BLACK DOG
Watershed Management Organization

2021 WATERSHED ANNUAL REPORT

Published April 2022

Our mission is . . .

To provide leadership in the management and stewardship of the water resources in northwestern Dakota County, Minnesota, through the cooperation of four cities and the involvement of local stakeholders.

Evaluating our Success

The BDWMO watershed management plan calls for the organization and its member cities to identify outcome-based goals for specific water bodies found within the watershed, and to meet annually to discuss progress toward these goals. The BDWMO uses the following tools to track progress toward goals:

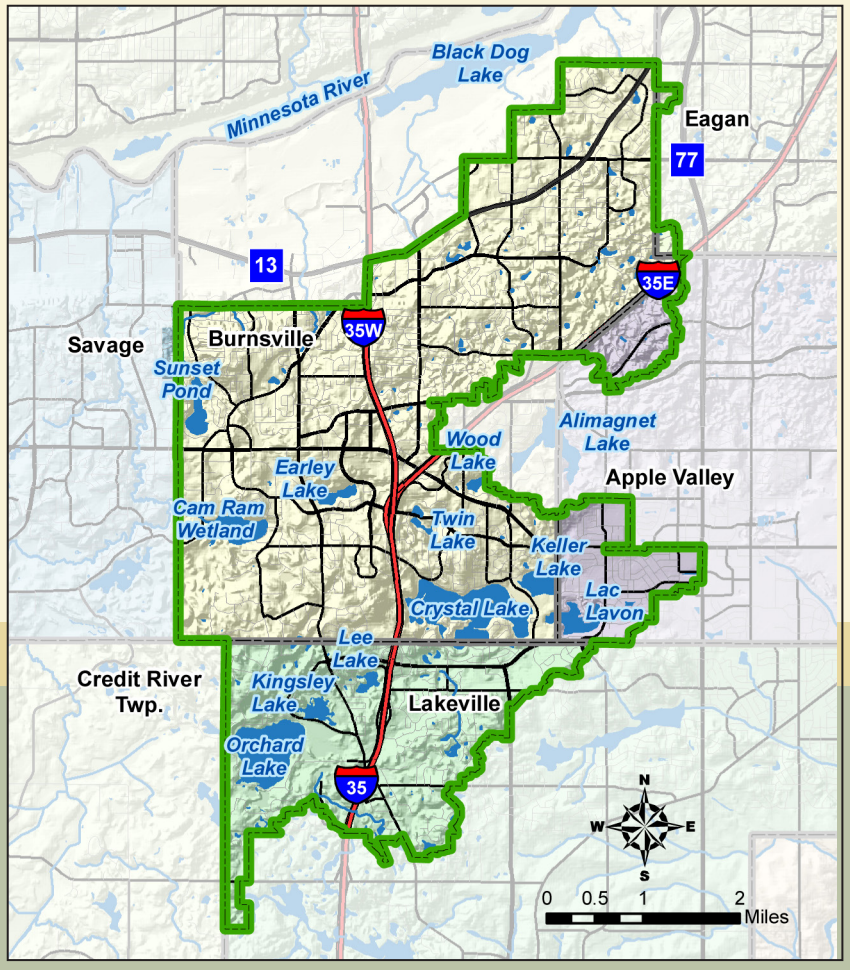
- **Trend Analysis**—The BDWMO collects water quality information to track water quality trends.
- **Performance Analysis**—The BDWMO will evaluate the member cities' implementation of maintenance plans, capital improvement projects, programs, and other items.
- **Habitat Quality Analysis**—The BDWMO collects habitat quality data to detect conditions that would trigger a need for management actions.

This annual report outlines the BDWMO's goals, progress toward those goals in 2021, and plans for 2022 and beyond.

What is the Black Dog Watershed Management Organization?

The Black Dog Watershed Management Organization (BDWMO) actively manages surface water, such as that found in lakes, streams, and wetlands, located in the Black Dog and Credit River watersheds within Dakota County. To effectively manage surface water, the BDWMO develops and implements plans that address water quality, responds to drainage issues that cross multiple municipal boundaries, and assists cities within the watershed to manage surface water runoff. The BDWMO is represented by commissioners who are appointed by the cities within the watershed, which include Burnsville, Lakeville, Apple Valley, and Eagan.

The total area of the Black Dog watershed is 17,500 acres; 70 percent of the watershed lies within the city of Burnsville, 21 percent of the area is within the city of Lakeville, 8 percent is within the city of Apple Valley, and 1 percent is within the city of Eagan.



In this Issue

Watershed Management Plan Update

The BDWMO is in the process of updating its Watershed Management Plan. The Plan will establish the goals, policies, and activities for managing and protecting the lakes, ponds, creeks, streams, wetlands, drainages, and groundwater in the BDWMO from 2023 through 2032.

State law and rules govern the watershed planning process and require that watershed management plans be updated every 10 years. The BDWMO adopted its current Plan in 2012 and anticipates completing the updated Plan in 2022. The Plan update began with a stakeholder engagement process to collect initial input from cities, residents, and other partners.

The BDWMO commissioners considered stakeholder input and available scientific data as they prioritized resources and issues, revised goals, and updated policies and performance standards through 2021. During this process representatives from the member cities and state, regional, and county agencies provided input through a technical advisory committee (TAC). The TAC will continue to meet in 2022 and provide input as part of the process.

In 2022, the BDWMO commissioners will work with its partners to develop a collaborative implementation schedule that outlines activities planned over the next 10 years. With the implementation schedule defined, the updated draft Plan will be submitted to the Board of Water and Soil Resources and other Plan review authorities for formal 60-day review required per state statute and rule.

Update on Keller Lake Projects

Alum Treatment Complete

In 2019, the BDWMO received a BWSR Clean Water Fund grant for an alum treatment project to improve Keller Lake's water quality. The alum and sodium aluminate treatment was divided into two phases to increase the long-term effectiveness. Phase I occurred in June, 2019, and Phase II was completed in September, 2021 when 37,673 gallons of chemical precipitant were applied to Keller Lake (see page 5 for story on Keller Lake water quality monitoring). It is expected that the in-lake aluminum treatment will reduce the annual average TP (total phosphorus) load to Keller Lake by 80% or 186 lbs/yr. The in-lake aluminum application represents most of the remaining TP load reduction required to ensure that Keller Lake water quality can meet the MPCA's shallow lake standards on a consistent basis.

Electrofishing Survey

In 2021, the cities of Burnsville and Apple Valley arranged for a company, Carp Solutions, to conduct an electrofishing survey on Keller Lake. The survey was designed to assess populations of goldfish, which had previously been observed by staff and residents, but also included a general assessment of the overall fish community in the lake. To get a good assessment of the population, three separate days of electrofishing occurred, with timed transects conducted on each visit. This protocol is similar to assessing common carp populations. An average of 12 goldfish were caught per sampling visit. Goldfish averaged 14 inches in length and 2.37 lbs, but one goldfish as large as 5.4 lbs was caught.

Although the goldfish captured were quite large, the study results suggest that the overall population is at a moderate density level, which is likely below the population threshold that would cause significant ecological damage. Furthermore, no smaller goldfish were captured during the survey, indicating that successful recruitment of new goldfish into the population may be rare. The survey found healthy levels of other native gamefish like largemouth bass and sunfish. These other fish species could then prey on goldfish eggs, larvae, and juveniles—predation that may be holding the goldfish population in check.

Photo credit: Caleb Ashling, City of Burnsville

The cities plan to continue periodic fish surveys to assess the heath of the overall fish community and any changes or trends in the goldfish population over time.

Redwood Pond Expansion

A recent pond expansion at Redwood Park in Apple Valley will help improve the water quality at Keller Lake. Keller Lake is impaired for nutrients and the City of Apple Valley and the BDWMO have an active shared interest in improving water quality. The City of Apple Valley's project included the expanding the pond, modifying the existing outlet, removing contaminated sediment, and redesigning the existing park trail and features impacted by the pond modifications. Project funding was leveraged by the Clean Water Land and Legacy amendment in partnership with the BDWMO.

Photo credit: Nearmap

Landscaping for Clean Water—Clean Water Starts at Home

Since most land is privately owned, it is up to each individual landowner to do the right thing on their property to help keep water clean. The Landscaping for Clean Water program makes it easy for residents to turn their yards into a lush and lovely force for clean water rather than a contributor to water pollution.

Are you doing everything possible on your patch of lawn? Attend a Landscaping for Clean Water workshop to find out. Participants in the program attend design workshops to develop landscape plans for their own yards. These plans include creating native gardens, raingardens, or native shorelines that stabilize soil. These planting practices provide habitat for pollinators and birds, reduce watering and require no chemical inputs. On top of that, these practices help water soak into the ground rather than running off and delivering polluted stormwater into lakes, rivers and wetlands.

Who can get a grant?

Participants in the workshops can submit an application, project plan, and cost estimates to the Dakota County SWCD for grant funds of up to $250.

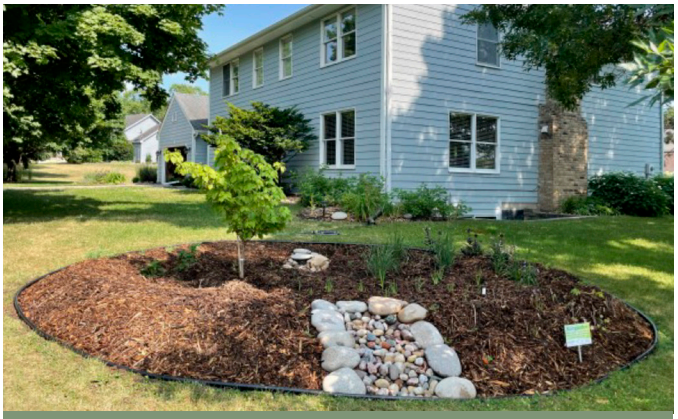
Adjusting and Accommodating

Due to the ongoing Covid-19 pandemic in 2021, all Landscaping for Clean Water programming was held virtually. Four live virtual Introduction classes were held in the spring (March through May) and then pre-recorded so others could participate in the classes at their leisure. A total of 123 residents of the BDWMO participated in the Introduction classes through either a live virtual class or through the recordings.

A total of 45 participants took part in the virtual Design classes which consisted of a series of pre-recorded videos. Project materials for participants were made available online and an "Office Hours" program was used to provide virtual consultations to Design class participants. A total of 14 participants took advantage of these virtual consultations with staff in 2021. Participants were thankful for the additional one-on-one design assistance.

In 2021, the Maintenance classes were split into three online sessions. Each workshop focused on maintenance for a given season (Spring, Summer and Fall) allowing for season specific information on how to maintain and promote the health, performance, and beauty of their garden. A total of 26 people registered for the Maintenance classes.

The 2022 Landscaping for Clean Water program will be held virtually, although the plan will be evaluated in early spring to see if hosting in-person classes/workshops becomes feasible. For more information, visit https://dakotaswcd.org/services/landscaping-for-clean-water/.



15 YEARS OF CLEAN WATER ACCOMPLISHMENTS within the BDWMO (2007-2021)

Workshop Participants — 1,350

Projects Completed — 175

Landscaping for Clean Water is one type of cost-sharing program offered by the Dakota County SWCD. For more information, call 651-480-7777 or go to https://dakotaswcd.org/services/landscaping-for-clean-water/.

Conservation in Action: Crystal Lake Shoreline Stabilization

Crystal Lake has been a major water quality success story, having been removed from the State's impaired waters list in 2018. A developing erosion issue was detected on the north shore of Crystal Lake around Tyacke Park. To prevent it from getting worse, the City of Burnsville and Dakota County Soil and Water Conservation District (SWCD) developed a plan and undertook a large shoreline stabilization project on the lake in the fall of 2021. To provide the best habitat and keep the natural aesthetics of the parkland, the plan utilized natural materials rather than the more intrusive rock rip rap.

Supported by a Conservation Initiative Funding grant from the SWCD, crews started by installing more than 980 feet of coconut fiber (coir) logs to buffer against the wave action. Invasive buckthorn was removed along the shoreline and native grasses and wildflowers were planted in its place. The deep-rooted native plants will help stabilize the shoreline long term while also providing valuable habitat to pollinators and other wildlife.

Crystal Lake in the Clear

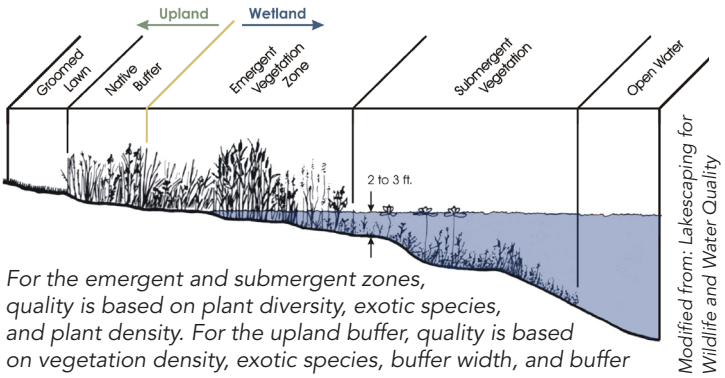
The BDWMO is pleased to report that Crystal Lake continues to have good water quality. The 2021 summer-average Secchi disc transparency in Crystal Lake was 2.5 meters (8.1 feet), which is slightly better than it was in 2020, and better than the MPCA deep-lake water quality standard of 1.4 meters. The water clarity in Crystal Lake has been trending towards better water quality over the past 10-year period (statistically significant trend). The last time summer-average Secchi disc transparency for Crystal Lake was 2.5 meters or better was 1992. The 2021 summer average of total phosphorus (the nutrient that drives algal growth) was 20 µg/L, one of the best on record for the lake, and better than the MPCA's deep lake standard (40 µg/L). The summer-average chlorophyll-*a* (a measure of algal abundance) was 9 µg/L, which ties 2018 for the best on record for the lake, and better than the MPCA's deep lake standard (14 µg/L). During the period of 2008 to 2011, the BDWMO, along with its member communities, the Minnesota Pollution Control Agency (MPCA), and other state and local agencies, developed a Total Maximum Daily Load (TMDL) report for Crystal Lake. The TMDL was required because the MPCA added Crystal Lake to its impaired waters list in 2002. Two other lakes in the Crystal Lake watershed—Keller Lake and Lee Lake—were also part of the TMDL report. The TMDL established phosphorus load allocations that would achieve water quality goals for Crystal, Keller, and Lee Lakes. The BDWMO member cities continue to implement water quality improvement measures with the goal of improving water quality in Crystal, Keller and Lee Lakes. Additional information regarding the Three-Lake TMDL can be found on page 2 of the BDWMO's 2011 Watershed Annual Report.

Aquatic plant surveys were performed in May and July of 2021. The May 2021 survey found 11 submerged plant species and one floating-leaf species, with curly-leaf pondweed as the dominant plant. The July 2021 survey found 15 submerged plant species and one floating-leaf species, with coontail as the dominant plant. Eurasian watermilfoil was found during both surveys at numerous sites. Harvesting of curly-leaf pondweed was conducted in Crystal Lake in 2021.

The BDWMO will continue to monitor the water quality of Crystal Lake in 2022, including regularly-scheduled management level monitoring and habitat monitoring.

Habitat Monitoring Program

Since 2003, the BDWMO has implemented a program for monitoring the wildlife and fish habitat quality of strategic water resources in the watershed, including biological and physical indicators, such as upland and aquatic vegetation, buffer zones, erosion, sedimentation, and the presence of non-native exotic species. The program also recommends management actions based upon monitoring results.



For the emergent and submergent zones, quality is based on plant diversity, exotic species, and plant density. For the upland buffer, quality is based on vegetation density, exotic species, buffer width, and buffer continuity.

Modified from: Lakescaping for Wildlife and Water Quality

In 2021, the BDWMO monitored the habitat quality of Kingsley Lake. Monitoring included transect, plot, and meandering surveys. Photographs were taken to document conditions. Analysis and reporting of the monitoring data includes a floristic quality assessment and a four-tiered rating system (poor, moderate, high, and excellent). Private versus public ownership was identified along the entire shoreline. The survey results, along with parcel data, were used to identify possible locations for restoration and preservation.

Habitat monitoring results showed that Kingsley Lake's submergent zone was rated moderate, but both the emergent and upland buffer zones were rated high. In one specific location in the western portion of Kingsley Lake, curly-leaf pondweed, a dominant species found some years in the lake, was present. Dense coverage of native submergent vegetation, including Robbin's pondweed and largeleaf pondweed in Kingsley Lake helps prevent the spread of curly-leaf pondweed.

See page 7 for additional Kingsley Lake habitat monitoring results. See www.blackdogwmo.org for the full report.

The member cities have provided lakeshore owners with shoreline restoration information since 2004 and continually promote and encourage lakeshore property owners each year to take advantage of the Dakota County SWCD Landscaping for Clean Water shoreline restoration program. (See page 3 for more about this program.)

Water Quality Monitoring Program

The BDWMO and member cities continued to monitor several of its lakes during 2021 through the Metropolitan Council's Citizen-Assisted Monitoring Program (CAMP) to detect any water quality changes that would require management action by the WMO. In addition, the BDWMO conducted more detailed monitoring on Crystal Lake (see page 4). The monitoring focused on three water quality indicators—total phosphorus and chlorophyll-*a* concentrations, plus Secchi disc transparency. All three variables correlate strongly to the open-water nuisance conditions of lakes (i.e., algal blooms).

Long-term monitoring is important because lakes can change from year to year. Only when several years of data are compiled do trends become apparent. Because the MPCA periodically evaluates water quality data from the most recent ten-year period to determine if a lake violates applicable water quality standards, the WMO has adopted the same time convention for conducting its annual trend analyses. Graphs on this page and subsequent pages show historic trends in water quality.

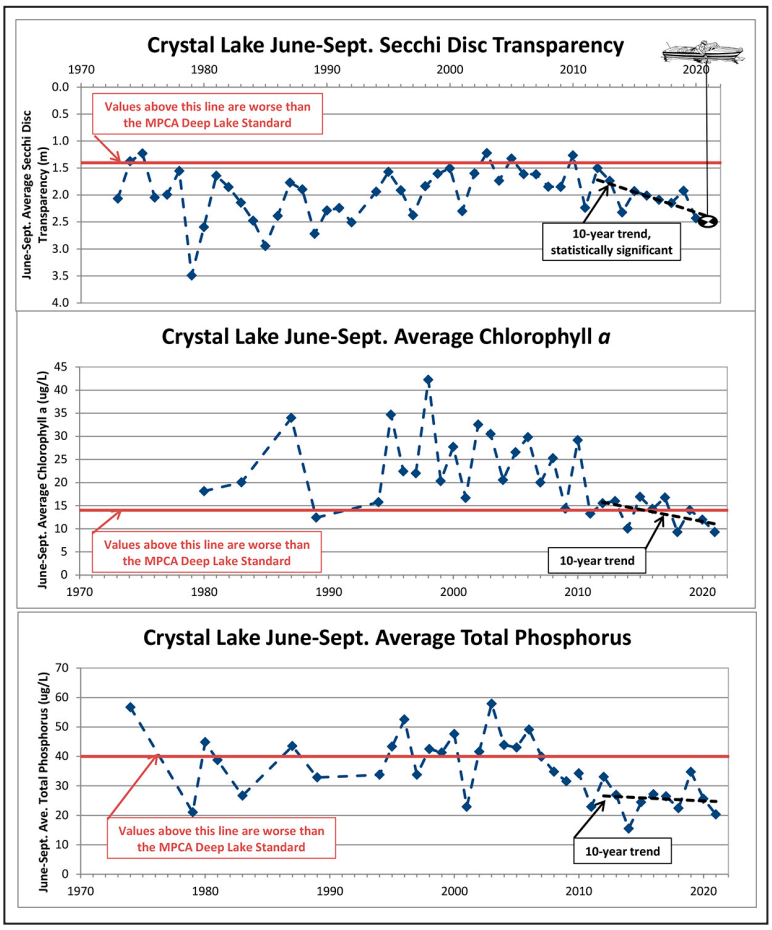
Crystal Lake (Burnsville & Lakeville)

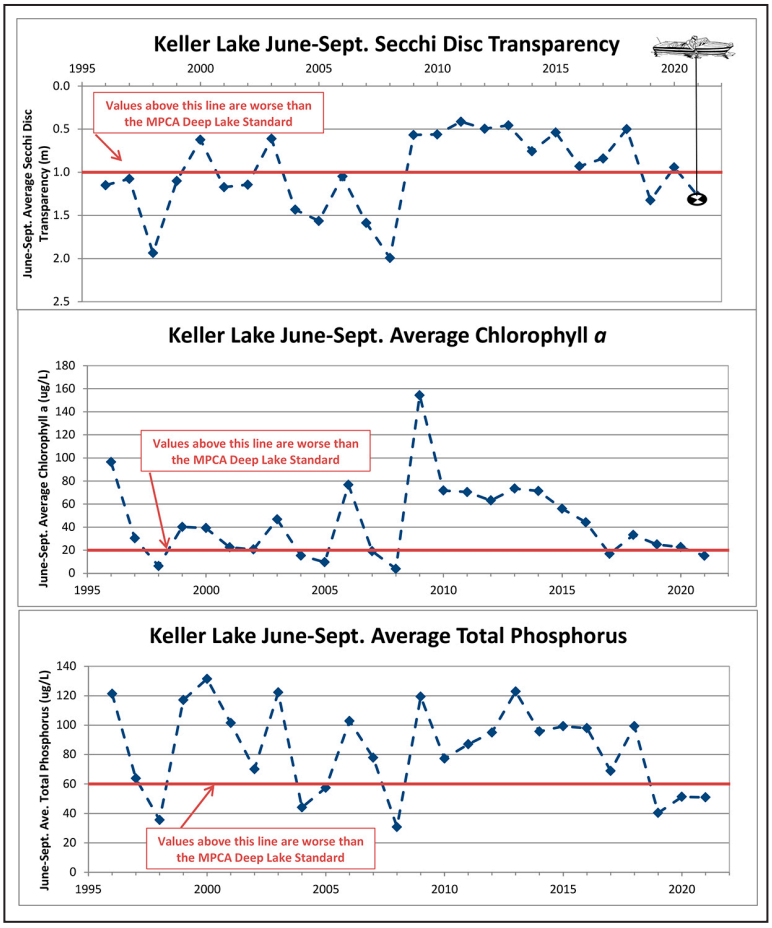
Water Quality Monitoring—In 2021, the BDWMO performed more detailed management level monitoring on the lake (see story on page 4).

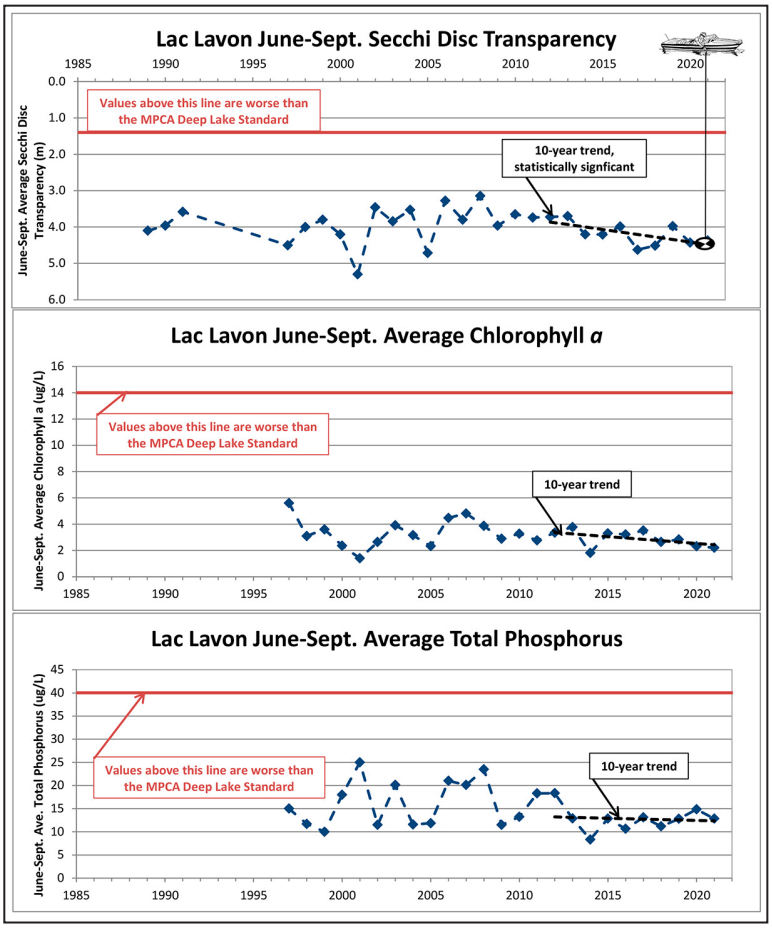
Keller Lake (Burnsville & Apple Valley)

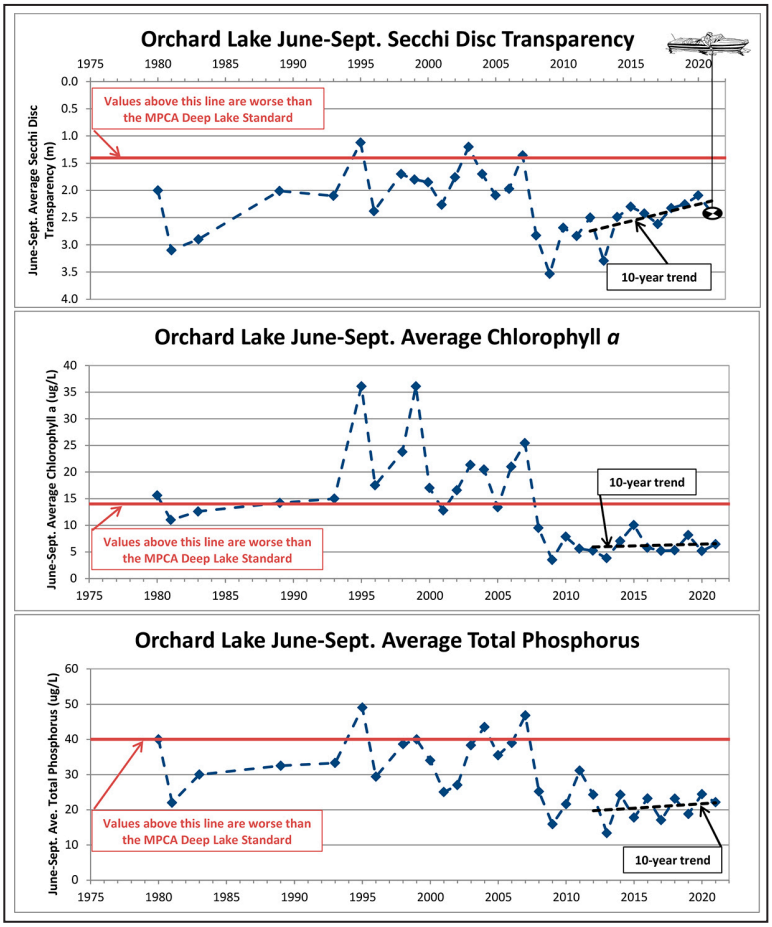
Water Quality Monitoring—An alum and sodium aluminate treatment was conducted on Keller Lake in Spring 2019 and Spring 2021, resulting in improved water quality in recent years (see details on page 2). The 2021 Secchi disc transparency summer average was 1.3 meters (4.2 feet), which is better than the MPCA's shallow lake standard of 1.0 meter (3.3 feet). The summer-average total phosphorus (51 µg/L) was also better than the MPCA's shallow lake standard of 60 µg/L. Summer averages of total phosphorus had been consistently worse than the MPCA standard every year for the period 2009-2018, before the alum and sodium aluminate treatment of the lake. The 2021 summer-average of chlorophyll-*a* (15 µg/L) was also better than the MPCA's shallow lake standard of 20 µg/L.

Trend analyses were not completed for Keller Lake because of the alum and sodium aluminate treatments that were conducted in 2019 and 2021. The three-lake TMDL study and implementation plan identifies the water quality improvement measures needed to achieve the BDWMO and MPCA goals for the lake. The BDWMO will continue to monitor the water quality of Keller Lake in 2022. See page 2 for updates on several Keller Lake projects.









Lac Lavon (Apple Valley & Burnsville)

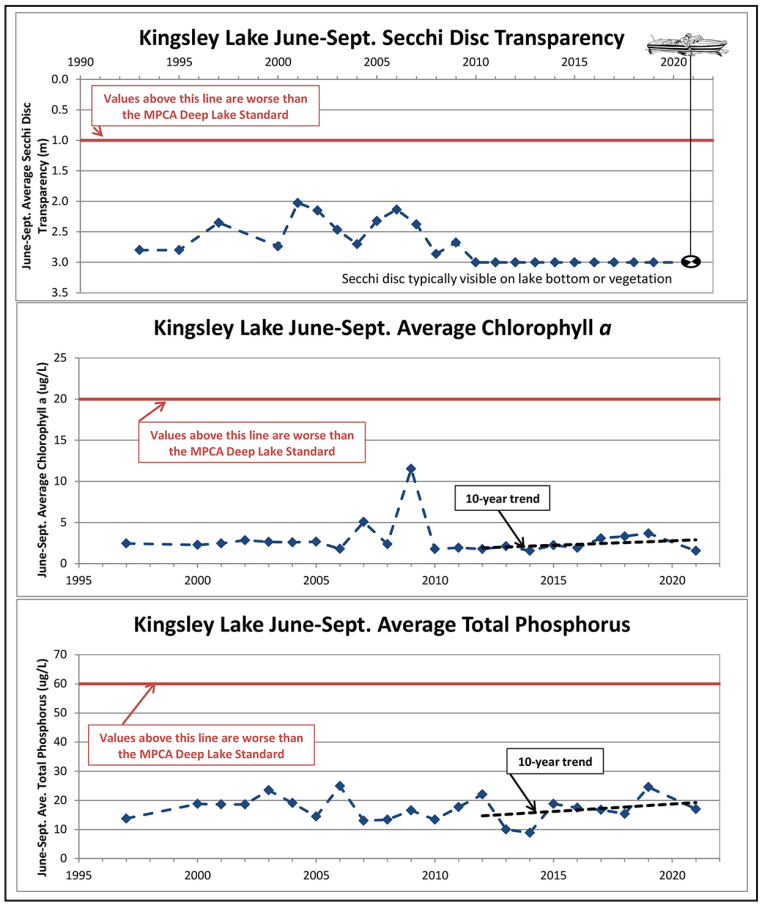
Water Quality Monitoring—Lac Lavon continued to experience excellent water quality in 2021. The 2021 summer-average Secchi disc transparency was 4.4 meters (14 feet), and is much better than the MPCA deep-lake water quality standard of 1.4 meters. The 2021 summer averages of total phosphorus (13 µg/L) and chlorophyll-*a* (2.2 µg/L) further indicate excellent water quality for Lac Lavon. Summer averages of Secchi disc transparency show a statistically significant improving trend for the most recent 10-year period of 2012-2021. There was no significant trend in summer averages of total phosphorus or chlorophyll-*a* for the same period. The BDWMO will continue to monitor the water quality of Lac Lavon in 2022, including regularly-scheduled management level monitoring and habitat monitoring.

Water Quality Improvement Project

The City of Apple Valley leveraged additional BWSR Clean Water Fund dollars to design and construct a new raingarden in the Lac Lavon Park parking lot. Currently, stormwater runoff flows off the parking lot, down a slope, ultimately reaching Lac Lavon. The raingarden, featuring native plants, will serve as a demonstration project for the improvement of water quality within the watershed.

Orchard Lake (Lakeville)

Water Quality Monitoring—Orchard Lake had improved water quality in 2021 compared to the previous three years, but has generally experienced declining water clarity over the past 12 years. The 2021 summer average Secchi disc transparency was 2.5 meters (8.1 feet), which is better than the MPCA deep-lake water quality standard of 1.4 meters. The 2021 summer-averages of total phosphorus (21 µg/L) and chlorophyll-*a* (6 µg/L) were better than the MPCA's deep-lake water quality standards. There were no statistically significant trends in water quality for the most recent 10-yr period. Summer averages of water quality in Orchard Lake have been consistently better than the water quality standards for the last fourteen years (2008-2021). The BDWMO will continue to monitor the water quality of Orchard Lake in 2022.

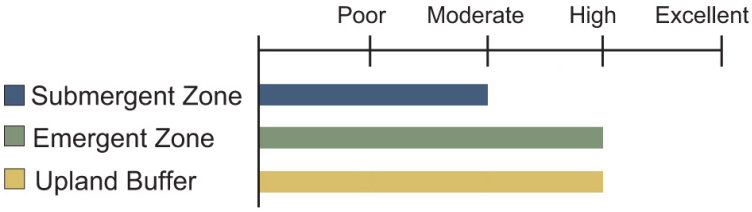


Kingsley Lake (Lakeville)

Water Quality Monitoring—Water quality monitoring data from 2021 show continued excellent water quality in Kingsley Lake. Water is often clear enough that the Secchi disc used to measure transparency can still be seen when resting on the bottom of the lake.* The 2021 summer averages of total phosphorus (17 µg/L) and chlorophyll-*a* (2 µg/L) concentrations were better than in 2019, and similar to years 2015-2018. Water quality was not monitored in Kingsley Lake in 2020, but began again in 2021. The 2021 summer averages of total phosphorus and chlorophyll-*a* were considerably better than the MPCA's shallow lake standards, and have consistently been below the water quality standards since 1997. The BDWMO will continue to monitor the water quality of Kingsley Lake in 2022. ** Secchi disc readings in Kingsley Lake are difficult because lake vegetation obscures the Secchi disc, giving false measurements; therefore, there is no trend line in the graph above.*

Kingsley Lake Habitat Monitoring Results for 2021

As mentioned in the article on page 4, habitat monitoring was conducted in 2021 on Kingsley Lake. The BDWMO made the following quality ratings, based on the monitoring results:



Submergent zone quality rating = Moderate

Rating based on averaging four criteria:

1. excellent total number of native species (19)
2. moderate average native plant density (1.7)
3. moderate rating for average exotic species density (1.5)
4. moderate coefficient of conservatism value (mean C-value) (5.5)

Curly-leaf pondweed, a dominant species found some years in Kingsley Lake, was present in only one specific location in the western portion of Kingsley Lake. The density increased slightly between 2016 and 2021. Dense coverage of native submergent vegetation, including Robbin's pondweed and largeleaf pondweed in Kingsley Lake helps prevent the spread of curly-leaf pondweed. A dense growth of filamentous and nostoc algae were present in the southeast lobe of the lake in 2021.

The BDWMO recommends continued monitoring and consideration of control measures if densities and locations increase to an extent of concern.

Emergent vegetation zone quality rating = High

Rating based on averaging four criteria:

1. excellent number of native wetland plant species (45)
2. high rating for % coverage of exotic species (26-50%)
3. a moderate mean C-value rating (4.0)
4. high rating for total vegetative cover (51-75%)

Non-native species including narrowleaf and hybrid cattail, purple loosestrife, and yellow iris are found in the vegetated emergent zone. Floating mats in the northeastern portion of Kingsley Lake contain diverse native vegetation including sundew, sedges, rushes, burr-reeds, ferns, and bog birch, which provide habitat for green frogs, painted turtles, egrets, green herons, wood ducks, loons, and great blue herons.

The BDWMO recommends continued control and management of purple loosestrife and yellow iris and protection of the floating mat habitat.

Upland buffer zone quality rating = High

- 67 native species and 28 exotic species observed.
- Exotic plant species 15-40% of upland vegetative cover. The mean C-value rating is 2.1 (poor).
- Upland buffer within portions of the shoreline is wide, providing wildlife habitat and shoreline protection. Though some areas with bare soil on steep slopes could cause erosion and sedimentation into the lake and should be vegetated with naturalized vegetation. Other areas with turf grass, gravel, and managed plantings with bare soil could be vegetated with native grasses and wildflowers. The BDWMO recommends control of non-native common buckthorn, Russian olive, Chinese silver grass, and Siberian elm
- The BDWMO recommends installation of a pre-treatment system such as a rain garden, pervious pavement, or sediment trap to collect sediment from a parking lot prior to discharge into the lake.
- Lakeshore property owners are encouraged to apply for funds (see page 3) to assist with implementation of the BDWMO recommendations.

Black Dog Watershed Management Organization

Board of Commissioners

Representing Burnsville:

Curtis Enestvedt, Chair
(serving since 2014)
Mike Hughes, Vice Chair
(serving since 2008)
Tom Harmening, Commissioner
(serving since 2002)
Frank Boyce, Alternate
(serving since 2021)

Representing Apple Valley and Eagan:

Rollie Greeno, Commissioner
(serving since 2018)
Greg Helms, Alternate
(serving since 2011)

Representing Lakeville:

Scott Thureen, Secretary/Treasurer
(serving since 2008)
Natalie Walker, Alternate
(serving since 2020)

Engineering Consultant:

Karen Chandler, P.E., Barr Engineering Co.

Legal Consultant:

Joel Jamnik, Campbell Knutson, P.A.

Regular board meetings...

are held at 5:00 p.m. on the third Wednesday of the month at the Burnsville Maintenance Facility at 13713 Frontier Court.

For more information, please contact:

Daryl Jacobson, Administrator
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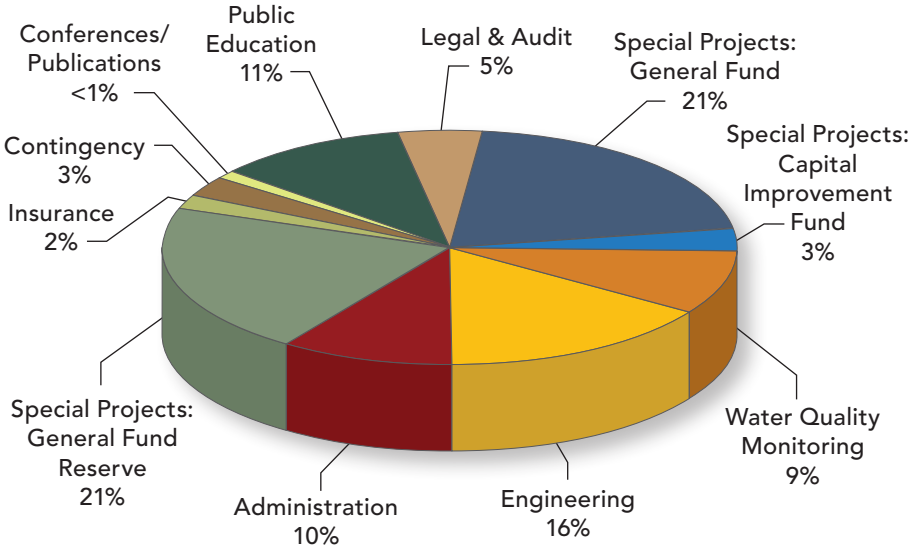
City of Burnsville
13713 Frontier Court
Burnsville, MN 55337
Telephone: 952-895-4574
Fax: 952-895-4531

Website: www.blackdogwmo.org

2022 Budget

Engineering	$31,000
Legal and Audit	$10,500
Administrative Services	$19,000
Public Education	$21,850
Insurance	$3,000
Special Projects – General Fund	$40,600
Special Projects – Capital Improvement Fund	$5,000
Special Projects – General Fund Reserve	$40,000
Conference/Publications	$500
Water Quality Monitoring	$17,200
Contingency	$5,000
Total Expenditures	**$193,650**



2022 Income

Member Contributions	$153,000
Interest	$40
Total Income	**$153,040**