount of additional infiltration achieved by addressing the calculated unmet demand would only increase the total county-wide infiltration by approximately 1.14%.

Stormwater Compliance	
100% Stay-on (28.81")	104,580,300 ft^3
90% Stay-on Requirement	94,122,270 ft^3
90% Infiltration Achieved if Exemptions and Prohibitions fully meet standards	95,197,239 ft^3
	1.14% Increase in Infiltration Achieved

4.3 Considerations for Feasibility of a Local FIL and Stormwater Volume Credit Trading Program

When assessing the feasibility of implementing a local program, it is essential to consider the anticipated demand for the program, the current regulatory environment, and insights gained from existing programs. These factors will provide a comprehensive understanding of the program's potential effectiveness, ensure compliance with existing regulations, and highlight best practices and potential pitfalls based on prior experiences. This thorough evaluation helps in designing a program that is both practical and adaptable to local needs and conditions.

In order to implement a successful FIL and Stormwater Volume Credit Trading Program, the following items were identified as needs for the administering agency:

- An inspection/maintenance program for credit recertification
- Staff for implementation and administration of the program
    - Additional staff for maintenance of county owned projects
- A database for the tracking of FIL payments or Stormwater Retention Credits
- A marketplace to connect buyers and sellers of credits
- A long-term operation plan, as development continues FIL programs may become more difficult or more expensive to implement
- Identification of incentives for participation
    - May be time consuming and off-putting for developers to identify a mitigation site and broker a 1:1 transaction with another site
- Establishment of a purchase obligation recurrence
    - Continuous purchase obligation requires more administration, but up-front payments put most of the risk on the agency implementing projects
- Establishment of trading boundaries and thresholds for when developers can go offsite

Most notably, Dane County Land & Water Resources Department currently lacks the maintenance and inspection framework that would be needed for successful implementation of a FIL and Stormwater Volume Credit Trading program. An inspection program has been a long-term goal of the stormwater program, but implementation of stormwater programs in other municipalities has proven difficult and

mostly unsuccessful. Even programs with minimal inspection requirements have struggled due to high demand and insufficient staffing. To address this, efforts are being made to enhance stormwater maintenance education to encourage voluntary compliance within the county.

Without existing formal inspection requirements in place, requiring formal inspections of stormwater BMPs that elect to sell credits would likely only deter developers from participation in a volume credit trading program. The county would either need to implement an inspection program in addition to the FIL and Volume Credit Trading program, both of which would be difficult individually, or forego formal inspection requirements in order to foster participation, which would likely result in a program with negative water quality or volume control benefits.

An additional challenge comes in the form of establishing thresholds for going offsite. Programs with restrictive off-site compliance options are unlikely to succeed in establishing an effective stormwater credit trading system. Narrow exceptions that limit off-site alternatives can hinder the development of a robust trading program. A successful program relies on relatively easy access to off-site options. For example, Washington D.C. allows up to 50% off-site retention, and Grand Rapids has flexible criteria for infeasibility, both of which contribute to their program's effectiveness. In contrast, Chattanooga, TN, experienced limited success due to restrictive off-site requirements. To improve the chances of success, the county would need to consider increasing flexibility for off-site compliance options, which does not align with current county goals that emphasize achieving infiltration onsite to the maximum extent practicable.

The large size of the county also presents a significant challenge in implementing a successful FIL and stormwater credit trading program. Effective trading boundaries are crucial to prevent the exacerbation of flood risks and degradation of water quality. To address these challenges, two potential HUC10 watershed trading areas were identified based on potential demand. It is important to note that the majority of those watersheds are located in areas managed by local stormwater permitting entities. Credit generators would be required to obtain permits for their projects, which would complicate tracking in areas where the County does not manage permitting. Effective program implementation would require developing a robust tracking system and significant coordination with multiple agencies.

Additionally, existing successful programs that have been implemented have been done on a much smaller scale, with much smaller areas and fewer HUC10 watersheds. Grand Rapids, whose limits are located in one HUC10 watershed, established three trading areas to ensure the program was equitable and did not result in negative impacts. Establishing a county-wide program would require even further analysis and careful planning to ensure trading boundaries are appropriately established.

Program Location	**2020 Population** (U.S. Census Bureau)	**HUC10 Watersheds**	**Area**
Washington DC	689,545	4	68.35 sq mi
Grand Rapids, MI	198,893	1	45.63 sq mi
Dane County	552,536	21	1,238 sq mi

4.3.2 Program Risks

In addition to the aforementioned programmatic challenges, there are also several program risks that may be associated with implementing a program, and therefore should be mentioned and considered.

First, a one-time up-front payment could provide greater certainty for both buyers and the stormwater agency, as it ensures that all off-site obligations are met before project completion, simplifying oversight to a single transaction. However, this approach places all future risks and costs on the credit provider. Alternatively, a recurring annual payment system transfers payment responsibilities to the buyer but introduces additional administrative complexity, requiring ongoing management and monitoring. Additionally, the county should consider that allowing preexisting projects, who have already paid capital costs, to participate might disincentivize new program involvement, as it could create a perception of disproportionate benefits or affect the program's appeal to new participants.

The stormwater fee-in-lieu program is dependent on stable revenue streams to finance stormwater management projects and cover administrative costs. Variability in fee collections, economic downturns, or budgetary constraints could threaten the program's financial stability.

Additionally, the fee-in-lieu structure may unintentionally exacerbate socio-economic disparities within communities, as low-income households or small businesses might face a disproportionate financial burden from the fees. Unlike larger developers or well-funded organizations, these groups may struggle to absorb the costs associated with compliance, which can lead to a range of negative impacts. The overall impact could be a widening of socio-economic gaps if the program inadvertently shifts financial responsibilities to those less able to bear them. This could undermine the program’s objectives of equitable environmental management and result in increased financial pressure on already vulnerable groups. Addressing these risks requires careful consideration of fee structures and potential support mechanisms to ensure that the program's benefits are equitably distributed and do not disproportionately impact those with fewer resources.

Implementing stormwater management projects funded through the fee in lieu program also involves technical challenges, such as site suitability, engineering design, construction quality, and long-term maintenance requirements. Technical failures or inadequate project implementation could compromise the program's effectiveness in reducing stormwater runoff and mitigating water quality impacts, and may also result in additional unforeseen costs.

Inadequate stormwater management or insufficient investment in green infrastructure projects funded through the fee-in-lieu program may pose risks to the local environment, including increased flooding, water pollution, habitat degradation, or erosion. Failure to address these environmental risks could result in ecological damage or regulatory sanctions.

Finally. effective governance and oversight are essential for the successful implementation and management of the stormwater FIL and volume credit trading program. However, governance challenges such as potential inefficiencies, difficulty coordinating among stakeholders, or inadequate enforcement mechanisms could undermine program effectiveness and accountability.

4.4 Feasibility Review

One of the initial TAC recommendations was to require trading for sites where on-site controls are prohibited. The review of stormwater management permits issued within a six-year time period demonstrated a low program demand for prohibited sites. Another recommendation was to allow volume trading for redevelopment and exempted sites. There exists potential for some program demand, particularly for redevelopment, however since 2017 recommendation, Chapter 14 has been updated to require 0.5" capture with GI for redevelopment. With an average of around 15 redevelopment permits per year, program implementation would require reducing onsite requirements in order to generate enough offsite demand, which is not recommended when program administration costs are high and onsite control is already a requirement and responsibility of developers.

This information, in combination with the aforementioned challenges associated with county size, trading boundaries, and a lack of an inspection program, means that at this time, a stormwater volume credit trading program is not likely to be successful without significant government funding and upfront investment.

5.0 Alternatives Analysis

Given that stormwater volume credit presents several difficulties, alternative options for a county FIL program have been outlined below. Each option involves establishing a dedicated fund, or funds, to support projects designed to improve stormwater retention throughout the county.

Option 1: Establishing a County-Wide Fund for Stormwater Management Projects

Under this approach, fees would be collected from sites where on-site infiltration practices are not feasible due to prohibitions or other constraints. These fees would be gathered from across the entire County, with staff from the Land & Water Resources Department responsible for identifying and prioritizing projects that offer the highest return on investment.

A fixed fee-in-lieu (FIL) structure would be implemented, which may potentially lead to inequities. Developers operating in high-cost development areas might find the fixed fee disproportionately low relative to the costs associated with their projects. This disparity could result in an uneven distribution of financial responsibility, where those in more expensive development areas bear a relatively smaller burden compared to those in lower-cost areas. To address this potential issue, careful consideration would need to be given to the fee structure to ensure fairness and equity across different development contexts.

Option 2: Establishing a Watershed-Based Fund for Stormwater Management Projects

This option involves creating separate funds for each major HUC10 watershed within Dane County to support projects aimed at enhancing stormwater retention and reducing flooding. Fees would be collected from sites where on-site infiltration practices are infeasible due to prohibitions or other constraints. These fees would be assessed on a watershed basis, with varying fee rates depending on the cost of implementation within each specific watershed.

One potential drawback of this approach is the risk of insufficient demand in certain watersheds, which could result in unused funds. However, the primary advantage of this method is that the funds are directed to the watershed where the fees are collected, ensuring that the investments are made in areas most directly impacted by the fee payments. This localized approach aims to align the benefits of the program with the areas contributing the fees, potentially increasing the relevance and effectiveness of the funded projects.

Option 3: Establishing a County-Wide Fund with Watershed-Based Fee Variation

This option proposes the creation of a county-wide FIL fund, where fees would be collected from sites where on-site infiltration practices are not feasible due to prohibitions or other constraints. The fees would be assessed on a watershed basis, with rates varying according to the implementation costs within each watershed.

A key feature of this option is the use of a variable fee-in-lieu (FIL) structure, which adjusts based on the specific cost of stormwater management projects in each watershed. While this approach aims to tailor the fees more closely to local conditions, it may raise concerns about equity. Developers in high-cost development areas might face higher fees, which could be used for projects in other watersheds. This could lead to perceptions of inequity if developers feel they are paying more for projects that benefit areas outside their immediate locality. Addressing these concerns would require careful consideration of fee structures and transparent communication regarding how funds are allocated and utilized across different watersheds.

6.0 Conclusion

Since the 2017 report produced by the TAC, significant changes have been implemented in the stormwater management program, including updated requirements for redevelopment and a reduction in exemptions from infiltration practices. These modifications aim to enhance the program's effectiveness; however, they have also led to a reduction in the potential benefits of a county-wide stormwater FIL or Volume Credit Trading program. Furthermore, the high costs and risks associated with administering such a program, along with the challenges of setting boundaries that avoid unintended negative consequences in a large geographic area, remain considerable obstacles. These factors collectively affect the overall efficacy and financial viability of the stormwater FIL and volume credit trading program in Dane County.

The related presentation, titled "Fee-in-Lieu & Stormwater Volume Credit Trading Feasibility Report", was delivered to the Lakes and Watershed Commission on June 5, 2024. Given the information detailed in this report, it is recommended that the county's efforts in stormwater management should focus on alternative strategies for increased compliance rather than the implementation of a FIL or stormwater volume credit trading program.