

**Table 7. 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 8. 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 9. 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.

### 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.

#### Development Related Land Disturbance

Soil disturbance during development activities can lead to high levels of erosion that result in sudden impacts to downstream water bodies if the sediment is transported offsite. Proper control of sediment and erosion during development activities can limit impacts to downstream resources. Development activities can also lead to an increase in stream velocities which can alter stream geomorphology, accelerating in-stream erosion.

#### Agricultural Practices

Agricultural activities regularly cause soil disturbance that can lead to high levels of erosion. If the sediment is transported offsite, the erosion results in impacts to downstream water bodies. Proper control of sediment and erosion on agricultural lands can limit the effect of soil disturbance on downstream resources.

### 3.2.4. 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 10: Erosion Prevention and Sediment Control Policies, Goals, and Implementation Activities**

SUB- ISSUE:		Existing Erosion Problems	
POLICY:		Protect the District’s water bodies from the impacts of sedimentation, excessive streambank and shoreline erosion, and adjacent upland erosion.	
GOALS		IMPLEMENTATION ITEM	
A	Provide long-term stabilization of the five highest priority erosion problem areas through stormwater management and stabilization projects including the establishment of native vegetation.	1	Conduct assessment of Brown’s Creek State Trail to evaluate culvert installations, identify erosion and sediment control issues related to the project and evaluate known areas of concern (e.g. bluff & ravine instabilities in the gorge).
		2	Conduct annual stream channel assessments from the headwaters to the St. Croix River to identify in-stream or near channel instabilities.
		3	Prioritize erosion projects based on the terrain analysis conducted in 2016 and implement corrective actions based on prioritization.
		4	Utilize the District’s cost-share program to assist in the installation of erosion and sedimentation control by citizens of the District.
		5	Determine sediment and chloride loading rates from the gravel roads within the District and work with municipalities and townships to address the issue.

<b>SUB- ISSUE:</b> Development Related Land Disturbance	
<b>POLICY:</b> The BCWD requires erosion and sediment controls in areas disturbed by development and construction related activities.	
<b>GOALS</b>	
<b>A</b>	Continue to perform routine site inspections during the construction process to monitor the performance of erosion and sediment control practices.
<b>IMPLEMENTATION ITEM</b>	
<b>1</b>	Addressed through administration of the BCWD regulatory standards and criteria.

<b>SUB- ISSUE:</b> Agricultural Practices	
<b>POLICY:</b> The BCWD encourages the use of stormwater runoff and erosion control best management practices on agricultural lands.	
<b>GOALS</b>	<b>IMPLEMENTATION ITEM</b>
<b>A</b>	Implement the results of the terrain analysis by installing BMPs on agricultural lands where increased use of erosion control and stormwater runoff best management practices could improve the quality of adjacent BCWD water bodies.
<b>B</b>	Use BCWD programs to implement solutions to identified stormwater runoff and erosion control problems that cannot be fully addressed by existing agricultural programs of other organizations.
<b>C</b>	Support the implementation of Minnesota's new buffer initiative by periodically assessing the quality and quantity of buffers on Public Waters in the BCWD.

**Table 11. Projected Expenditures (in 1,000's), for Erosion Prevention and Sediment Control Practices**

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Conduct assessment of Brown's Creek State Trail to evaluate culvert installations, identify erosion and sediment control issues related to the project and evaluate known areas of concern (e.g. bluff and ravine instabilities in the gorge)	10	--	--	--	--	--	--	--	--	--	10
<b>Total for Erosion and Sediment Control</b>	<b>10</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>10</b>

**Table 12. Erosion Prevention and Sediment Control Implementation Activities from Table 10 where implementation costs covered under another Issue Category**

Implementation Activity	Issue Category where implementation cost is identified (Table #)
Conduct annual stream channel assessments from the headwaters to the St. Croix River to identify in-stream or near channel instabilities.	<b>Stream Management (Table 13)</b>
Prioritize erosion projects based on the terrain analysis conducted in 2016 and implement corrective actions based on prioritization.	<b>Stream Management (Table 13)</b>
Utilize the District's cost-share program to assist in the installation of erosion and sedimentation control by citizens of the District.	<b>Stormwater Runoff Management (Table 5)</b>

### 3.6. Floodplain Management

#### 3.6.1. General Issue Statement

The BCWD risks losing flood storage areas through land and basin alterations. The loss of flood storage areas can increase the frequency, elevation, and duration of flooding and can result in increased impacts to infrastructure, property, and the natural environment.

#### 3.6.2. Relevance to the District

Flooding is a natural occurrence that is vital to the health of many ecosystems. Natural water bodies and constructed stormwater management facilities within the watershed function as flood storage areas. Alterations to the floodplain or outlets of water bodies or stormwater management facilities can change flooding characteristics and impact properties and natural resources. According to the landlocked basin analysis the BCWD performed in 2016 (using the updated NOAA Atlas 14 Precipitation-Frequency Atlas of the United States), the 33 basins within the watershed that are landlocked for the 100-year, 10-day event may be at an elevated risk for flooding if changes in adjacent land uses cause increased volumes of runoff to enter the basins. Additionally, existing or proposed structures in and around flood storage areas require protection from damage caused by flooding.

#### 3.6.3. Sub-Issue Areas

##### Protection of Flood Storage Areas

The natural process of flooding can become damaging to structures if the areas that naturally store floodwaters are filled. Filling of flood storage areas (with earthen fill) increases the frequency of flooding and increases the water surface elevation of a flood.

##### Management of Flood-Prone Areas

Areas prone to flooding such as lands adjacent to lakes, streams, and wetlands or within landlocked basins should be managed to avoid impacts to structures. Development within these flood prone areas can remove critical stabilizing features, such as vegetation and shoreline structure. Instability along the shoreline of streams and lakes leads to negative ecological impacts, such as erosion and loss in biodiversity. Structures can be placed where the risk of flooding is low in order to avoid damage.

#### 3.6.4. 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 23. Floodplain Management Policies, Goals, and Implementation Activities**

<b>SUB-ISSUE:</b>		<b>Protection of Flood Storage Areas</b>	
<b>POLICY:</b>		<b>The BCWD is committed to the protection of flood storage areas to reduce the impacts of flooding and promote recharge.</b>	
<b>GOALS</b>		<b>IMPLEMENTATION ITEM</b>	
<b>A</b>	Ensure no net loss of flood storage capability within the watershed.	<b>1</b>	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>

**Table 23. Floodplain Management Policies, Goals, and Implementation Activities**

<b>SUB- ISSUE:</b>		<b>Management of Flood Prone Areas</b>	
<b>POLICY:</b>		<b>The BCWD will continue to protect structures and natural communities from flooding exceeding natural water level fluctuations.</b>	
<b>GOALS</b>		<b>IMPLEMENTATION ITEM</b>	
<b>A</b>	Assess the potential for flooding properties when evaluating land management activities.	<b>1</b>	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>
		<b>2</b>	Continue to monitor lake levels and shallow aquifer groundwater levels to evaluate conditions that may cause impacts to existing structures.
<b>POLICY:</b>		<b>The BCWD desires to minimize the risks of flooding associated with land alterations adjacent to landlocked basins.</b>	
<b>GOALS</b>		<b>IMPLEMENTATION ITEM</b>	
<b>A</b>	Minimize the risk of flooding to structures within landlocked basins.	<b>1</b>	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>
<b>B</b>	Minimize the risk of flooding on downstream properties when outlets are provided for landlocked basins.	<b>2</b>	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>

**Table 24. 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.
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*Kismet Basin Lake aerial*

### **3.7. Groundwater Management**

#### **3.7.1. General Issue Statement**

Land-altering activities have the potential to impact groundwater resources as well as groundwater dependent natural resources. Without proper land-use and water resource management, the following impacts may occur: reduced groundwater recharge, reduced groundwater quality, alterations to drinking water supply, and alterations to the functions and values of groundwater dependent natural resources.

#### **3.7.2. Relevance to the District**

The BCWD contains groundwater dependent natural resources which have the potential to be impacted by increasing development pressure in the watershed. While some of these resources are well known to the public, for example Brown's Creek, there are other unique resources that had not been identified until the [North Washington Groundwater Study](#) and the Natural Resource Inventory for the Brown's Creek watershed were performed.

The impairment of Brown's Creek, declining groundwater levels, and reduced baseflow in the creek highlight the need to protect, conserve and utilize the region's groundwater in ways that protect public health, support economic growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities.

The [Washington County Groundwater Plan \(2014-2024\)](#) lists several actions that should be addressed by Watershed Management Organizations (WMOs) including BCWD:

- Develop, through the Washington County Water Consortium, a county-wide groundwater monitoring plan and a data tracking and mapping system in coordination with WMOs.
- Collaborate with LGUs and WMOs to identify and preserve regional recharge areas. Encourage LGUs and WMOs to incorporate protection of recharge areas into plan updates.
- Work with Public Water Suppliers and WMOs to strengthen education efforts, and develop and distribute materials needed to inform home owners on where they get their water from, what source water protection is, and the efforts they can make to ensure that they do not contaminate their drinking water.
- Identify available partnerships and funding opportunities to address agricultural nutrient management (with) Watershed Districts/WMO programs.

#### **3.7.3. Sub-Issue Areas**

##### **Management of Groundwater Quality**

Groundwater supplies all of the drinking water within BCWD and Washington County. Pollution prevention is the key to maintaining this vital resource. The cleanup of aquifers is expensive, takes a long time, and is often not even possible with current technology. Ensuring that volume control and infiltration practices installed within the watershed will not lead to contamination of groundwater aquifers is important to the protection of drinking water sources.

### **Management of Groundwater Recharge and Supply**

Drinking water supplies and groundwater dependent natural resources need a sustainable supply of groundwater in order to remain viable. Impervious surfaces can reduce the amount of water that infiltrates and recharges aquifers. Excessive groundwater withdrawals from wells can alter groundwater flow and limit the availability of groundwater for other purposes. Groundwater sustainability can generally be defined as groundwater withdrawals and natural discharges being equal to groundwater recharge, with no negative impacts to surface water bodies. Groundwater recharge occurs on a large scale throughout the watershed. In fact, some groundwater within the watershed boundaries may be recharged by areas outside the watershed.

The BCWD intends to proactively manage groundwater resources in the watershed rather than reactively responding to a crisis. Groundwater elevations and flow are controlled by long-term trends in climate, recharge, and groundwater withdrawal. By the time low groundwater elevations or discharges become a problem, it may be too late to implement a timely solution. The BCWD will not only monitor trends in groundwater elevations and water use, but also try to recognize and predict when and where issues could arise in the future and implement policies to avoid adverse effects on natural resources and water supplies.

### **Management of Groundwater Dependent Natural Resources**

The Brown's Creek Watershed District has been proactively managing its unique groundwater dependent natural resources since its inception in 1997. While Brown's Creek was the focal point initially, the BCWD has come to recognize the value in protecting the other high quality and highly sensitive groundwater dependent natural resources in the watershed, including:

- Wetlands
- Fens (rare wetlands with high pH)
- Springs and spring creeks
- Most lakes

Brown's Creek Watershed District should continue to protect these resources by recognizing when and where they are threatened. The BCWD will review options for strengthening its rules to ensure the sustainability of groundwater flow. Enforcement of the rules must be ongoing. Public education is critical to the widespread acceptance and compliance with the rules.

#### **3.7.4. 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 25. Groundwater Management Policies, Goals, and Implementation Activities**

SUB- ISSUE:		Management of Groundwater Quality	
POLICY: The BCWD supports the protection of groundwater quality.			
GOALS		IMPLEMENTATION ITEM	
A	Establish controls to reduce the potential for transport of pollutants into the groundwater.	1	Support well-sealing programs by Washington County and others by helping to identify unsealed wells and promote the program to residents in the BCWD.
		2	Rely on regulatory subsurface sewage treatment system (SSTS) programs of Washington County and MPCA to address potential contamination from septic systems. Support and promote Washington County financial assistance program for non-compliant SSTS, and work with the county as opportunities arise to implement other SSTS strategies from the Washington County Groundwater Plan, such as targeted inventories, and education efforts.
		3	Work with Washington County to develop an outreach plan to educate lawn care companies, golf courses, kennel operations, and county and LGU public works departments on how to use BMPs to minimize the effects on groundwater caused by the use and storage of fertilizers, pesticides, and road salt, while properly maintaining their properties.
		4	Work with Washington County to develop and implement an education program directed at homeowners outlining proper use and disposal of pharmaceuticals, lawn and garden chemicals, hazardous household waste, salt usage and storage, and management of pet waste (e.g. Unused Medications Disposal, Household Hazardous Waste Events).
		5	Support county and state government efforts to define, monitor, and educate the public about contaminants of emerging concern.
		6	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>
B	Cooperate with the wellhead protection and source water assessment efforts of municipalities and others.	1	Share relevant data on groundwater resources and resource protection areas with municipalities for use in wellhead protection plans and source water assessments.
		2	Review wellhead protection plans and source water assessments for consistency with BCWD-identified areas of contamination concern and recharge protection.
SUB- ISSUE:		Management of Groundwater Recharge and Supply	
POLICY: The BCWD is committed to sustaining the quantity of groundwater within the watershed.			
GOALS		IMPLEMENTATION ITEM	
A	Work with state and other local partners to maintain or restore pre-settlement recharge conditions within the District.	1	Utilize USGS GW model to determine how best to implement impervious surface retrofit projects to benefit groundwater dependent natural resources.
		2	Continue to participate in the North and East Metro Groundwater Management Area Plan Project Advisory Team by attending meetings.
		3	Establish rules and policies for “no net loss” of recharge due to construction of impervious surfaces.
		4	Utilize the cost-share program to assist with groundwater conservation BMPs.
		5	<i>Addressed through administration of the BCWD regulatory standards and criteria.</i>
B	Address the utilization of groundwater through groundwater appropriation standards.	1	Review water appropriations permits applications and submit comments to the Department of Natural Resources.
		2	Work with Washington County and the MDNR to develop a regional water conservation plan.
		3	Consider amending Rules to include groundwater appropriations standards for wells being constructed in the vicinity of a GDNR by 2018.
C	Quantify, to the extent possible, the potential effects of groundwater appropriations on Brown’s Creek and other groundwater-dependent natural resources.	1	Present investigation findings to the City of Stillwater, to the MNDNR, and to the Oak Glen Golf Course and consider whether a different pumping schedule could alleviate stress on the aquifers below Brown’s Creek.
		2	Provide the USGS with new information so that the Groundwater Model can be updated every two years.

SUB- ISSUE: Management of Groundwater Recharge and Supply (continued)	
POLICY: The BCWD is committed to sustaining the quantity of groundwater within the watershed.	
GOALS	IMPLEMENTATION ITEM
<p><b>D</b></p> <p><u>Promote groundwater conservation</u></p>	<p><b>1</b></p> <p><i><u>Implement stormwater-reuse projects, including but not necessarily limited to projects at Oak Glen Golf Course, Stillwater Country Club, and the Long Lake Regional Treatment facility, to reduce groundwater withdrawal for irrigation</u></i></p>
<p><b>D</b></p> <p><b>E</b></p> <p>Gather information to support the District's understanding of groundwater quantities and groundwater flow.</p>	<p><b>1</b></p> <p>Collect groundwater elevation data from residential wells, monitoring wells and high capacity wells at least annually. Install data recorders to collect more frequent measurements where possible. Share information with Washington County and MNDNR.</p>
	<p><b>2</b></p> <p>Collect groundwater data in Brown's Creek to identify stretches that are gaining and losing groundwater every five years starting in 2018.</p>
	<p><b>3</b></p> <p>Conduct groundwater chemistry monitoring and analysis near groundwater dependent natural resources (i.e. lakes) to provide data supporting groundwater flow analysis.</p>
	<p><b>4</b></p> <p>Complete a dye trace (or other tracer such as stable isotopes) study to quantify groundwater flow into Brown's Creek by 2017.</p>
	<p><b>5</b></p> <p>Conduct 10 soil borings or install 10 monitoring wells (piezometers) near the creek to better define the glacial geology in areas between the high capacity wells and Brown's Creek.</p>
	<p><b>6</b></p> <p>Inventory seepage points along the creek and other GDNR every other year and compare to previous inventories.</p>
	<p><b>7</b></p> <p>In support of groundwater modeling efforts, conduct one pumping test per year on existing residential and golf course wells to obtain better local data on hydraulic conductivity of aquifers.</p>
	<p><b>8</b></p> <p>Work with the MNDNR Observation Well program and others to install deep observation wells near Brown's Creek to monitor bedrock aquifers.</p>
	<p><b>9</b></p> <p>Identify opportunities to partner on groundwater monitoring efforts with municipalities, other watershed districts, Washington County, and state agencies.</p>
	<p><b>10</b></p> <p>Develop a water budget for the district that includes surface water and groundwater interaction, an assessment of the geologic conditions, land use and groundwater contamination and climate change trends and impacts</p>
SUB- ISSUE: Management of Groundwater Dependent Natural Resources	
POLICY: The BCWD is committed to sustaining and improving the function and value of groundwater dependent natural resources.	
GOALS	IMPLEMENTATION ITEM
<p><b>A</b></p> <p>Maintain or improve the function and value of groundwater dependent natural resources within the District.</p>	<p><b>1</b></p> <p>Evaluate definition of groundwater dependent natural resources and associated contributing drainage area to assess the need to revise BCWD Rule language.</p>
	<p><b>2</b></p> <p>Develop GIS database of relevant current and historical groundwater dependent natural resources monitoring data and provide the database to the public via the District website.</p>
	<p><b>3</b></p> <p>Develop and implement an expanded education program for citizens and public officials on the interaction between groundwater and surface water, the value of and need to protect groundwater recharge areas and wetlands, an implementation of BMPs and LID and redevelopment strategies to protect groundwater resources.</p>
	<p><b>4</b></p> <p>Get permission from the owner of Indian Hills Golf Course and conduct baseline monitoring of the fen.</p>

**Table 26. Projected Expenditures (in 1,000's) for Groundwater Management Practices**

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Work with Washington County to develop an outreach plan to educate land care companies, golf courses, kennel operations, and county and LGU public works departments on how to use BMPs to minimize the effects on groundwater caused by the use and storage of fertilizers, pesticides, and road salt, while properly maintaining their properties.	--	--	--	--	3	--	--	--	--	--	3
Work with Washington County to develop and implement an education program directed at homeowners outlining proper use and disposal of lawn and garden chemicals, salt usage and storage, and management of pet waste.	--	--	--	--	3	--	--	--	--	--	3
Utilize USGS GW model to determine how best to implement impervious surface retrofit projects to benefit groundwater dependent natural resources.	--	2	--	--	--	--	--	--	--	--	2
Continue to participate in the North and East Metro Groundwater Management Area Plan Project Advisory Team by attending meetings.	1	1	--	--	--	--	--	--	--	--	2
Establish rules and policies for "no net loss" of recharge due to construction of impervious surfaces.	5	5	--	--	--	--	--	--	--	--	10
Review water appropriations permit applications and submit comments to the Department of Natural Resources.	1	1	1	1	1	1	1	1	1	1	10
Work with Washington County and/or to MDNR to develop a regional water conservation plan.	--	--	--	--	5	--	--	--	--	--	5
Consider amending Rules to include groundwater appropriations standards for wells being constructed in the vicinity of a GDNR by 2018.	5	--	--	--	--	--	--	--	--	--	5
Present investigation findings to the City of Stillwater and to Oak Glen Golf Course and consider whether a revised pumping schedule could alleviate stress on the aquifers below Brown's Creek by meeting with them individually.	7	--	--	--	--	--	--	--	--	--	7

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
Provide the USGS with new information so that Groundwater Model can be updated every two years.	--	10	--	10	--	10	--	10	--	10	50
Collect groundwater elevation data from residential wells, monitoring wells and high capacity wells at least annually. Install data recorders to collect more frequent measurements where possible. Share information with Washington County and MNDNR.	5	5	5	5	5	5	5	5	5	5	50
Collect groundwater data in Brown's Creek to identify stretches that are gaining and losing groundwater every five years starting in 2018.	--	5	--	--	--	--	5	--	--	--	10
Conduct groundwater chemistry monitoring and analysis near groundwater dependent natural resources (i.e. lakes) to provide data supporting groundwater flow analysis.	--	--	12	--	--	--	--	--	--	--	12
Complete a dye trace (or other tracer such as stable isotopes) study to quantify groundwater flow into Brown's Creek by 2020.	--	--	--	20	--	--	--	--	--	--	20
Conduct 10 soil borings or install 10 monitoring wells (piezometers) near the creek to better define the glacial geology in areas between the high capacity wells and Brown's Creek.	--	--	7	7	7	--	--	--	--	--	21
Inventory seepage points along the creek and other GDNR every other year and compare to previous inventories.	--	1.5	--	1.5	--	1.5	--	1.5	--	1.5	7.5
In support of groundwater modeling efforts, conduct one pumping test per year on existing residential and golf course wells to obtain better local data on hydraulic conductivity of aquifers.	--	--	8	8	8	8	8	--	--	--	40
Work with the MNDNR Observation Well program and others to install deep observation wells near Brown's Creek to monitor bedrock aquifers.	1	1	1	1	1	--	--	--	--	--	5
Evaluate definition of groundwater dependent natural resources and	3	'--	'--	'--	'--	'--	'--	'--	'--	'--	3

Implementation Activities	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Yr. Total
associated contributing drainage area to assess the need to revise BCWD Rule language.											
Develop GIS database of relevant current and historical groundwater dependent natural resources monitoring data and provide the database to the public via the District website.	--	--	--	--	--	3	--	--	--	--	3
Develop and implement an expanded education program for citizens and public officials on the interaction between groundwater and surface water, the value of and need to protect groundwater recharge areas and wetlands, an implementation of BMPs and LID and redevelopment strategies to protect groundwater resources.	--	--	--	--	1	1	1	--	--	--	3
<b>Total for Groundwater Management</b>	<b>28</b>	<b>31.5</b>	<b>34</b>	<b>53.5</b>	<b>34</b>	<b>29.5</b>	<b>20</b>	<b>17.5</b>	<b>6</b>	<b>17.5</b>	<b>271.5</b>

**Table 27. Groundwater Management Implementation Activities from Table 25 addressed by Administrative and/or Project Development Program**

Support well sealing programs by Washington County and others by helping to identify unsealed wells and promote the program to residents in the BCWD.
Rely on regulatory subsurface sewage treatment system (SSTS) programs of Washington County and MPCA to address potential contamination from septic systems. Support and promote Washington County financial assistance program for non-compliant SSTS, and work with the county as opportunities arise to implement other SSTS strategies from the Washington County Groundwater Plan, such as targeted inventories, and education efforts.
Share relevant data on groundwater resources and resource protection areas with municipalities for use in wellhead protection plans and source water assessments.
Review wellhead protection plans and source water assessments for consistency with BCWD-identified areas of contamination concern and recharge protection.
Identify opportunities to partner on groundwater monitoring efforts with municipalities, other watershed districts, Washington County, and state agencies.

**Table 28 Groundwater Management Implementation Activities from Table 25 addressed by East Metro Water Resource Education Program**

Support county and state government efforts to define, monitor, and educate the public about contaminants of emerging concern.
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**Table 29. Groundwater Management Implementation Activities from Table 25 where implementation costs covered under another Issue Category**

Implementation Activity	Issue Category where implementation cost is identified (Table #)
Utilize the cost-share program to assist with groundwater conservation BMPs.	Stormwater Management (Table <del>5</del> 6)
<i><u>Implement stormwater-reuse projects providing substantial reduction in the use of groundwater for irrigation, including but not necessarily limited to projects at Oak Glen Golf Course, Stillwater Country Club, and the Long Lake Regional Treatment facility</u></i>	<u>Stormwater Management (Table 6)</u>