1.5. District Boundaries (Jurisdictional Area)

The Brown's Creek Watershed District covers portions of seven municipalities; the City of Stillwater, City of Oak Park Heights, City of Lake Elmo, City of Grant, City of Hugo, May Township and Stillwater Township. Figure 1 shows the legal and hydrologic boundaries of the District. The hydrologic boundary delineates areas that would ultimately drain to Brown's Creek. The legal boundary defines the actual legal area of jurisdiction of the District; it corresponds as closely as possible to the hydrologic boundary while following established property lines.

1.6. Board of Managers

A five-member Board of Managers governs the Brown's Creek Watershed District. The managers are appointed by the Washington County Board of Commissioners and serve staggered three-year terms in office. Watershed District managers must be voting residents of the watershed and cannot be a public officer of the county, state, or federal government, except that a soil and water conservation district supervisor may be a manager. The Board of Managers involved in the development of this Plan included Klayton Eckles (President), Celia Wirth (Vice-President), NEW Manager, Chuck LeRoux (Secretary), and Deb Sahulka (Manager). All managers, past and present, are listed in Table 3.

Table 3. Board of Managers and Terms in Office

Manager	Term
Klayton Eckles	2021- present
Tim Freeman	2002-2003
Ned Gordon	1997–2003, 2003-2004
Gerald Johnson	2003–2024
Karen Kilberg	1997-2004
Craig Leiser	1997–2021
Anne Maule Miller	2016-2020
Rob McKim	2021- 2022
Barb Medinger	2002-2004
Jon Michaels	1997-1999
Chuck LeRoux	2020 - present
Don Peterson	1999-2001
Dan Potter	1997-2000
Gail Pundsack	2004-2016
Deb Sahulka	2024- present
Sharon Schwarze	2013-2020
Connie Taillon	2004-2018
Jerry Turnquist	2001-2001
Rick Vanzwol	2005-2013
Celia Wirth	2021 - present

1.7. Summary of Issues, Goals and Strategies

Many of the BCWD's issues have been consistent from plan to plan because many of the resource protection and restoration needs have been the same. Concerns related to the impacts of

development continue to be articulated under Stormwater Management, Erosion and Sediment Control, Floodplain Management and Regulations while concerns related to specific resources are articulated under Lake, Stream and Wetland Management as well as Groundwater Management, Ecological Health and Monitoring and Data Collection. While the issues have remained more or less the same, the policies, goals and implementation activities have not. As state water quality standards have evolved and the District has collected more information about the quality of its resources, the management approach has shifted with time: the District's goals and activities have become more targeted.

New to this Plan is the integration of climate change and Diversity, Equity, and Inclusion (DEI). Rather than include these issues as stand-alone categories in the Plan, this document takes a holistic approach that recognizes the intersection of environmental and social factors. By considering these elements at each stage of the planning process, the BCWD ensures that the strategies included in the implementation plan not only achieve the District's watershed management goals but are also equitable, inclusive and build resilience in the face of climate change.

1.7.1. Climate Change

Within the last 10 years, the BCWD has experienced a number of impacts related to climate change. According to Kenny Blumenfeld, Senior Climatologist with the Minnesota Department of Natural Resources, 2010-2020 was the wettest decade on record. More precipitation is coming from larger storm events (1-inch or more per day) and the frequency of 3-inch/day storm events is increasing while the return period is decreasing. These conditions resulted in flooding throughout Washington County including the flooding of Kimbro Basin which overtopped County Road 12 and encroached on neighboring properties. This is raising concerns about access to and flooding of homes, as well as public safety. Similarly, changes in temperature patterns are having an impact on the District's resources. Winter nights are warming ten times faster than summer temperatures and the lowest temperature of winter is also increasing. This means that liquid precipitation during winter is increasing and days with snow are decreasing. The winter of 2023 was the warmest on record throughout the state. The warm conditions during the early winter delayed ice formation on lakes with many experiencing their latest ice-in dates on record. These types of changes have wide-ranging consequences for water quality, fisheries, recreational activities, and local economies. As a result, climate change impacts have been considered and summarized for each issue in the WMP. Implementation activities developed to enhance the resilience of the District's natural and built systems are indicated with the following icon.

1.7.2. Diversity, Equity, and Inclusion

Government agencies are increasingly acknowledging that the impacts of historical decision-making have impacted communities in ways that have generated unequal outcomes that have advantaged some while disadvantaged others, predominately along lines of social vulnerability such as race, age, gender, but also other individual and intersecting identities. In an effort to address these historic inequalities, particularly in the areas of environmental planning and engineering, organization such as the EPA and the Met Council are increasingly looking to ways to work with communities to understand how to respect diversity, engage inclusively, and undertake projects and programs equitably.

In 2024, the BCWD Board of Managers adopted the following Diversity, Equity, Inclusion and Accessibility Policy:

> Brown's Creek Watershed District is a special-purpose unit of government established under Minnesota Statutes chapters 103B and 103D to mitigate damage from flooding and improve Brown's Creek and the wetlands, lakes and streams in the watershed. As a public entity working on fundamental water issues that affect everyone in the watershed, BCWD is obligated to ensure its expenditure of tax funds accrues to the benefit of all. In pursuit of this goal, BCWD will ensure diversity, equity, inclusion and accessibility influences its development and implementation of its programs and projects and will work toward addressing current and historical inequities in how land and waters have been managed and improved in the watershed. BCWD will incorporate diverse views in its decision-making, robustly communicate and engage with historically underserved communities, provide equitable access to information and resources, and use social vulnerability and related indices in developing and implementing its programs and projects.

To illustrate how the District's programs and projects are informed by DEI, social vulnerability has been considered and summarized for each issue in the WMP. Implementation activities developed to address social vulnerability are indicated with the following icon.

Red-Shouldered Hawk

3.1. Stormwater Runoff Management

3.1.1. General Issue Statement

Properly managed impervious surfaces can reduce common environmental impacts, such as increased runoff rates, decreased water quality, and reduced groundwater recharge. Urbanization and land-use changes often involve an increase in imperviousness, compaction of native soils, and removal of existing vegetation. Unless land use changes are properly managed, these activities will increase the rate and volume of stormwater runoff generated in the watershed and will decrease the quality of surface water resources and the quantity of groundwater resources. Many of the Best Management Practices used to provide stormwater management require long-term maintenance to ensure their performance. Existing urbanized areas already contribute additional runoff volume and increased runoff rates to local water bodies, compared with pre-settlement conditions.

3.1.2. Relevance to the District

Development and redevelopment activities have occurred within the watershed and are expected to continue. Given the amount of development that has occurred in the urban portions of the watershed it is expected that the predominant land development activity in this portion of the watershed will be redevelopment. In the last five years, the watershed district has seen increased development pressure in rural areas including the Cities of Grant and Hugo. Areas of special concern remain development and redevelopment around landlocked basins, groundwater dependent natural resources, wetlands, and areas tributary to Brown's Creek and the St. Croix River. Many areas of the watershed developed prior to adoption of the BCWD Rules and represent stormwater runoff management retrofit opportunities. Additionally, many of the stormwater management practices constructed to meet the District's rules or installed as retrofit projects need maintenance to ensure that they continue to function as designed.

There are also portions of the watershed that have been hydrologically altered. Modifications like the Diversion Structure (described in Appendix A-Land and Water Resource Inventory) have implications for application of the District's stormwater rules and regulations and participation in the restoration and protection of waterbodies outside of the watershed boundary. Surface waters listed as impaired for various pollutants (including the emerging issue of chloride impairment) by the MPCA and resources that are approaching an exceedance of state water quality standards can benefit from additional stormwater management efforts.

Climate change has a significant impact on stormwater runoff, altering both the quantity and quality of water flowing through urban and rural systems. These changes can create a range of challenges for stormwater management, infrastructure, and ecosystems as illustrated in Table X.

Table 5. Related Climate Change Impacts

Impact	Description	Indicators
More Extreme Water-Related Events	Heavier precipitation during rainfall events	- Increased risk of flooding - Increased variability of streamflows - Increased velocity of water during high flow periods - Taxes existing infrastructure systems (e.g.

		levees, sewer pipes, wastewater treatment plans, etc…)
Increases in Water Pollution Problems	Increased flooding increases water-borne diseases and sediment transport	- Increased stormwater runoff washes sediments (erosion) and other contaminants into waterbodies - Overloading of stormwater and stormsewer systems transports contaminants into waterbodies
Water Boundary Movement and Displacement	Size of wetlands and lakes will change	- Changing water flow to lakes/streams - Changes in precipitation impacts wetland hydrology (bounce and duration)
	Increased stream channel instability	- Increase in channel-forming flows (bank-full flows) leads to increased sediment transport potential and channel instability
	Decreased groundwater recharge	- Rain from extreme events falls too quickly to be absorbed into the ground

Planning and implementation of stormwater runoff management can address DEI by:

- Reducing communities' exposure to hazards such as flooding and pollution.
- Retrofitting spaces to include more greenspace that can contribute to indirect physical and mental health outcomes.
- Mitigating the Urban Heat Island effect and improving air quality.
- Noise control.
- Carbon sequestration (i.e., by increasing tree canopy, native vegetation, etc.)

3.1.3. Sub-Issue Areas

Quality, Quantity, and Rate of Stormwater Runoff

Increases in runoff rate, usually caused by increases in impervious surfaces or changes in vegetative cover (e.g., forested areas converted to turf grass), can intensify erosion and raise flood levels. Similarly, increases in runoff volumes, often caused by increases in impervious surface cover and soil compaction, can cause flooding and can reduce the landscape's ability to infiltrate surface water to groundwater.

The quality of runoff entering water bodies such as lakes, streams and wetlands is affected by land management practices. Practices that degrade water quality include, among others, connection of impervious surfaces to water bodies, soil disturbance leading to erosion, excessive fertilizer and chloride uses, and lack of terrestrial invasive species management. Increases in runoff rate and volume also lead to decreased water quality because of increased erosion, direct connection of impervious surface to water bodies, increased water temperature, and increased volume of water carrying pollutants to water bodies. A number of management techniques can be used to limit the downstream effect of rate and volume increases and to limit the impact to water quality. These management techniques are typically constructed as part of the District's regulatory program, stormwater retrofit program or its capital improvement program. Opportunities to partner with the business and development community in going above and beyond the rule requirements would further help to address stormwater related impacts.Monitoring and Maintenance of Stormwater Management Facilities

Stormwater management facilities are constructed to limit the effects of increased runoff rates and volumes and to collect pollutants that could degrade downstream resources. To fully achieve these purposes, stormwater management facilities require regular inspections and

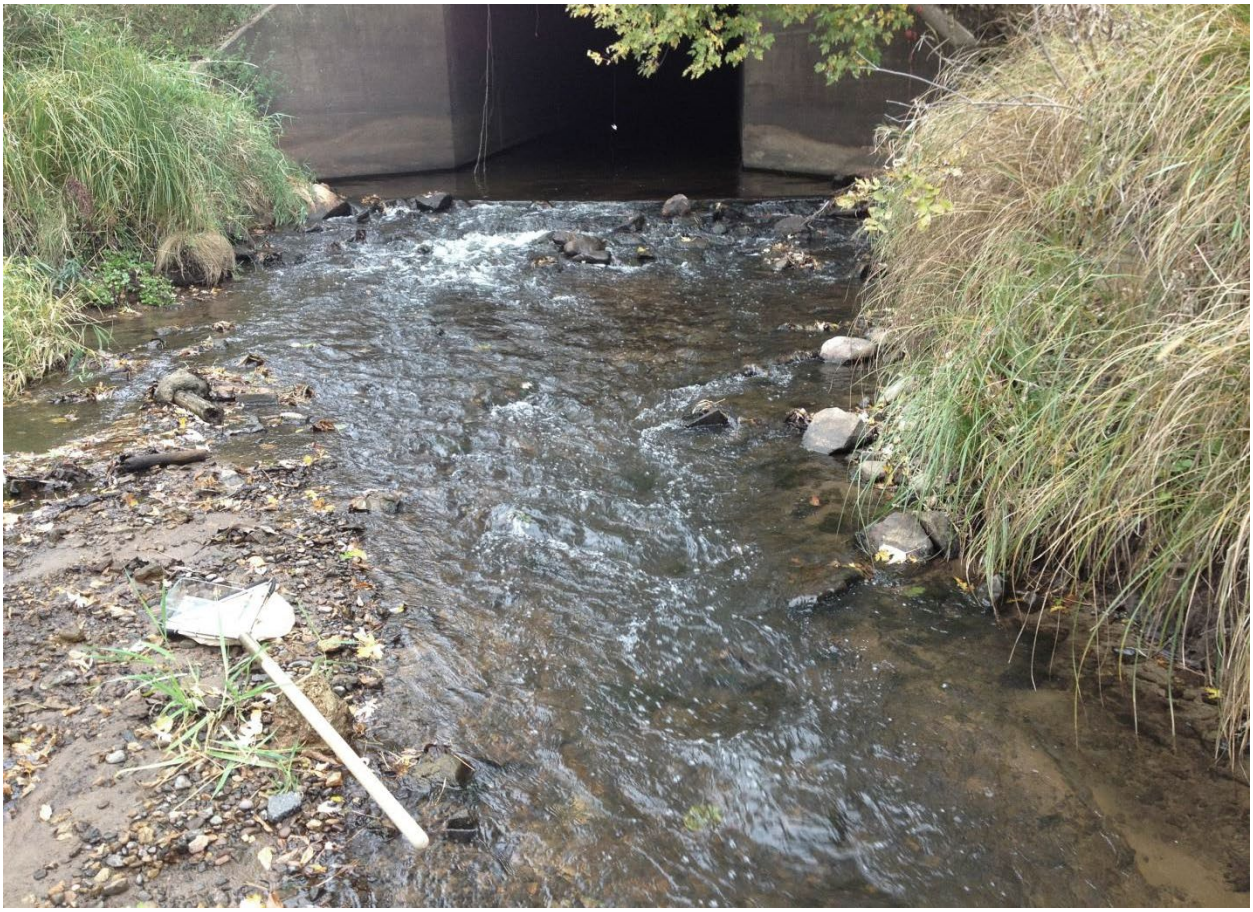
periodic maintenance. Cities, towns, and Homeowners Associations (HOAs) generally have responsibility for the operation and maintenance of stormwater management facilities; some have greater capacity than others to perform the monitoring and maintenance activities needed on a regular, routine basis.

Coordination with Other Government Agencies

Development activity and population growth threaten the health of lakes, wetlands, and streams (e.g. change in density and/or change in the type of development). The watershed is affected by the urbanization of the landscape and the transformation of the natural environment. Coordinated planning and control of development and redevelopment activities can reduce the impact of land use changes on the water resources of the District. Opportunities to partner with the member communities on the implementation of stormwater improvement projects would further help to address stormwater related impacts.

3.1.4. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.



Mussel Survey Net – Brown's Creek

Table 6. Stormwater Runoff Management Policies, Goals, and Implementation Activities

SUB-ISSUE:	Quality, Quantity, and Rate of Stormwater Runoff		
POLICY:	**The BCWD is committed to improving the quality of stormwater runoff in order to reduce pollutant loadings to downstream water bodies.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Achieve the Revised TMDL Load Reduction for Phosphorous of 848 lb./yr. assigned to Brown's Creek in the *Implementation Plan for the Lake St. Croix Nutrient TMDL (February, 2013)*	**1**	Annually analyze progress toward the phosphorus reduction goal based on evaluation of the collected monitoring data (conducted as part of the baseline monitoring program).
		2	Utilize the District's cost-share program to assist in citizen installation of water quality improvement projects (including thermal BMPs) and water quantity (e.g. volume control) practices
		3	Work with Washington County, MNDOT and member communities to improve operation & maintenance practices.
		4	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
B	TSS loads within the contributing drainage area to Brown's Creek, includes both the regulated and nonregulated portions of municipalities; need to be reduced by 74% on average in order to meet these loading limits. (Brown's Creek TMDL Implementation Plan, 2012)	**1**	Annually analyze progress toward the TSS reduction goal based on evaluation of the collected monitoring data (conducted as part of the baseline monitoring program).
		2	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
C	Restore impaired lakes so that they meet state standards for total phosphorous, chlorophyll A, and chloride concentrations, and Secchi depth	**1**	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER LAKE MANAGEMENT PLANS (TABLE 62)**
D	Achieve the TP Load Reduction goal of 148 lbs. established at the Diversion Structure as identified in the *McKusick Lake and Lily Lake Mgmt. Plan*	**1**	Re-assess water quality data collected in contributing drainage area to Diversion Structure to evaluate pollutant loading and identify sources.
E	Manage the nutrient inputs (watershed loading and internal loading) to the following lakes: - Bass Lakes (East and West) - Benz Lake - Goggins Lake - Lynch Lake (North and South) - Lake Masterman - Pat Lake - Plaisted Lake - North School Section Lake - South School Section Lake - Woodpile Lake	**1**	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER LAKE MANAGEMENT PLANS**
J	Manage the nutrient inputs (watershed loading and internal loading) to the following ponds: - Kismet Basin - July Avenue Pond - Heifort Pond - Brewers Pond - Sinnets Pond		**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER POND MANAGEMENT PLANS**
POLICY:	**The BCWD is committed to ensuring that activities within the watershed provide for groundwater recharge, provide thermal protection to Brown's Creek, reduce volume related impacts to the Distric water bodies and reduce flood hazards to downstream properties.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Protect and maintain the quantity and quality of groundwater recharge	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Identify and implement methods to provide thermal protection to Brown's Creek to achieve the thermal loading reductions identified in the Brown's Creek TMDL Implementation Plan	**1**	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**

C	Reduce volume-related impacts to the District's water bodies (e.g. stormwater impacts such as wetland bounce and duration)	**1**	Promote stormwater reuse by working with local businesses, local units of government and Washington County to incorporate BMPs into new development or redevelopment projects.
		2	*Addressed through administration of the BCWD regulatory standards and criteria.*
D	Reduce flood hazards under existing 100-year event and projected 100-year event.	**3**	**SEE FLOODING ACTIVITES IDENTIFIED UNDER…SEE FLOODING ACTIVITES IDENTIFIED UNDER…** **EE FLOODING ACTIVITES IDENTIFIED UNDER…SEE FLOODING ACTIVITES IDENTIFIED UNDER…** Partner with the City of Stillwater in the implementation of recommendations made in the Maryland Avenue North Drainage Easement Assessment.
POLICY:	**The BCWD is committed to ensuring that the rate of stormwater runoff is controlled in order to reduce impacts to the District's water bodies.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Ensure no-net increase in runoff rate from new development and redevelopment	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Identify and implement rate control projects to reduce rate-related impacts to water bodies and build resilience.	**1**	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
		2	BCWD Cost Share Program for going above and beyond the rules to meet a future (projected) rainfall condition OR waive permit fees if they provide this mount of treatment.
SUB-ISSUE:	**Monitoring and Maintenance of Stormwater Management Facilities**		
POLICY:	**The BCWD is committed to ensuring the long-term maintenance of stormwater management facilities in order to improve the water resources of the District through the continued achievement of the expected rate control, water quality treatment and infiltration goals of a facility.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Continue to monitor stormwater management facilities to evaluate long-term performance and obtain design information on infiltration rates, suspended solids removal rates, phosphorus removal rates, and chloride concentrations as appropriate to the facility.	**1**	Monitor the IESF, THPP, Kern Center Pond, Kismet Basin, and Bradshaw Pond as outlined in maintenance plans and agreements.
		2	Conduct monitoring of stormwater management facilities to evaluate performance as needed. Observe facilities chosen for monitoring during construction to evaluate any conditions that would affect infiltration or removal rates.
B	Monitor any facilities constructed or installed by the BCWD for at least five years following facility installation to evaluate performance.	**1**	Complete a minimum five-year monitoring period for the Iron Enhanced Sand Filter (constructed by BCWD in 2013) and conduct monitoring after medium is replaced.
		2	Complete a five-year monitoring period for BMPs that are implemented in the future by the District.
C	Each stormwater management facility in the District will be regularly inspected and maintained as appropriate to the type of facility.	**1**	Continue to require permanent maintenance commitments for stormwater management facilities constructed under the District's Rules.
		2	Develop and follow an operations and maintenance plan for the stormwater management facilities operated by the BCWD.
		3	Work with member communities to collaborate on maintenance of stormwater management facilities and to define criteria triggering the need for maintenance on installed stormwater management practices.
		4	Conduct a cost-benefit analysis considering the impacts if operations and maintenance needs are not met.
		5	Support HOAs in understanding their maintenance responsibilities for stormwater runoff infrastructure by providing HOAs with stormwater management maintenance resources.

SUB-ISSUE:	Coordination with Other Government Agencies		
POLICY:	**BCWD will partner with municipalities early in the land use & development planning processes to ensure that BCWD & municipal standards are met within a community and within a development.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Establish a process for BCWD involvement early in each municipality's development review process.	**1**	Work with individual municipalities to establish a process for early involvement in development review. The municipal partnership will establish a process that allows cost-effective and efficient review of development projects and ensures the incorporation of stormwater management practices as an integral part of development plans.
		2	Work with Townships and Washington County to become involved in development review in townships within the BCWD.
		3	Conduct a pre-permit meeting that is free of charge with potential permit applicant & its design team and municipal staff.
B	BCWD reviews of municipal comprehensive plans, local water management plans and water resource management plans will specifically address the connection between the designated land uses and the goals & policies of the BCWD.	**1**	Work with each municipality and township through the comprehensive plan and water resource management plan review process to develop and implement land use policies that focus on preservation and protection of water and natural resources.
C	Ensure application of consistent standards for review of stormwater management practices.	**1**	Review the findings of monitoring studies on infiltration practices being conducted by local agencies to evaluate recommended design infiltration rates.
		2	Develop a list of published and industry accepted total phosphorus and total suspended solids removal rates from innovative and standard stormwater management practices as a permitting tool.
		3	Provide the phosphorus and sediment removal rates list and the design infiltration rate list to allow cities to make land use permit applicants aware of District requirements early in the plan development process.
D	Achieve more stormwater management treatment through incentives and/or partnerships.	**1**	Establish an incentive program that will allow the BCWD to partner with the business/development community on BMPs that help a site go above and beyond the rule requirements.
		2	Establish a cost share program that will allow the BCWD to partner with its member communities in the implementation of water quality improvement/retrofit projects.

Table 7. Projected Expenditures (in 1,000's) for Stormwater Runoff Management

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Utilize the District's cost-share program to assist in citizen installation of water quality improvement projects (including thermal BMPs) and water quantity (e.g. volume control) practices	20	20	20	20	20	20	20	20	20	20	200
Re-assess water quality data collected in contributing drainage area to Diversion Structure to evaluate pollutant loading and identify sources.	--	--	--	--	--	--	--	--	--	10	10

Partner with the City of Stillwater in the implementation of recommendations made in the Marylane Avenue North Drainage Easement Assessment.	--	65	--	--	--	--	--	--	--	--	65
Complete a minimum five-year monitoring period for the Iron Enhanced Sand Filter and conduct monitoring after medium is replaced.	19	19	19	19	--	19	--	--	--	--	93
Complete a five-year monitoring period for BMPs that are implemented in the future by the District.	18	18	18	18	18	20	20	20	20	20	190
Develop and follow operations and maintenance plan for the stormwater management facilities operated by the BCWD.	50	50	50	50	65	65	70	60	60	60	580
Total for Stormwater Runoff Management	**107**	**172**	**107**	**107**	**103**	**109**	**110**	**100**	**100**	**110**	**1,138**

Table 8. Stormwater Runoff Management Implementation Activities from Table 5 covered by Administrative and/or Project Development Program

Work with Washington County, MNDOT and member communities to improve operation & maintenance practices.
Promote stormwater reuse by working with local businesses, local units of government and Washington County to incorporate BMPs into new development or redevelopment projects.
Work with member communities to collaborate on maintenance of stormwater management facilities and to define criteria triggering the need for maintenance on installed stormwater management practices.
Work with each municipality through the comprehensive plan and water resource management plan review process to develop and implement land use policies that focus on preservation and protection of water and natural resources
Review the findings of monitoring studies on infiltration practices being conducted by local agencies to evaluate recommended design infiltration rates.

Table 9. Stormwater Runoff Management Implementation Activities from Table 5 addressed by Baseline Monitoring Program

Annually analyze progress toward the TSS reduction goal based on evaluation of the collected monitoring data (conducted as part of the baseline monitoring program).
Annually analyze progress toward the phosphorus reduction goal based on evaluation of the collected monitoring data.
Monitor the IESF, THPP, Kern Center Pond, Kismet Basin, and Bradshaw Pond as outlined in maintenance plans and agreements

Table 10. Stormwater Runoff Management Implementation Activities from Table 5 covered by Regulatory Program

Continue to require permanent maintenance commitments for stormwater management facilities constructed under the District's Rules.
Work with individual municipalities to establish a process for early involvement in development review
Work with Washington County to become involved in development review in townships within the BCWD.
Conduct a pre-permit meeting that is free of charge with potential permit applicant and its design team and municipal staff.

Develop a list of published and industry accepted total phosphorus and total suspended solids removal rates from innovative and standard stormwater management practices as a tool for permit review.
Provide the phosphorus and sediment removal rates list and the design infiltration rate list to allow cities to make land use permit applicants aware of District requirements early in the plan development process.

3.2. Erosion Prevention and Sediment Control

3.2.1. General Issue Statement

Unless properly managed, land-disturbing activities can intensify erosion and lead to increased transport of sediment into surface waters. Increased erosion can also cause the formation of gullies in areas with unstable soils. Sedimentation in waterways can lead to fish kills, clogged streams, reduced storage volume of reservoirs and reductions in stormwater infiltration by sealing permeable soils.

3.2.2. Relevance to the District

The erosion that occurs naturally throughout the watershed and as a result of land-disturbing activities (e.g. development activity and agricultural activity) has the potential to transport sediment and associated nutrients into the District's surface waters. Waters of particular concern include Brown's Creek, which is impaired for aquatic life due to a lack of cold water fish assemblage. Through the stressor identification process, high suspended solids were identified as one of the primary stressors to the biota in the impaired reach of Brown's Creek. To date the origins of the total contribution of suspended solids to Brown's Creek have not been identified and the District continues to evaluate sources from the landscape as well as near-channel. Several District lakes are impaired due to excess nutrient loading which is associated with erosion as nutrients are generally tied to sediment particles.

[Preamble, climate change impact on the Issue]

Table 11. Related Climate Change Impacts

Impact	Description	Indicators
		-
		-
		-
		-

Planning and implementation of [Issue] opportunities can address DEI by:

-

3.2.3. Sub-Issue Areas

Existing Erosion Problems

Excessive erosion near the District's water bodies can add sediment and nutrients that degrade water quality. Identifying problem areas, performing cost-benefit analyses and implementing long-term solutions can limit the impact of these issues on the quality of the District's waters.

3.3. Stream Management

3.3.1. General Issue Statement

Alterations in land use disrupt the hydrology and ecology of stream ecosystems. For example, increased imperviousness in the contributing drainage area to a resource results in inhibited infiltration of rainfall and snowmelt. This reduction in infiltration results in reduced baseflow, larger and more frequent stormwater discharges, and increased temperature and pollutant loads. These factors contribute to channel enlargement, changes to instream habitat, decreased aquatic diversity and, in general, degradation of the resource. A portion of Brown's Creek does not meet the State's water quality standards and is impaired for aquatic life due to a lack of cold-water fish assemblage and high turbidity. Currently, Chloride concentrations in Brown's Creek are not near the chronic threshold for chloride but Chloride loads and concentrations are increasing at every monitoring station in Brown's Creek. While data collected from 2015-2023 indicates an overall upward (improving) trend in stream health and macroinvertebrate community quality, further improvements are still necessary.

3.3.2. Relevance to the District

Three reaches of Brown's Creek are included on the MPCA 303d (Impaired Waters) list. Both branches of Brown's Creek, the North Branch (from 110th Street to Manning Avenue) and the Main Branch (Highway 96 near Manning Avenue to the St. Croix River) are impaired for aquatic recreation and aquatic life due to low levels of dissolved oxygen, lack of cold-water fish assemblage, and high levels of *E. coli* (Escherichia coli) bacteria. Through the stressor identification process, the primary stressors to the biota in these impaired reaches of Brown's Creek were identified as high suspended solids and high temperatures. Although high copper concentrations were identified in previous stressor identification processes, follow-up investigation ruled out copper as an ongoing concern. While these impairments have been addressed by the Brown's Creek TMDL Report and Implementation Plan (the latter of which identifies specific goals for restoration activities), additional impairments in the system for Escherichia coli (*E. coli*) and Dissolved Oxygen are under investigation. The North Branch is also impaired due to a low score of the Minnesota Macroinvertebrate Index of Biological Integrity (M-IBI). While the index of biological integrity (M-IBI) scores in Brown's Creek are improving at all three locations where samples are being collected, total suspended solids (TSS) concentrations remain very high exceeding the TSS standard for Cold water streams at all monitoring locations.

In addition to Brown's Creek there are several small tributaries in the southern, portion of the District all of which drain to the Diversion Structure. These tributaries include the Long Lake Tributary, South Central Tributary and Zephyr Tributary. Land use change in the drainage area to the Diversion Structure has resulted in changes in flow conditions, head cutting of the tributaries, and water quality concerns. While the surface water contribution from this drainage system has been altered by the Diversion Structure, these tributaries are an important source of recharge and groundwater baseflow to Brown's Creek.

The St. Croix River is a Wild and Scenic Waterway administered by the National Park Service. While the BCWD focuses much of its efforts on the protection and restoration of its surface water bodies, it is important to remember that the watershed is a tributary to this National

treasure. Anything that the BCWD does to improve the health of Brown's Creek has a direct impact on the health of the St. Croix River.
Climate change has a significant impact on cold-water fisheries and stream systems. These changes can create a range of challenges for watershed management as illustrated in Table X.

Table 15. Related Climate Change Impacts

Impact	Description	Indicators
More Extreme Water-Related Events	Heavier precipitation during rainfall events	- Increased risk of flooding - Increased variability of streamflows - Increased velocity of water during high flow periods
Increases in Water Pollution Problems	Increases in sediment transport	- Increased stormwater runoff washes sediments (erosion) and other contaminants into waterbodies (i.e. TSS)
	Warmer air temperatures result in warmer waters	-
	Changes in snowfall patterns	- More ice during the winter requires application of more chemicals (i.e., chlorides)
Water Boundary Movement and Displacement	Size of wetlands and lakes will change	- Changing water flow to lakes/streams - Changes in precipitation impacts wetland hydrology (bounce and duration)
	Increased stream channel instability	- Increase in channel-forming flows (bank-full flows) leads to increased sediment transport potential and channel instability
	Decreased groundwater recharge	- Rain from extreme events falls too quickly to be absorbed into the ground
Changes to availability of Drinking Water Supplies	Changing patterns of precipitation and snowmelt	- Increased drought conditions place higher demands on drinking water supplies - Increased water loss due to higher evaporation (as a result of warmer air temperatures)
	Water air temperature	- Places higher demands on community water supplies - Increased water needs for agriculture and industry - Increased need for energy production (e.g. air conditioning)

Planning and implementation of stream management can address DEI by:

- Equitable access to healthy water resourcesProtecting sacred and culturally significant waterways (i.e., Brown's Creek and the St. Croix River)
- Provide health, recreational, and aesthetic benefits.

3.3.3. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items

for that goal. This format is intended to clearly display how each policy and goal will be addressed.

Table 16. Floodplain Management Policies, Goals, and Implementation Activities

SUB-ISSUE:	**Protection of Flood Storage Areas**		
POLICY:	**The BCWD is committed to the protection of flood storage areas to reduce the impacts of flooding and promote recharge.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Ensure no net loss of flood storage capability within the watershed.	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
SUB-ISSUE:	**Management of Flood Prone Areas**		
POLICY:	**The BCWD will continue to protect structures and natural communities from flooding exceeding natural water level fluctuations.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Assess the potential for flooding properties when evaluating land management activities.	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
		2	Continue to monitor lake levels and shallow aquifer groundwater levels to evaluate conditions that may cause impacts to existing structures.
POLICY:	**The BCWD desires to minimize the risks of flooding associated with land alterations adjacent to landlocked basins.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Minimize the risk of flooding to structures within landlocked basins.	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Minimize the risk of flooding on downstream properties when outlets are provided for landlocked basins.	**2**	*Addressed through administration of the BCWD regulatory standards and criteria.*

Table 17. Floodplain Management Implementation Activities (from Table 23) addressed by Baseline Monitoring Program

Continue to monitor lake levels and shallow aquifer groundwater levels to evaluate conditions that may cause impacts to existing structures - Costs identified in under the Baseline Monitoring Program.

Kismet Basin Lake aerial

3.3.4. Sub-Issue Areas

Water Quality, Aquatic Habitat, and Fisheries Protection

The flora and fauna of Brown's Creek require a specific range of conditions in order to complete their life cycles and maintain viable populations. The lower reaches of Brown's Creek currently support an assemblage of organisms that require cold water and clean substrates (i.e. macroinvertebrates). Additionally, the cool microclimate of the lower gorge supports unique flora species not found elsewhere in the watershed. The wetland conditions of the upper reaches of Brown's Creek do not support certain species due to differences in vegetative cover, water quality, and temperature. While the management requirements in this portion of the watershed differ from those in the lower portions of the watershed (as described in the Unique Species Inventory) the groundwater discharge within the upper reaches feed the lower reaches of the creek and are instrumental in maintaining the health and baseflow of the creek.

Maintenance of Flow and Geomorphology

The shape and course of a stream is determined by topography, vegetation, and flow conditions. Changes in vegetation quality and type, particularly from invasive to native vegetation, and in flow conditions can alter the size and course of a stream. Urbanization near a stream can lead to bank erosion, undercutting, and stream widening if rates and volumes of runoff are not managed. Additionally, over pumping of groundwater can reduce stream baseflow.

3.3.5. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.

Table 18: Stream Management Policies, Goals, and Implementation Activities

SUB-ISSUE:	**Water Quality, Aquatic Habitat, and Fisheries Protection**		
POLICY:	**The BCWD is committed to the improvement of the water quality and ecological integrity of Brown's Creek and its tributaries, including maintaining a viable cold-water fishery**		
GOALS		**IMPLEMENTATION ITEM**	
A	Achieving and maintaining the Macroinvertebrate Index of Biological Integrity (IBI) for southern coldwater streams of 46 or higher and the fish IBI for southern coldwater streams of 45 or higher in the trout stream portion of Brown's Creek (or revised standard as determined by PCA)	**1**	Continue to implement volunteer stream monitoring program by providing financial support to the Stillwater High School science program.
		2	Reassess the fish and macroinvertebrate community health at representative sites in three portions of Brown's Creek (Headwaters, Central and Lower Gorge) in May and September.
		3	Complete annual report on stream flow, water quality, and fisheries and aquatic habitat trends based on monitoring results.
		4	Continue to assess the copper concentrations in Brown's Creek.
		5	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
B	Maintaining a minimum daily Dissolved Oxygen concentration of 7 mg/L in the trout stream portion of Brown's Creek.	**1**	Continue to monitor Dissolved Oxygen in Brown's Creek and expand monitoring and evaluation efforts as needed to evaluate changes along the length of the creek.
C	Maintaining an instantaneous Total Suspended Solids (TSS) concentration of 10 mg/L or lower in at least 90% of samples	**1**	Monitor sediment load and sediment concentration in Brown's Creek in coordination with municipalities, Washington County, and state agencies as appropriate to evaluate locations of excessive

	collected between April 1 and September 30 in the trout stream portion of Brown's Creek.		sediment input and to measure progress toward the TSS goal.
		2	Implement TSS reduction projects based on the findings of the BCWD's sediment evaluations (e.g. PTMapp Analysis and McKusick Stormwater Feasibility Analysis) - **SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
D	Achieve and maintain in-stream water temperatures of 18.3°C (65°F) or lower in the trout stream portion of Brown's Creek.	**1**	Monitor Brown's Creek temp. in coordination with municipalities, Washington County, and state agencies as appropriate.
		2	Assess the need to establish a policy on beaver management on Brown's Creek by simulating beaver dams in the District's Thermal Model for Brown's Creek.
		3	**SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
		4	Monitor the water quality impacts of discharge from the Diversion Structure at Neal Avenue to Brown's Creek and conduct a feasibility study to evaluate options for reducing the thermal load to the creek.
E	NDNR are stocking Brook Trout starting in 2025. What Fish IBI should we be shooting for to support the Brook Trout.		Coordinate with MNDNR on the development and implementation of a fisheries management plan for the Creek that would establish stocking rates, species, and planning for expansion of the trout stream portion of the Creek.
F	Try to understand E. coli and implement what we can to reduce it.	**1**	Continue to monitor through *E. coli* source investigation to evaluate bacteria sources to Brown's Creek and to guide Best Management Practice selection.
		2	
G	Facilitate the implementation of the Brown's Creek TMDL Implementation Plan.	**1**	Coordinate with member communities to discuss progress toward Local Surface Water Management Plan implementation, TMDL Implementation Plan goals, other mutual goals and opportunities for partnerships.
		2	Track performance towards Brown's Creek TMDL goals annually.
H	Achieve and maintain the water quality and ecological integrity of upper Brown's Creek (Headwaters to Manning) to achieve the State's goals.	**1**	Maintaining native vegetation, pools, riffles, and woody debris within the stream corridor.
SUB-ISSUE:	**Maintenance of Flow and Geomorphology**		
POLICY:	**The BCWD strives to maintain the hydrology and geomorphology of Brown's Creek and its tributaries required for stream equilibrium and health.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Manage the watershed to mimic natural (pre-settlement) hydrologic conditions	**1**	*Addressed through administration of the BCWD regulatory standards and criteria.*
B	Evaluate system-wide geomorphology on a five-year basis and identify and execute restoration opportunities.	**1**	Monitor geomorphology of Brown's Creek and its tributaries on a five-year basis to understand the creek's response to restoration activities and to detect changes within unrestored reaches.
		2	Improve reaches of the creek (specific projects not yet identified) categorized as having degraded stream channel geomorphology (from a thermal stand-point by addressing: Stream Width, Over-Hanging Banks, and Profile and Alignment. (Brown's Creek TMDL Implementation Plan, EOR, 2012) - **SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**
		3	Implement the recommendations of diversion tributary resource assessment by discussing restoration projects with adjacent landowners, establishing grade control and thinning the canopy.

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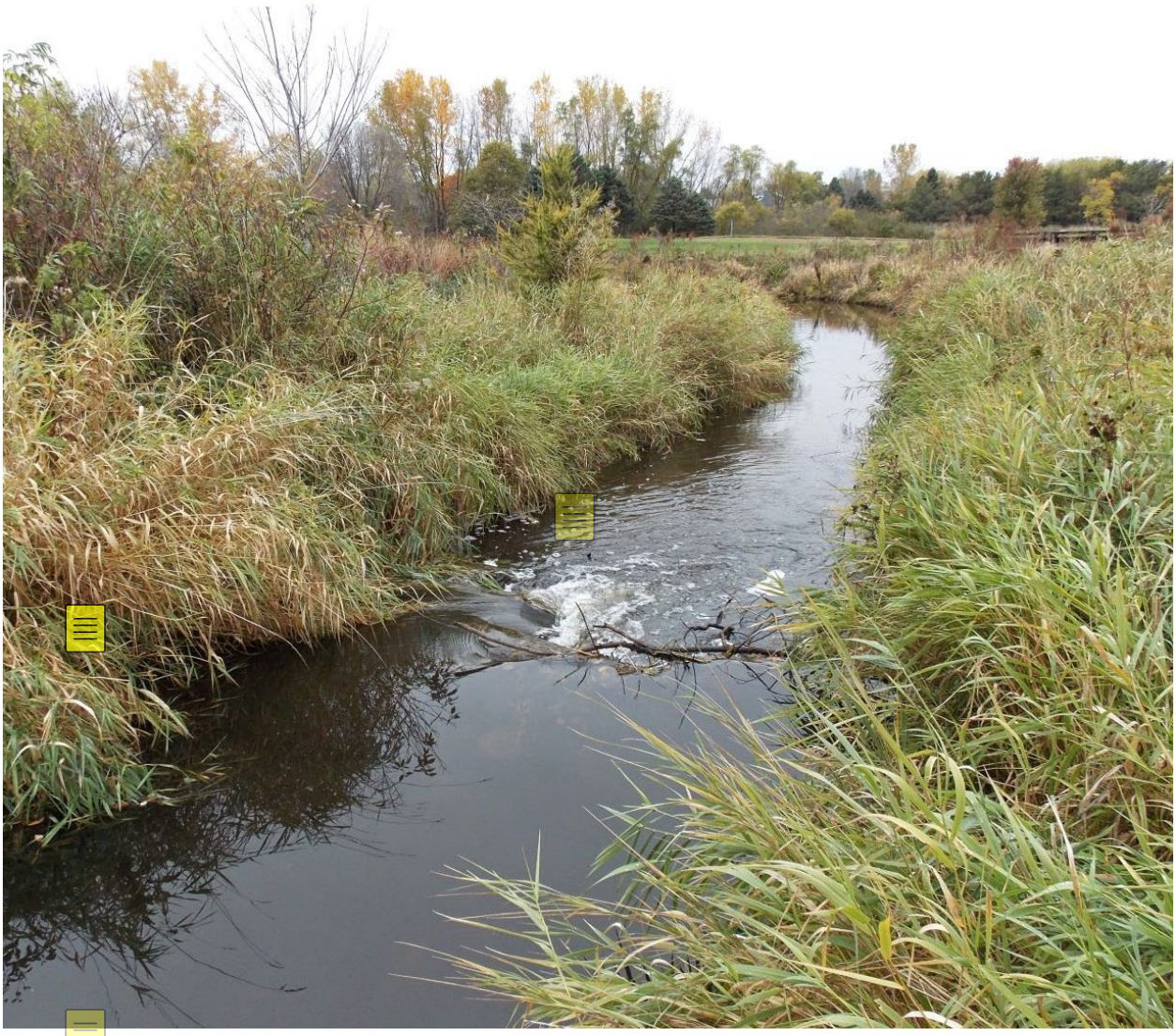


Brown's Creek – Oak Glenn Golf Course

Table 19. Projected Expenditures (in 1,000's) for Stream Management Practices

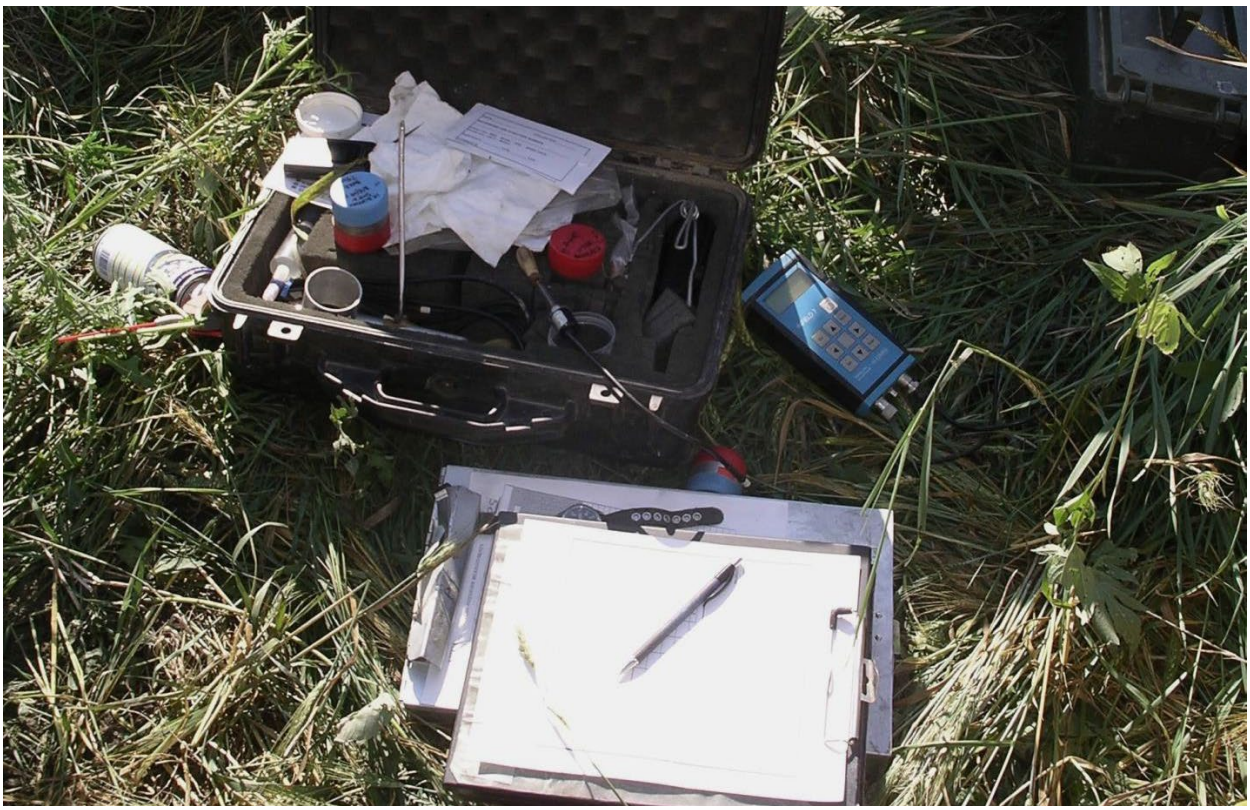
Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Continue to implement volunteer stream monitoring program by providing financial support to the Stillwater High School science program	4	4	4	4	4	4	4	4	4	4	40
Reassess the fish and macroinvertebrate community health at representative sites in three portions of Brown's Creek (Headwaters, Central and Lower Gorge) in May and September	15	9	--	--	9	15	9	15	9	15	96
Implement TSS reduction projects based on the findings of the BCWD's sediment evaluations - **SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**	30	20	50	30	30	--	--	158	158	--	476
Re-survey the two actively eroding bluffs within the lower gorge to re-evaluate rate of erosion and the need for stabilization	--	--	--	--	7	--	--	--	--	--	7
Assess the need for a beaver management policy on Brown's Creek by simulating beaver dams in the District's Thermal Model for Brown's Creek	--	--	--	--	15	--	--	--	--	--	15
Continue to conduct *E. coli* source investigation to evaluate bacteria sources to Brown's Creek and to guide Best Management Practice selection.	5	5	5	5	5	5	5	5	5	5	50

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Consider developing a program to conduct a targeted SSTS inventory and inspections, which may include incentives for residents who participate.	--	10	10	10	10	10	--	--	--	--	50
Hold annual meetings with member communities to discuss progress toward Local Surface Water Management Plan implementation, TMDL Implementation Plan goals, other mutual goals & opportunities for partnerships.	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	27.5
Track performance towards Brown's Creek TMDL goals annually.	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	25
Monitor geomorphology of Brown's Creek and its tributaries on a biennial basis.	--	10	--	10	--	10	--	10	--	10	50
Improve reaches of the creek categorized as having degraded stream channel geomorphology (Stream Width, Over-Hanging Banks, and Profile and Alignment) - **SEE IMPLEMENTATION ACTIVITIES IDENTIFIED UNDER BROWN'S CREEK MANAGEMENT PLAN (TABLE 61)**	65	62	30	94	49	120	190	--	--	--	608

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Implement the recommendations of diversion tributary resource assessment by discussing restoration projects with adjacent landowners, establishing grade control and thinning the canopy.	18.3	1	1	1	1	1	1	1	1	1	27.3
Total for Stream Management	**153**	**136**	**105**	**159**	**135**	**170**	**216**	**198**	**182**	**40**	**1,494**

Table 20. Stream Management Implementation Activities from Table 13 addressed by Baseline Monitoring Program

Complete annual report on stream flow, water quality, and fisheries and aquatic habitat trends based on monitoring results
Continue to assess the copper concentrations in Brown's Creek.
Continue to monitor Dissolved Oxygen in Brown's Creek and expand monitoring and evaluation efforts as needed to evaluate changes along the length of the creek.
Monitor sediment load and sediment concentration in Brown's Creek in coordination with municipalities, Washington County, and state agencies as appropriate to evaluate locations of excessive sediment input and to measure progress toward the TSS goal.
Monitor the temperature of Brown's Creek in coordination with municipalities, Washington County, and state agencies as appropriate.



Monitoring / Field Notes

3.11. Recreation

3.11.1. General Issue Statement

The Brown's Creek corridor and other natural areas within the watershed provide opportunities for fishing, wildlife viewing, and outdoor learning. As the District implements projects that provide more opportunities for people to engage with resources like Brown's Creek, ongoing monitoring is critical to ensure these resources are protected from overuse.

3.11.2. Relevance to the District

Recreational and tourism activities are two primary ecosystem services provided by the natural environment. The Brown's Creek corridor has an appealing aesthetic and has the potential to attract more frequent fishing, birdwatching, and environmental education or eco-tourism programs. Existing trails (e.g. Gateway Trail, Brown's Creek Trail, and roadside trails) and associated public access areas within the Brown's Creek corridor, and the recent acquisition of the Brown's Creek Conservation Property provides the necessary infrastructure to support increased outdoor recreation.

As greater public access to naturalized green spaces occurs, ensuring natural resources are enjoyed responsibly is critical to protecting the investments made by the District to improve watershed health. Greater access may increase the public's appreciation and desire to care for natural areas, helping supplement the District's existing and future efforts to protect and restore natural resources. The BCWD's role should focus on the recreational co-benefits that can come from watershed resource improvement, and coordination with local units of government and state agencies on their public recreational resources.

Climate change has a significant impact on recreation altering the resources people have available to access for their enjoyment, health, and wellbeing. These changes can create a range of challenges for recreation as illustrated in Table X.

Table 51. Related Climate Change Impacts

Impact	Description	Indicators
Warming Winters	Less ice and snow may result in fewer opportunities for winter recreation such as cross country skiing, snowshoeing, and ice fishing.	- Fewer days with snow cover - Later ice-in/earlier ice-out - Unsafe ice conditions
Warming Water	Less ice cover, warmer winters, and warmer summer waters may impair access to sustainable fishing populations.	- Water temperature
Habitat Loss	Changing growth zones and competition from invasive species may result in habitat loss reducing the presence of species of interest for recreation such as birds.	- Species inventory

Planning and implementation of recreation opportunities can address DEI by:

- TBD

3.11.3. Sub-Issue Areas

Recreational Opportunities

The Brown's Creek Watershed District has a number of resources designated for recreation use and there is interest in greater recreation opportunities throughout the watershed. Improving water quality and enhancing wildlife habitat will increase the recreational value of the resources for the public's use.

In order to provide greater connectivity to certain resources, the District may need to be more flexible with its rules to permit the creation of new trails or sidewalks to formalize access.

Additionally, access to high quality naturalized green spaces have well-documented benefits to peoples' physical and mental health. Improving access to opportunities to interact with improved natural resources presents the opportunity to achieve indirect co-benefits such as improved health outcomes and greater care for the resources they have access to.

Stewardship

As opportunities to recreate in the BCWD increase, individuals utilizing the resources for fishing, canoeing, biking, etc. need to do so responsibly.

By fostering opportunities to access improved natural resources, through areas such as the Brown's Creek Conservation Property, people are exposed to what healthy ecosystems look like which may spark behavioral change to support the District's work.

3.11.4. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.

Table 52. Recreation Policies, Goals, and Implementation Activities

SUB-ISSUE:	**Recreational Opportunities**		
POLICY:	**BCWD supports access to natural areas for a diversity of outdoor recreation activities throughout the watershed for all of its residents and visitors**		
GOALS		**IMPLEMENTATION ITEM**	
A	Manage the lakes and fishery in the District to enhance passive recreation by …	**1**	Implement BMPs, shoreline improvements and other management recommendations found in Lake Management Plans.
B	Explore opportunities to develop and leverage partnerships which increase awareness and access to natural resources recreation in BCWD	**1**	*Addressed through administration of the East Metro Water Resource Education Program (EMWREP).*
		2	Develop a mapped inventory of current and desired recreation activities and locations with watershed partners through the Enhanced Stakeholder Engagement process.
SUB-ISSUE:	**Stewardship**		
POLICY:	**The BCWD is committed to playing a strong leadership role in creating a culture that encourages environmental stewardship**		
GOALS		**IMPLEMENTATION ITEM**	
A	Enhance public knowledge and appreciation for the District's water resources through an increase in passive and active voluntary stewardship activities.	**1**	*Addressed through administration of the East Metro Water Resource Education Program (EMWREP).*
		2	Conduct BMP installation and implementation training workshops to provide citizens with the knowledge to install and implement BMPs on their properties. Programs could include workshops on topics such as rain barrels, rain gardens, shoreline restoration, and fertilizer use, and native vegetation buffer establishment and maintenance.
		3	Utilize the stewardship grant program to assist citizens in best management practice installation.
B	Protect areas of investment from recreation-related impacts	**1**	Monitor public access and use of Brown's Creek and evaluate the need to provide formal dedicated access points and the need to mitigate new impacts, i.e. erosion from foot traffic.
		2	Meet annually with municipalities to review recreation-related issues to understand impacts and develop responses to emerging issues *Record instances of these engagements and what areas were identified/responded to through this process.*
C	Promote access throughout the watershed to opportunities for interaction with high-quality naturalized environments.	**1**	Prioritize projects watershed resources which add the co-benefit of improving resources in areas of the watershed not previously served by improvements
		2	Host an annual "District on the Lake" event for small watercraft to explore a lake and learn about improvements and challenges facing the resource.

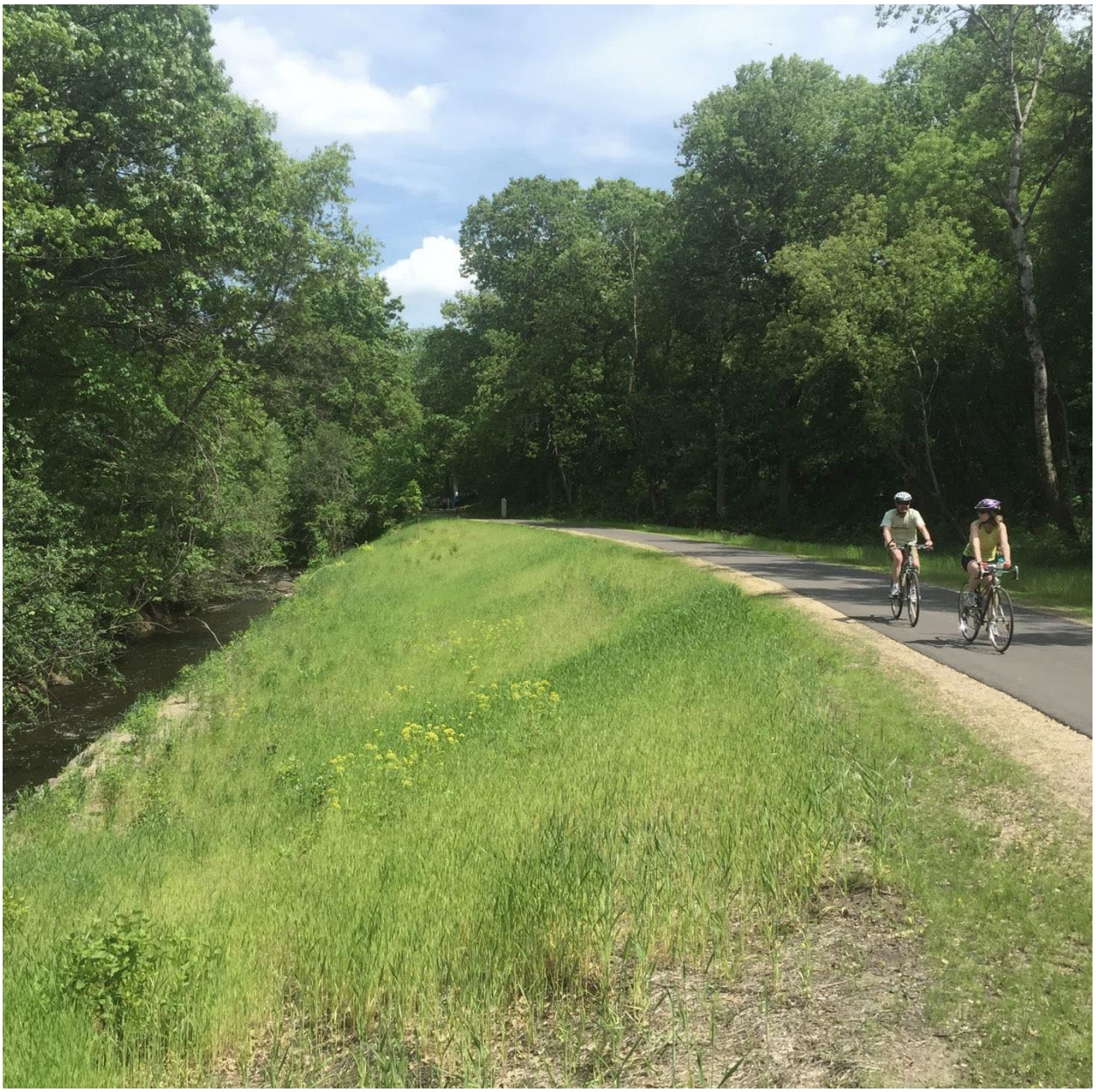
Table 53. Projected Expenditures (in 1,000's) for Recreation Activities

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr Total
Monitor public access and	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.5

use of Brown's Creek by walking the trail annually to evaluate the need to provide formal dedicated access points and the need to mitigate new impacts (e.g. erosion from foot traffic).											
Total for Recreation	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**2.5**

Table 54. Recreation Implementation Activities from Table 44 where implementation costs covered under another Issue Category

Implementation Activity	Issue Category where implementation cost is identified (Table #)
Implement fisheries management recommendations found in Lake Management Plans	Ecological Health (Table 30)
Conduct BMP installation and implementation training workshops to provide citizens with the knowledge to install and implement BMPs on their properties. Programs could include workshops on topics such as rain barrels, rain gardens, shoreline restoration, and fertilizer use, and native vegetation buffer establishment and maintenance.	Education and Outreach (Table 47)
Utilize the cost-share program to assist citizens in best management practice installation	Stormwater Management (Table 5)



Brown's Creek Trail – old railway line

3.12. Education, Outreach and Stewardship

3.12.1. General Issue Statement

Successful efforts to achieve the BCWD's goals will require the involvement of residents, businesses, and municipalities. These groups will be most interested in active participation in District projects, or in water and natural resource protection in general, if they understand and relate to the issues and the benefits of water resource management. Historically, engagement and outreach has resonated with individuals and communities with a direct interest in environmental conservation (e.g. bird watchers, fishers, hikers, gardeners) and struggled with audiences indirectly impacted by changes in watershed resources (e.g. home and business owners, local elected officials). The BCWD continues its efforts to broaden relationships to work with communities throughout the watershed so they understand the district's responsibilities and roles in their communities. In particular, the BCWD continues to think about who is being served by its work and the co-benefits this work can generate.

3.12.2. Relevance to the District

Since its inception as a watershed management organization, public involvement and public information efforts have played a strong role in directing project implementation in the BCWD. The BCWD has a history of citizen participation in watershed management planning and implementation. For example, through the enhanced stakeholder engagement process, the BCWD has reignited its relationship with Trout Unlimited. Together the BCWD and Trout Unlimited are now working together to encourage girls to get out into nature through STREAM Girls, monitoring at Brown's Creek Conservation Property, helping to secure volunteers for planting events at the Brown's Creek restoration project, and collaborating in the Trout in the Classroom program. The BCWD has been involved through EMWREP in the creation of mini workshops for HOA's.

The BCWD continues to develop relationships with its watershed partners through enhanced engagement efforts designed to target opportunities for involvement and collaboration with existing and new watershed partners.

[Preamble, climate change impact on Education, Outreach and Stewardship]

Table 55. Related Climate Change Impacts

Impact	Description	Indicators
		-
		-
		-
		-

Planning and implementation of Education, Outreach and Stewardship opportunities can address DEI by:

-

3.12.3. Sub-Issue Areas

Municipality and Developer/Contractor Education and Outreach

Municipalities, as the land use authority, have great potential to impact and improve water resources. They also own and operate roads, stormwater management facilities and other stormwater infrastructure in the watershed. Additionally, municipalities are often the first point of contact for citizens, businesses, and developers interested in local water resource management. Developers and contractors, as the individuals conducting the change in land use, can directly impact and improve water resources through, among others, development planning and construction techniques. Educating municipal officials can lead to better planning, zoning and ordinances, as well as changes to operations and maintenance policies and programs. Training municipal staff allows them to more effectively install and maintain stormwater systems and BMPs, reduce impacts to water resources from other operation and maintenance activities (e.g. road and park maintenance) and more effectively interface with the development community.

Homeowners Associations (HOAs) Education and Outreach

Growing communities across the district have led to the establishment of more HOAs. These associations are responsible for the management and maintenance of the stormwater management practices of their development, however these responsibilities are susceptible to neglect or improper maintenance. The presence of many HOAs makes determining a point of contact, combined with management turnover, challenging to maintain and develop deeper relationships with HOAs. Opportunities exist to reciprocate information sharing to better understand interest in natural resource management, strategies to conduct more efficient management of resources in their care, and develop a network of organizations capable to learning and supporting each other.

Public-Focused Education, Outreach, and Project Assistance

The public at large are the largest group of constituents of the BCWD comprising people who live, work, and play within the watershed. They make everyday decisions about their relationship to the landscape that impact the quality of resources. They can protect and enhance water resources through stewardship in their communities and everyday management decisions. The public also act to influence the policies of the BCWD, state agencies, and municipalities. The BCWD can serve as a valuable resource for its citizens by ensuring its role continues building relationships through shared priorities.

Business Community

Historically the BCWD has had a weaker relationship with the local business community. These watershed partners play an important role in maintenance practices tied to their properties and operations. Greater collaboration with the business community can create opportunities to involve these watershed partners in initiatives targeting BCWD priorities such as chloride management and water capture and re-use by establishing clearer connections between the business community's operational practices and watershed impacts. Ensuring that proposed operational opportunities emphasize cost impacts will be key to making these alternatives resonate with the business community.

Youth Education and Outreach

The BCWD improves the water resources of the District so they can be managed sustainably for future generations to benefit from. As future stewards of this landscape, supporting the involvement young people in efforts to care for these resources plays an important role in nurturing the next generation of advocates, volunteers, and stewards. BCWD Board of Managers

Ensuring the Board is aware of news issues, concerns, opportunities, and ways of thinking about watershed resources is vital to their role as decision-makers for the District.

3.12.4. Policies, Goals, and Implementation

The policies, goals, and implementation items related to these sub-issue areas are summarized in the following tables. The sub-issue area is identified in a heading, followed by a related policy. The goals addressing that policy are lettered and stated, followed by the implementation items for that goal. This format is intended to clearly display how each policy and goal will be addressed.

Table 56. Education, Outreach and Stewardship Policies, Goals, and Implementation Activities

SUB-ISSUE:	Municipality and Developer/Contractor Education and Outreach		
POLICY:	**The BCWD is committed to providing education and outreach services to municipalities in the District to promote good stewardship of water and natural resources.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase municipal official and staff capacity for and use of development techniques and regulatory strategies that protect natural resources and benefit water quality.	**1**	*Coordinate BCWD education and outreach efforts with those of municipalities and other local watershed organizations by continuing to support the East Metro Water Resource Education Program (EMWREP).*
		2	*Encourage attendance at training sessions hosted by Stormwater U on ordinances, development planning strategies, and development techniques that protect natural resources and benefit water quality by providing stipends so that 2 people from each District community can attend once every three years.*
		3	*Promote the MPCA's tool called WMAt for winter maintenance professionals to promote chloride reduction activities in the Long lake subwatershed.*
B	Increase municipal official and staff capacity to promote the benefits of regular maintenance of stormwater management and infiltration practices and increase the implementation of maintenance practices.	**1**	*Encourage attendance at training sessions hosted by Stormwater U on stormwater management facility maintenance schedules and procedures and the relation to water quality improvement (e.g. best practices to reduce impacts to water resources from parks and road maintenance activities - road salt application, fertilizer use, irrigation practices) by providing stipends so that 2 people from each District community can attend once every three years.*
		2	*Work with municipalities in the development of operation and maintenance plans for stormwater management facilities.*
C	Increase municipal official and municipal staff awareness of the BCWD and the assistance it can provide to municipalities.	**1**	*Develop demonstration projects to highlight BMPs and stewardship.*
		2	*Promote Friends of the Mississippi River's Blue Star Award program to recognize municipal programs or projects and/or developer and contractor programs or projects that exemplify water and natural resource stewardship.*
		3	*Educate municipalities about the District's Rules.*
		4	*Develop a Continuing Education Credit recognition for municipalities and developers recognizing their understanding of responsible watershed development practices.*
POLICY:	**The BCWD promotes good stewardship of water and natural resources through education and outreach opportunities for landowners and managers conducting work within the District in order to promote good stewardship of water and natural resources.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase developers' and contractors' awareness and use of development techniques that protect natural resources and benefit water quality.	**1**	Conduct workshops targeted to developers and realtors about marketing lakeshore properties based on BCWD analysis of lake functions and values.
		2	Provide training sessions on development planning strategies and development techniques that protect natural resources and benefit water quality.
B	Increase developers' and contractors' awareness of the importance of construction, installation, and maintenance techniques on the long-term functionality of stormwater management practices and increase the implementation of these techniques.	**1**	Encourage attendance at training sessions hosted by Stormwater U on stormwater management practice construction and installation techniques and the relationship to the continued functionality of the practice by providing stipends to individuals involved in construction oversight once every three years.
		2	Encourage developers with active projects in the watershed to attend erosion control seminars held by EMWREP / MECA.
C	Increase developer, contractor, awareness of the BCWD and the assistance it can provide.	**1**	Educate developers and the local design community about the District's Rules.

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SUB-ISSUE:	Homeowner Association (HOA) and Property Manager Education and Outreach		
POLICY:	**The BCWD is committed to helping HOAs and property managers make informed decisions about their responsibilities to promote good stewardship of water and natural resources.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase homeowner's associations and property managers' awareness of the importance of construction, installation, and maintenance techniques on the long-term functionality of stormwater management practices and increase the implementation of these techniques.	**1**	Provide HOAs with stormwater management maintenance resources to better inform maintenance approaches.
		2	Educate HOA owners when a development is completed and follow-up 5 years later.
B	Increase homeowner's associations and property managers' awareness of the BCWD and the assistance it can provide.	**1**	
SUB-ISSUE:	**Public-Focused Education, Outreach, and Project Assistance**		
POLICY:	**The BCWD will provide clear and accessible information highlighting existing efforts to share the story of watershed accomplishments and opportunities to get involved.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase public awareness of surface water, groundwater, and natural resource protection, restoration, and stewardship.	**1**	Regularly promote the District's accomplishments and events through multiple communication channels (newsletters, mail outs, social media, etc…) to reach audiences, sharing information about topics such as groundwater recharge, wetland and lake aesthetics and natural condition, home and yard care practices, and shoreline and wetland stewardship as well as information on BCWD accomplishments.
		2	Include an educational component in all BCWD capital improvement projects.
		3	Provide targeted educational messages to local businesses, local organizations, and areas experiencing specific challenges (e.g. chloride impairment in Long Lake).
		5	Provide education to residents of the District on groundwater conservation strategies.
		6	Host online information sessions on education topics of interest and maintain a record of these webinars on BCWD's website. Track views for these sessions to understand level of interest and gather participant engagement.
		7	Maintain an updated list of partners and event participants – update the list quarterly to reflect new information on partners and participants.
		8	Establish one permanent information kiosk with permanent and rotating information that is geographically relevant to resources near the kiosk (e.g. chloride impairment in Long Lake).
B	Promote public-led efforts in water and natural resource	**1**	Continue to administer the Annual Recognition Program to recognize citizen efforts in water resource and natural resource protection.

	restoration, protection, and stewardship.	**2**	Conduct BMP installation and implementation training workshops and provide supporting resources (e.g. directory to the State's Stormwater BMP guide) to provide citizens with the knowledge to install and implement BMPs on their properties. Programs could include workshops on topics such as rain barrels, rain gardens, shoreline restoration, and fertilizer use, and native vegetation buffer establishment and maintenance.
		3	Utilize the stewardship grant to assist citizens in best management practice installation.
		4	Develop demonstration projects to highlight stormwater management practices natural resource protection methods and resource stewardship.
POLICY:	**The BCWD desires to provide education and public involvement opportunities in watershed management planning and implementation in order to promote good stewardship of water and natural resources.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Increase public awareness of the BCWD, its role, and the functions and assistance it provides.	**1**	Update the District website and Facebook page to include easy-to-use information on resource protection and stewardship.
		2	Include an educational component in all BCWD capital improvement projects.
		3	Educate residents about the District's permitting program
		4	Host annual community watershed event in different parts of the watershed to highlight local projects and to engage residents in scientific and recreational activities
B	Stay informed on the topic of pollutants of emerging concern in lakes, streams, and groundwater by monitoring future studies completed by the MPCA and sharing information with the public.	**1**	Educate the public about pollutants of emerging concern including the widespread prevalence of pharmaceutical and cosmetic products in our lakes and streams, how these compounds can disrupt hormone regulation of aquatic organisms, such as fish, and how these chemicals enter lakes and streams.
SUB-ISSUE:	**Youth Education and Outreach**		
POLICY:	**The BCWD will support the work of its partners in furthering opportunities for youth to learn about watershed resources and get involved in stewardship.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Support watershed partners specializing in youth education and outreach to provide greater understanding and stewardship of watershed resources	**1**	
B	Provide K – 12 educational opportunities to encourage stewardship and increase awareness of the interconnected nature of land, surface water, and groundwater.	**1**	Develop classroom educational program that provides grants to teachers planning water and natural resource education sessions for their classroom or assist with curriculum development (e.g. perform monitoring activities, monitor BMPs, design BMPs, and develop watershed educational materials for variety of audiences).
		2	Conduct classroom presentations (K-12) on watershed concepts and water and natural resource stewardship.
	BCWD Board of Manager Education		
POLICY:	**The BCWD will provide its Board of Managers with opportunities to further their understanding of emerging topics to help inform decision-making.**		
GOALS		**IMPLEMENTATION ITEM**	
A	Provide continuous learning opportunities for the Board to further their understanding of current and emerging watershed issues.	**1**	Develop a Board Training Plan for new Board member orientation and ongoing learning opportunities
		2	Hold an annual training workshop for the Board

		3	Hold quarterly in-meeting trainings on topics identified by the Board
		4	Support attendance at external trainings

Table 57. Projected Expenditures (in 1,000's) for Education, Outreach and Stewardship Activities

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr Total
Coordinate BCWD education and outreach efforts with those of municipalities and other local watershed organizations by continuing to support the EMWREP.	18.5	18.5	19.4	19.4	19.4	20.4	20.4	20.4	21.4	21.4	199.3
Encourage attendance at training sessions hosted by Stormwater U on ordinances, development planning strategies, and development techniques that protect natural resources & benefit water quality by providing stipend: 2 people from District communities can attend once every 3 years.	--	--	2	--	--	2	--	--	2	--	6
Encourage attendance at training sessions hosted by Stormwater U on stormwater management facility maintenance schedules and procedures and the relation to water quality improvement by providing stipends: 2 people from District communities can attend once every three years.	--	2	--	--	2	--	--	2	--	--	6
Educate municipalities about the District's Rules.	--	--	7.5	--	--	--	--	--	--	--	7.5
Encourage attendance at training sessions hosted by Stormwater U on stormwater management practice construction and installation techniques and the relationship to the continued functionality of the practice by providing stipends to individuals involved in construction oversight once every 3 yrs.	--	--	2	--	--	2	--	--	2	--	6
Educate developers & the local design community about the District's Rules.	--	--	7.5	--	--	--	--	--	--	--	7.5

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Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr Total
Send annual newsletter to all citizens of the District.	5	5	5	5	5	5	5	5	5	5	50
Include an educational component in all BCWD capital improvement projects.	--	6.5	--	6.5	--	6.5	--	6.5	--	6.5	32.5
Host education seminars on Estate Planning to educate the public about tax incentives to property owners who create and donate a conservation easement.	.25	--	.25	--	.25	--	.25	--	.25	--	1.25
Continue to administer the Annual Recognition Program to recognize citizen efforts in water resource and natural resource protection.	--	.25	--	.25	--	.25	--	.25	--	.25	1.25
Update the District website and Facebook page to include easy-to-use information on resource protection and stewardship	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
Host annual ice cream social in different parts of the watershed to highlight local projects and to engage residents in scientific and recreational activities	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	15
Develop classroom educational program	5	5	5	5	5	5	5	5	5	5	50
Conduct classroom (K-12) presentations on watershed concepts and water and natural resource stewardship.	--	--	--	--	--	1	1	1	1	1	5
Total for Education	**30.75**	**39.25**	**50.7**	**38.2**	**33.7**	**44.1**	**33.6**	**42.1**	**38.7**	**41.2**	**392.3**

Table 58. Education, Outreach and Stewardship Implementation Activities from Table 47 addressed by Administrative and/or Project Development Program

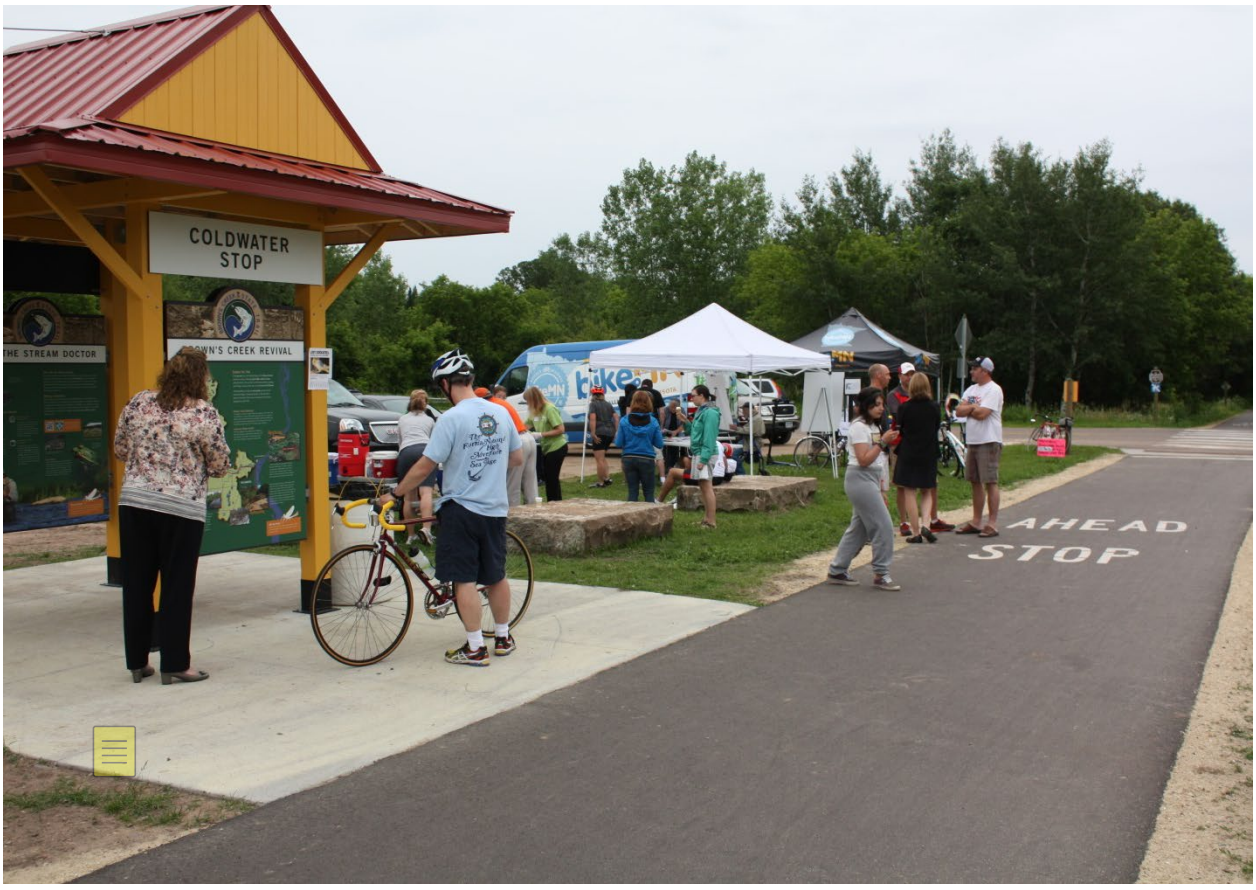
Work with municipalities in the development of operation and maintenance plans for stormwater management facilities.
Promote Friends of the Mississippi River's Blue Star Award program to recognize municipal programs or projects and/or developer and contractor programs or projects that exemplify water and natural resource stewardship.
Encourage developers with active projects in the watershed to attend erosion control seminars held by EMWREP / MECA.
Educate citizens about the District's permitting program.

Table 59. Education, Outreach and Stewardship Implementation Activities from Table 46 addressed by East Metro Water Resource Education Program

Promote the MPCA's tool called WMAt for winter maintenance professionals to promote chloride reduction activities in the Long lake subwatershed.
Conduct workshops targeted to developers and realtors about marketing lakeshore properties based on BCWD analysis of lake functions and values.
Provide training sessions on development planning strategies and development techniques that protect natural resources and benefit water quality.
Provide targeted educational messages through local businesses and local organizations. Businesses and organizations may include fertilizer suppliers, lawn care and garden companies, lake associations and garden clubs.
Provide education to residents of the District on groundwater conservation strategies.
Conduct BMP installation and implementation training workshops to provide citizens with the knowledge to install and implement BMPs on their properties. Programs could include workshops on topics such as rain barrels, rain gardens, shoreline restoration, and fertilizer use, and native vegetation buffer establishment and maintenance.
Educate the public about pollutants of emerging concern including the widespread prevalence of pharmaceutical and cosmetic products in our lakes and streams, how these compounds can disrupt hormone regulation of aquatic organisms, such as fish, and how these chemicals enter lakes and streams.

Table 60. Education, Outreach and Stewardship Implementation Activities from Table 47 where implementation costs covered under another Issue Category

Implementation Activity	Issue Category where implementation cost is identified (Table #)
Develop demonstration projects to highlight BMPs and stewardship.	Funding (Table 54)
Utilize the cost-share program to assist citizens in best management practice installation.	Stormwater Management (Table 5)



Brown's Creek Trail Opening