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South Washington Watershed District Monitoring Plan

Prepared for
South Washington Watershed District

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Abbreviations

API	Application Programming Interface
BMP	Best Management Practice
CAMP	Community-Assisted Lake Monitoring Program
CoCoRaHS	Community Collaborative Rain, Hail and Snow Network
CSV	Comma-Separated Values
DO	Dissolved Oxygen
EQuIS	Environmental Quality Information System
GIS	Geographic Information System
HAB	Harmful Algal Bloom
MCES	Metropolitan Council Environmental Services
MDH	Minnesota Department of Health
MnDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
Obwell	Observation Well
QAQC	Quality Assurance / Quality Control
SWWD	South Washington Watershed District
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
USGS	United States Geological Survey
WCD	Washington Conservation District

1 Introduction

The South Washington Watershed District (SWWD or District) has undertaken the monitoring of its water resources throughout the District since 1996. The primary goal of the SWWD's monitoring program is to create a baseline of understanding of water quality, hydrologic, and ecological conditions across the watershed, to evaluate the effectiveness of ongoing management, and to inform future District implementation efforts. Monitoring data collected through the District's program supports the adaptive management of water resources, informs regulatory compliance, and supports strategic planning, ensuring that the SWWD can respond effectively to changing conditions and emerging challenges.

Since 2000, SWWD has partnered with the Washington Conservation District (WCD) to implement its monitoring programs. These efforts have included the monitoring of long-term regional assessment sites, lake level monitoring, water quality sampling, and groundwater observations. Over time, monitoring priorities have evolved in response to land use changes, climate variability, and regulatory requirements. The District's current approach utilizes the data collected for analysis and reporting, leveraging dashboards and modeling tools to inform projects and policies.

The SWWD's monitoring activities support compliance with state and federal programs, including providing information for their partners' use related to Municipal Separate Storm Sewer System (MS4) permit responsibilities and Total Maximum Daily Load (TMDL) requirements. SWWD collaborates with agencies such as the Minnesota Pollution Control Agency (MPCA), Minnesota Department of Natural Resources (MnDNR), and United States Geological Survey (USGS), as well as municipalities and neighboring watershed districts in sharing their data for these purposes. Monitoring data also informs planning for capital improvement projects, project prioritization, and adaptive management strategies. Data is also regularly shared with research organizations focused on water resource management and is used to support public education and transparency through reporting tools and online dashboards.

This Monitoring Plan was developed in support of the SWWD's 2026-2035 Watershed Management Plan and establishes a framework for the collection, management, and application of monitoring data for the protection and improvement of water resources within the District. This plan defines the monitoring goals, describes program components, and structure related to the implementation of monitoring activities by the SWWD. Monitoring and data analysis related to surface water quality, regional flow locations, key infiltration areas, groundwater, lake levels, and precipitation are included as potential components of the District's overall monitoring program. The Monitoring Plan is intended for SWWD staff, technical partners, and agencies, and serves as a reference for annual planning and long-term decision making related to the program.

2 Monitoring Goals

The SWWD's monitoring program is designed to provide reliable, actionable data that supports adaptive watershed management and long-term resource protection. These goals reflect priorities identified in the District's Watershed Management Plan and recent planning initiatives, including climate resiliency and regional collaboration. The primary goals of the SWWD's monitoring program include:

- **Track Long-Term Trends –** Monitor water quality, quantity, and hydrology across the District to identify changes over time and evaluate progress toward resource protection objectives.
- **Protect Priority Waterbodies –** Maintain and improve conditions in high-value lakes and streams, particularly those that are not impaired or have been recently delisted, to prevent degradation and sustain ecological health.
- **Support Adaptive Management –** Provide data that informs annual planning, project prioritization, and updates to management strategies.
- **Evaluate Effectiveness of Management Actions –** Assess the performance of best management practices (BMPs), regulatory controls, capital projects, and other management actions in reducing pollutant loads, mitigating hydrologic impacts, and improving ecological health.
- **Ensure Compliance** – Monitoring at key locations to track and ensure compliance with regional flood mitigation and management agreements related to maximum allowable discharges.
- **Monitor Climate Impacts –** Detect changes in water quality and quantity, and stormwater runoff associated with climate variability.
- **Monitor Land Use Change Impacts –** Detect changes in stormwater runoff, water quality, and quantity associated with land use changes (e.g., development).
- **Inform Modeling and Planning –** Supply data for the calibration and validation of hydrologic, hydraulic, and water quality models used in project design and watershed planning.
- **Protect Groundwater Resources –** Understand groundwater-surface water interactions, recharge dynamics, and potential contamination risks.
- **Enhance Public Communication and Education –** Make monitoring results accessible through water resource summaries, dashboards, and other channels to promote transparency and stakeholder engagement.
- **Facilitate Interagency Coordination –** Share data with partners such as MnDNR, MPCA, USGS, research institutions, municipalities, and neighboring watershed districts to support regional water resources management.

To achieve these goals, the SWWD's monitoring program is organized into distinct categories that address different scales, data needs, and resource types. The following section describes these categories, along with their purposes, methods, and how they support the District's overall management strategy. Consistent with District policies to limit the duplication of effort between government agencies, while the District will remain adaptable to considering additions to its monitoring program over the lifespan of this plan, it may not independently monitor for specific pollutants (e.g., PFAS), instead relying on the expertise, data, and guidance of state and federal agencies to inform watershed management needs.

3 Monitoring Categories

3.1 Regional Assessment

Regional assessment monitoring provides a consistent and robust dataset as part of SWWD's long-term programming. These sites are strategically located at critical crossings and outlets to characterize watershed-scale hydrology and water quality trends. Data from these monitoring sites support trend analysis, model calibration, flood management compliance, assessing compliance with state standards, and evaluation of land use (development) and climate change impacts. This approach ensures that SWWD can identify emerging issues early and adapt management strategies accordingly.

These locations are subcategorized into long-term assessment locations and rotating subwatershed assessment locations, as described below.

3.1.1 Long-Term Assessment Locations

One of the objectives of the SWWD is to establish a framework for characterizing and managing water resources at a regional level rather than solely at a site-specific level. Long-term regional assessment monitoring stations are maintained to achieve this objective, provide continuity in monitoring from year-to-year, and to track long-term trends in flow and water quality. These sites represent major drainage areas and are selected to capture conditions entering and leaving key watershed regions, including waterbody outlets. Monitoring at these locations allows SWWD to evaluate the effects of development, cumulative BMP implementation, and climate variability on watershed health. Data from these stations is used to calibrate and validate regional hydrologic/hydraulic and water quality models, set benchmarks for regional water quality, assess compliance with state water quality standards, evaluate the effectiveness of local controls in managing pollutant loading and compliance with flood management standards, and to predict and evaluate the performance of management actions (i.e., capital improvements, natural resource conservation efforts, etc.).

The SWWD's network of long-term regional assessment locations is designed with an intent to be part of the District's permanent monitoring program and for individual stations to be operated until deemed unnecessary by the analysis of monitoring results, modeling, and/or changes in land use, regulations, and/or climatic considerations. Any additions to or retirement of stations from the District's network of regional assessment locations will be evaluated by SWWD staff, ensuring that changes support the District's long-term goals without compromising historical datasets (see Section 5).

Regional assessment monitoring stations are automated to the greatest extent feasible. Continuous measurements of stage, velocity, and discharge are collected throughout the monitoring season, typically April through November. Rainfall measurements may also be collected at these locations to complement hydrologic monitoring, when feasible. Water quality sampling includes flow-weighted storm event composites, storm event and snowmelt grab samples, and baseflow composites and grab samples. Water quality samples collected at these stations are analyzed at the Metropolitan Council Environmental Services Laboratory, and field measurements and rating curves are used to fill data gaps when sensors are compromised. Additional information about specific methods or equipment can be obtained by contacting staff at SWWD or WCD.

Table 3-1 lists the SWWD's long-term regional assessment locations and provides a general description of the station's location, the focus of monitoring at each location, and the type of data being collected. Additional details on each of the stations, including the types and frequency of data collection at each

location can be obtained by contacting SWWD staff. A map showing the current, active monitoring locations within the District is available on the District's website: South Washington Watershed District Data Viewer.

Table 3-1 Long-Term Regional Assessment Locations

Station	Station Description
MS-1	*Established in 1996 to monitor intercommunity flows from Lake Elmo and Oakdale into Woodbury. Data provides a baseline understanding of initial surface water quality and quantity at the headwaters of the watershed. Includes continuous flow data (April – November) and select water quality parameters.*
Wilmes Lake Outlet	*Established in 2009 to monitor water quality and quantity leaving the northern watershed and flowing toward Colby Lake. Includes continuous flow data (April – November) and select water quality parameters.*
Colby Lake Outlet	*Established in 2011 to monitor water quality and quantity leaving the northern watershed and flowing toward Bailey Lake. Includes continuous flow data (April – November) and select water quality parameters.*
MS-2	*Established in 1996 to monitor a large portion of Woodbury, including outflow from Colby Lake, before flowing into Bailey Lake. Monitoring data used to develop models that evaluate effects of proposed development, BMP, and conservation projects. Includes continuous flow data and select water quality parameters.*
Newport	*Established in 2006 to develop baseline of water quality and quantity data for runoff flowing into the Mississippi River from the tributary area including stormwater flows from the Cities of Newport and Woodbury, and to characterize stormwater runoff from an urban area following treatment in a stormwater pond. Includes continuous flow data and select water quality parameters.*
Newport at 4th Street	*Established in 2018 to evaluate stormwater quantity and quality discharging to the Mississippi River from tributary area including portions of the Cities of Newport, Woodbury, Cottage Grove, and St. Paul Park. Includes continuous flow data and select water quality parameters.*
St. Paul Park	*Established in 2006 to establish a baseline of water quality and quantity data for runoff flowing into the Mississippi River and characterize stormwater flows from a tributary area in the City of St. Paul Park. Includes continuous flow data and select water quality parameters.*
Central Ravine	*Established in 2009 to give a better understanding of the quantity and quality of water leaving the Central Draw watershed and draining to the Mississippi River. The 100th Street location formerly served as the regional assessment location for the Central Draw watershed, but was eventually superseded by the Central Ravine station. Includes continuous flow data and select water quality parameters.*
Ravine Lake Outlet	*Established in 2015 to monitor water quality and quantity leaving Ravine Lake to a receiving stream which outlets to the Mississippi River. Includes continuous flow data (April – November) and select water quality parameters.*
Trout Brook	*Established in 2007 to monitor water quality and quantity within the Trout Brook watershed and evaluate watershed discharges to the St Croix River. Includes continuous flow data (April – November) and select water quality parameters.*
O'Conners Creek	*Established in 2010 to monitor water quality and quantity within the O'Conner's Creek watershed, which is landlocked. O'Conners Creek monitoring station was relocated to O'Conners at 80th St in 2021 to address tailwater concerns at original location. Includes continuous flow data (April – November) and select water quality parameters.*

3.1.2 Rotating Subwatershed Assessment Locations

To enhance and supplement the SWWD regional assessment framework, the District operates additional assessment sites on a rotating basis, at the subwatershed-scale (i.e., subwatershed assessment locations). Subwatershed assessment locations are established to further define hydrology and/or manage water resources within the major regions of the watershed, by providing data at the smaller, subwatershed-scale. Data collected at these locations is used to identify priority subwatersheds within the larger watershed regions of the District as well as to help calibrate regional models, assess benchmarks for regional water quality, and evaluate the effectiveness of more localized controls in managing water resources. Subwatershed assessment sites, once established, are typically operated for a temporary period (e.g., 3-10 years) depending on District goals and the value of the data being collected. In many cases, the District collects monitoring data at subwatershed assessment locations for a predetermined period of time, rotates away from the station for a few years, and then returns to the site to continue building a long-term data set of monitoring at this smaller spatial-scale, but at locations that do not require a year-after-year continuous data record in order to meet the district's monitoring and assessment goals at that given location.

Monitoring methods at subwatershed assessment locations vary depending on the SWWD's objectives for each location. Rotating subwatershed assessment monitoring stations are and will continue to be automated to the greatest extent feasible and operated by the WCD. Currently, all subwatershed assessment sites are monitored for flow using a self-powered water level logger. Stage measurements are taken every 15 minutes. Field stage measurements are taken at all sites and stage to discharge rating curves are developed, if possible. Rating curves are used to calculate discharge at the rotating assessment locations. If necessary, subwatershed assessment locations can be equipped with sampling equipment to assess nutrient and pollution loading on a subwatershed level. Additional information about specific methods or equipment can be obtained by contacting staff at SWWD or WCD.

Table 3-2 summarizes the SWWD's currently active subwatershed assessment locations, provides a general description of the station's location, the focus of monitoring at each location, and the type of data being collected. Additional details on each of the stations, including the types and frequency of data collection at each location can be obtained by contacting SWWD staff.

Table 3-2 Subwatershed Assessment Locations

Station[1]	Station Description
Powers East	*Subwatershed assessment tributary to Powers Lake. Established to monitor a residential subwatershed east of the lake and maintain or update model calibration. Includes inlet flow monitoring and select water quality parameters.*
Colby Lake – West Inlet	*Subwatershed assessment tributary to Colby Lake. Established to monitor a residential subwatershed west of the lake. Includes continuous flow monitoring and select water quality parameters.*

[1] Stations listed in this table are those that are considered 'active' at the time of the writing of this plan. For information on historic, now inactive subwatershed assessment locations, contact SWWD staff.

3.2 Waterbody Assessment

Monitoring lakes and other waterbodies within the District provides essential information for protecting aquatic resources and assessing compliance with state lake water quality standards. Historically, SWWD's waterbody assessment efforts have included the long-term screening of lakes in the form of lake level monitoring and participation in the Metropolitan Council Community-Assisted Lake Monitoring Program (CAMP). To ensure data consistency and accuracy across all monitored waterbodies, in the future the District may consider moving away from CAMP, which utilizes volunteers to collect water quality samples, to having one consistent entity conducting all waterbody monitoring. By collecting this long-term baseline data, the District can assess and identify trends in water quality and quantify over time (both positive and negative), assess compliance with state water quality standards, and identify lakes that would benefit from additional analysis and more in-depth study (see Section 3.3.2 under Project Assessment).

The District conducts annual lake monitoring on all major lakes. Lake water quality monitoring includes biweekly sampling from April through October at the deepest point of each lake. Field measurements of surface temperature, dissolved oxygen, and transparency (Secchi depth) are collected alongside water samples analyzed for total phosphorus, nitrogen, and chlorophyll-a. Where appropriate, hypolimnetic samples are obtained to evaluate nutrient dynamics. Additionally, macrophyte point-intercept surveys are conducted in the District's priority waterbodies every three years.

Lake level monitoring is conducted biweekly on twelve lakes using staff gauges installed and read by WCD. These measurements document seasonal fluctuations and help identify abnormal changes that may signal hydrologic or ecological stressors.

When data from waterbody assessment locations indicate impairment or nutrient loading in excess of SWWD or state standards, the District may initiate a more in-depth assessment of targeted waterbodies. A description of in-depth assessments is included in Section 3.3.2 of this plan.

The waterbody assessment locations are intended to be adaptive. Lakes may be monitored more or less frequently depending on trends and watershed needs, allowing resources to be directed toward priority waterbodies.

Table 3-3 summarizes the SWWD's waterbody monitoring locations, provides a general description of the station's location, and the data collected at each location. A map showing the current, active monitoring locations within the District is available on the District's website: South Washington Watershed District Data Viewer. Additional details on each of the monitoring stations can be obtained by contacting SWWD staff.

Table 3-3 Waterbody Assessment Locations

Station	Station Description
Armstrong Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Wilmes Lake - South	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Markgrafs Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Powers Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Fish Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Colby Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Ravine Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
Bailey Wetland	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
O'Conners Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*
La Lake	*Waterbody assessment location on SWWD priority lake. Includes bi-weekly lake level monitoring, field and physical parameters, and select water quality parameters.*

3.3 Project Assessment

Project-specific monitoring provides SWWD with the flexibility to address unique data needs associated with the more detailed planning, design, and assessment of capital projects, BMP implementation, and in-lake management. These efforts are intended to be short-term and highly focused. Project assessment monitoring is designed to complement data collected through long-term monitoring efforts by targeting the collection of data related to more specific questions associated with the anticipated effectiveness, ecological response, and/or similar design performance metrics. Upon identification of a project's need for monitoring data, the SWWD will develop a plan summarizing the purpose of the monitoring, the type and frequency of data collection that is needed, and how long the assessment effort will last. The following subsections describe various types of project assessment monitoring and types of monitoring methods that may be used.

3.3.1 Stormwater

SWWD may conduct monitoring to support both pre-project planning and post-project evaluation for capital projects and stormwater BMPs. More localized, catchment-scale monitoring may be conducted to characterize drainage areas upstream of major outfalls or other critical locations to identify pollutant sources that are impacting downstream waterbodies. These assessments will typically be conducted in the early stages of project planning – for example, as part of a subwatershed retrofit feasibility study – or in support of gathering additional data to inform a project design. Before or following construction of a project, the SWWD may also conduct project-scale monitoring to gather additional needed information or evaluate the performance of BMPs to verify conformance with original design goals and help to inform future projects.

Monitoring at these sites may include stage and flow measurements, storm event sampling for pollutants, inflow/outflow monitoring from BMPs. Chloride sampling during winter months and spring thaw may be used to assess chloride management projects. Stormwater project assessments will generally be conducted for a relatively short time period (e.g., 2-3 years), providing sufficient data to inform design and evaluate implementation effectiveness.

3.3.2 In-Lake

When routine lake monitoring (described in Section 3.2) and assessment indicates the need for additional data to inform the development of in-lake management strategies, SWWD may initiate in-depth lake assessments to diagnose causes and guide restoration strategies. Additional data collected to perform in-lake project assessments may include:

- Sediment coring to evaluate internal loading
- Intensive water quality profiles data collection
- Macrophyte surveys (point intercept, biomass, turion, etc.)
- Phytoplankton and zooplankton sampling
- Cyanobacteria identification/speciation
- Toxicity testing of confirmed Harmful Algal Blooms (HABs)
- Fisheries assessments

3.3.3 Geomorphic

SWWD recognizes the importance of maintaining stable channels and ravines to protect the water quality and ecological benefits of natural resources within the District. Geomorphic assessments may be utilized by SWWD to understand changes in critical watercourses such as the Mississippi River's Gray Cloud Channel, Trout Brook, O'Conner's Creek, and other ravines within the District. This monitoring may include the evaluation of channel geometry, sediment transport, and erosion risk. Data collected through geomorphic assessments will be used to inform stabilization and restoration projects, habitat improvements, and other long-term strategies for managing these systems. Monitoring may also be used to assess the effectiveness of stabilization and restoration projects post-implementation.

Table 3-4 summarizes the current project assessment locations within the SWWD, including the project assessment type and a summary of goals for monitoring at these locations. Additional details are available by contacting SWWD staff. With project assessment activities being targeted at collecting data

for a relatively short time period and a more focused purpose, it is expected that these locations will rotate frequently over time. A map showing the current, active monitoring locations within the District is available on the District's website: South Washington Watershed District Data Viewer.

Table 3-4 Current Project Assessment Locations

Stations	Station Type[1]	Station Description
Seasons Park (Inlet and Outlet)	Stormwater	*Monitoring at the inlet and outlet of the Seasons Park Filtration BMP to assess performance of the BMP in reducing nutrient loading.*
Armstrong Wetland (9th Street, 10th Street, Outlet)	Stormwater	*Monitoring at 2 main inflow points and the outlet of Armstrong Wetland to inform and assess effectiveness of cattail harvesting for nutrient load reductions.*
Kargel Park	Stormwater	*Monitoring west of Kargel Park to inform design of the Kargel Park Alum Treatment Facility.*
Armstrong Lake, Wilmes Lake, Markgrafs Lake, Powers Lake, Colby Lake, Ravine Lake, Bailey Wetland, La Lake	In-Lake	*Activities may include sediment coring to evaluate internal loading, intensive water-quality profile data collection, non-routine macrophyte surveys (point-intercept, biomass, turion, etc.), phytoplankton and zooplankton sampling, cyanobacteria identification and speciation, toxicity testing of confirmed Harmful Algal Blooms (HABs), and fisheries assessments.*

[1] *No geomorphic monitoring stations are currently established*

3.4 Groundwater Assessment

Groundwater is a vital water resource within the SWWD. Municipalities within the SWWD rely on groundwater to provide potable water, satisfy water demand for commercial and industrial users, and for irrigation. Many surface water features in the District also interact directly with groundwater, making its protection essential for maintaining healthy lakes, streams, and wetlands. The purpose of groundwater monitoring by the SWWD is to understand how surface water and groundwater interact, evaluate the influence of stormwater infiltration on groundwater quality and quantity, and to provide data to refine regional groundwater models. Monitoring will help to identify trends, assess contamination risks, direct management strategies, and guide coordination with partnering agencies (e.g., Washington County or the Minnesota Department of Health).

Key areas of interest for the SWWD include: tracking groundwater levels and quality, understanding recharge dynamics, and evaluating seasonal variability such as spring recharge and summer drawdown. Assessments will also focus on potential contamination risks from chlorides and other pollutants, particularly near infiltration basins and areas with vulnerable geology.

In many areas of the District, infiltrating water remains in the shallow soil profile. However, in other areas, sinkholes and karst features allow a large portion of infiltrated water to recharge into deep groundwater aquifers. These features are of particular concern in areas adjacent to the District's regional infiltration basins (CD-P85 and CD-P86) and Central Draw Overflow, which provides drainage for overflow from the regional infiltration basins to the Mississippi River. SWWD currently operates four groundwater observation wells (obwells) in the area of their Central Draw regional infiltration basins. Groundwater water level readings are collected by WCD 12 times per year using the manual tape down method. Water quality samples are collected and analyzed at the obwells three times per year.

Future monitoring efforts may leverage the District's existing observation wells as needed and leverage partnerships with agencies such as Washington County, the Minnesota Department of Health (MDH), United States Geological Survey (USGS), and MnDNR. Monitoring needs will be informed by data collected and assessments performed by the SWWD and ongoing groundwater planning efforts being led by Washington County. Activities may include manual and automated water level measurements, targeted water quality sampling for chloride, nitrate, phosphorus, and bacteria, and integration of groundwater data with surface water monitoring to better understand interactions. Data collected will support the development of adaptive management strategies and improve groundwater modeling tools. These efforts will be implemented strategically on an as needed basis, focusing on areas where groundwater concerns intersect with SWWD projects or regional surface water priorities.

4 Data Management and Reporting

SWWD's monitoring data will be centrally housed and managed through a modernized database system developed in partnership with Barr Engineering Co. (Barr). This system will integrate historic and current datasets (including lake and stream water quality, lake levels, groundwater observations, and continuous flow data) into a structured database environment. Currently, after samples are collected, WCD sends them to the Metropolitan Council Environmental Services (MCES) Laboratory to be analyzed. Analytical data is then sent back to WCD for QAQC. All data will then be submitted to Barr for incorporation into the database. Water quality data will be stored in EQuIS and flow data will be stored in comma separated value (csv) format files. The monitoring data will be organized for consistency and accessibility, supporting long-term tracking and analysis across monitoring categories.

Monitoring results will be visualized through a Power BI-based reporting interface, which provides interactive dashboards, time-series graphs, and summary tables. These tools will allow staff and stakeholders to explore trends, filter data by location or parameter, and export results for further analysis. The interface will be embedded within SWWD's website, making monitoring data publicly accessible and supporting transparency in watershed management.

To enhance the utility of results from the monitoring program, SWWD's data platform will incorporate real-time data feeds from external sources. Automated web services will retrieve precipitation, groundwater, and lake level data from public APIs (e.g., MnDNR, CoCoRaHS), allowing for timely updates and expanded context. These datasets will be aligned with monitoring results from SWWD's program and refreshed on a recurring schedule.

Annual updates to the SWWD's monitoring database will be coordinated with WCD, with new data typically received in February following the monitoring season. This process will ensure that the most recent observations are incorporated into the reporting tools and available for planning, communication, and decision-making.

5 Monitoring Planning and Adaptation

SWWD's monitoring program is designed to be adaptive, ensuring that District resources are directed toward the highest priorities while maintaining continuity in long-term datasets. Each year, SWWD staff will review its planned monitoring locations for the next season and determine any sites, parameters, and methods that may need adjustments in order to meet District goals outlined within this Monitoring Plan and the 2026-2035 Watershed Management Plan.

This planning process will occur early in the winter preceding the upcoming monitoring season. The planning will begin with an evaluation of existing data, a review of data needs coming up for the District within the next several years, and if the District's monitoring goals are being met with the current monitoring setup. Staff will review and confirm that existing monitoring locations continue to provide value, whether additional monitoring sites might be needed to address emerging needs, and identify any stations that should be considered for retirement and/or for rotating out of the monitoring cycle for the upcoming year. Considerations for the addition or removal of monitoring sites may include: upcoming land use changes or development activity, impaired waters listings / delistings, trends in lake, stream, or wetland water quality, and upcoming management activities or capital projects. For example, monitoring may be expanded in areas slated for retrofit studies or reduced in subwatersheds where conditions in the receiving waterbody have met SWWD's water quality goals. The planning process will also include parameter selection for each site. While core parameters such as flow and nutrients will remain standard, additional parameters may be added to address specific concerns (e.g., chloride). Similarly, biological monitoring may be scheduled for lakes where more in-depth study is needed. The District will also evaluate opportunities to incorporate new technologies or methods that improve efficiency and data quality. These decisions will be made in coordination with partners such as WCD to identify potential capabilities gaps that would need to be addressed through subcontractors.

Any changes to the SWWD's monitoring activities for the upcoming year will be documented in a way that outlines updated site locations, sampling frequency, and parameterization. By reviewing and confirming needs for the upcoming monitoring season each year, the SWWD will ensure that its program remains relevant, cost-effective, and aligned with both the District's long-term goals and also adaptive to changing conditions.