



Black Dog Watershed Management Organization

2017 WATERSHED ANNUAL REPORT

Published April 2018

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:

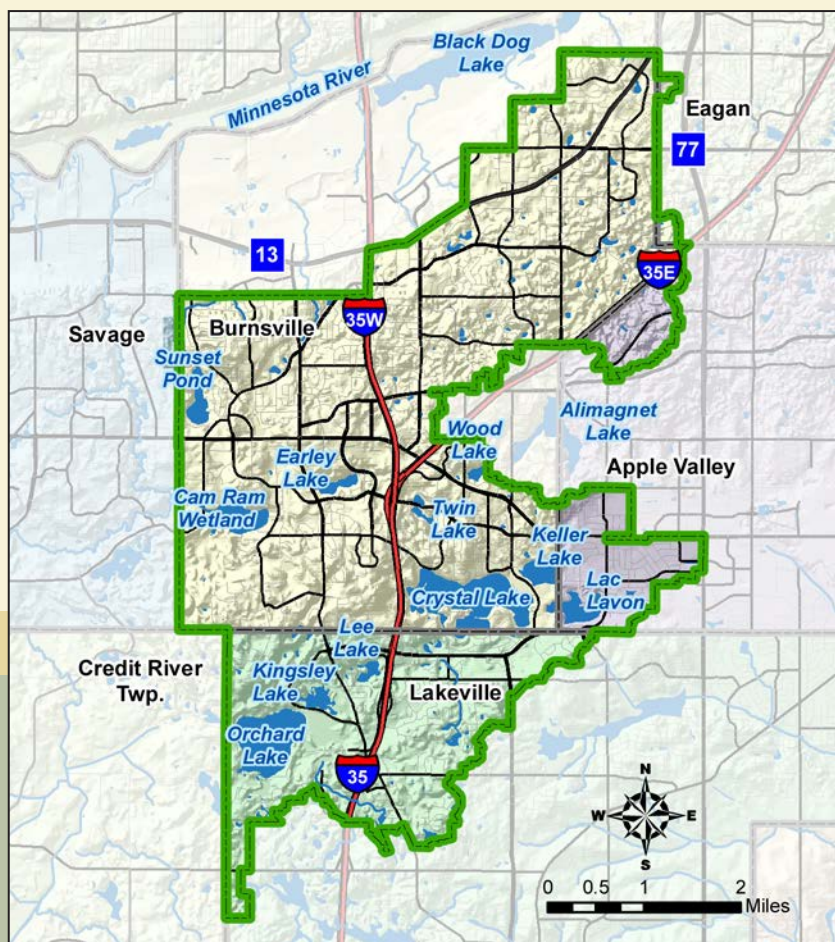
- **Trend Analysis**—The BDWMO collects water quality information to track water quality trends.
- **Performance Analysis**—The BDWMO will evaluate the member cities' implementation of maintenance plans, capital improvement projects, programs, and other items.
- **Habitat Quality Analysis**—The BDWMO 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 2017, and plans for 2018 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.



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Star Gazing

Volunteers search for Minnesota's newest invasive aquatic species — starry stonewort

In the summer of 2017, a group of volunteers searched Minnesota lakes for a new non-native, invasive aquatic species called starry stonewort. Mike Hughes, a BDWMO Commissioner, was part of the group who combed through samples taken from Crystal Lake in Burnsville and Orchard Lake in Lakeville. Five other lakes in Dakota County were searched on that day.

Starry stonewort was first detected in a Minnesota lake in 2015 and has since spread to nine area lakes. The BDWMO is happy to report that at this point, starry stonewort has not been found in BDWMO waterbodies.

At their September meeting, the BDWMO Commissioners learned more about starry stonewort from staff at the Minnesota Aquatic Invasive Species Research Center, including where it's most likely to be found and how to control it.

If you're interested in volunteering at the next "starry trek," mark your calendar for Saturday, August 18th. Visit www.maisrc.umn.edu/starrytrek for more information. It is hoped that this will become an annual event across Minnesota to increase public awareness.

Clean, Drain, Dispose

Like many other invasive species, it is believed that starry stonewort is an aquatic hitchhiker. Its bulbils likely become attached to things such as boat props, trailers, anchors and

What exactly is starry stonewort?

Starry stonewort looks like native musk-grass, but is actually a type of algae. It has tiny star-shaped bulbils on its root system that resemble little stars, making it easier to identify. Starry stonewort is invasive, forming dense mats, similar to Eurasian watermilfoil. These mats are not only unpleasant for swimmer and boaters,

but they also can choke out native plants and make it difficult for fish to reach their spawning grounds.



Above source: dnr.state.mn.us

Inset source: dnr.wi.gov Photo credit: Paul Skawinski

docks. The Minnesota Department of Natural Resources would like to remind everyone of three important words to keep these invasives away: clean, drain, dispose. Clean everything off of watercraft after it leaves a body of water; drain all water from the watercraft; and dispose of unused bait in the trash. It's not just a recommendation; it's the law!

Keller Lake Subwatershed Assessment

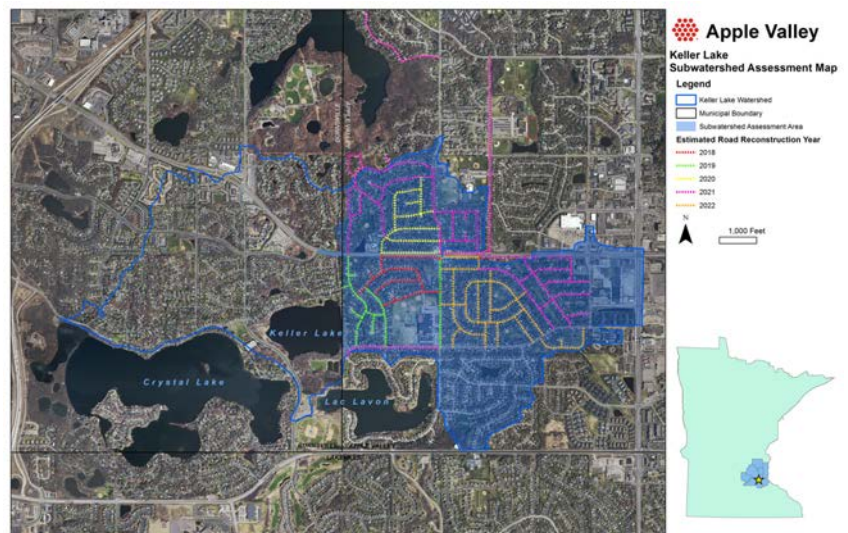
Phosphorus Load Reduction Requirements

In 2011, the United States Environmental Protection Agency approved the Keller Lake Total Maximum Daily Load (TMDL) Study. The study assigned a watershed load reduction goal of 130 pounds of total phosphorus per year to the City of Apple Valley. Combined with another 7.7 pound reduction for Dakota County within the portion of the watershed in Apple Valley, that is a 54% reduction.

The TMDL implementation plan identified several watershed projects intended to improve runoff water quality, many of which have been implemented by the City of Apple Valley. However, additional projects are necessary to meet the reduction requirements.

Identifying Potential Projects

In 2017, the City conducted a subwatershed assessment on the sections of Apple Valley draining to Keller Lake to target potential projects. The goal was to identify potential cost effective retrofit projects and operations improvements capable



of fulfilling needed phosphorus reductions ahead of a number of planned infrastructure projects tentatively scheduled for 2018-2022. The watershed assessment helped determine which efforts are worth pursuing further and provided some cost efficiencies by having potential projects identified ahead of infrastructure improvement project feasibility studies, design, and installation.

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, rain gardens, 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 gets a grant?

Participants can submit an application, project plan, and cost estimates to the Dakota County SWCD for grant funds of up to \$250. In 2017, 77 homeowners attended Landscaping for Clean Water Introductory workshops hosted by the BDWMO; 41 went on to design projects. Of those, 17 projects within the WMO received construction-funding grants and were installed. Up to 18 Landscaping for Clean Water Introductory projects will also be funded by the BDWMO in 2018. Homeowners must attend workshops to apply for grants.

Landscaping for Clean Water is one type of cost-sharing program offered by the Dakota County SWCD (see table below). For more information, call 651-480-7777 or go to www.dakotaswcd.org/costshare.html.

Program	For Who?	Award Amounts	Project Examples
Landscaping for Clean Water Grants	Dakota County homeowners	\$250	Native gardens Rain gardens Native shoreline plantings
Citizen Conservation Stewards (CCS)	Dakota County property owners	Up to \$5,000 (up to 75% of actual project cost)	Erosion and slope stabilization; gully, wetland, lake or stream restorations; sediment basins; bioretention practices; shoreline stabilizations
Conservation Initiative Funding (CIF)	For the implementation of conservation practices on commercial or multiple properties in Dakota County	Up to \$25,000 (up to 75% of actual project cost)	Low-impact development practices; stormwater retrofit with best-management practices; erosion and slope stabilization; gully, wetland, lake, or stream restorations; bioretention practices; shoreline stabilizations
Community Conservation Partnership (CCP)	Public landowners interested in implementing TMDL and local water management plans	Up to \$50,000 (up to 75% of actual project cost)	Bioretention; infiltration; filtration soil amendments; rooftop disconnect; reduced impervious surface areas; porous pavements; thermal impact prevention/mitigation practices; snowmelt treatment; stormwater recycling; best management practices

Helpful Resources for Improving Water Quality

There are other helpful resources where homeowners can find more information on how they can protect and improve water quality. Below are links to some of this information.

- www.blue-thumb.org
- <http://www.dnr.state.mn.us/restoreyourshore/index.html>
- <http://www.dnr.state.mn.us/lakescaping/index.html>
- <http://www.dnr.state.mn.us/gardens/nativeplants/index.html>

For septic system owners, it's important to maintain the system to protect water quality. Learn more at the links below:

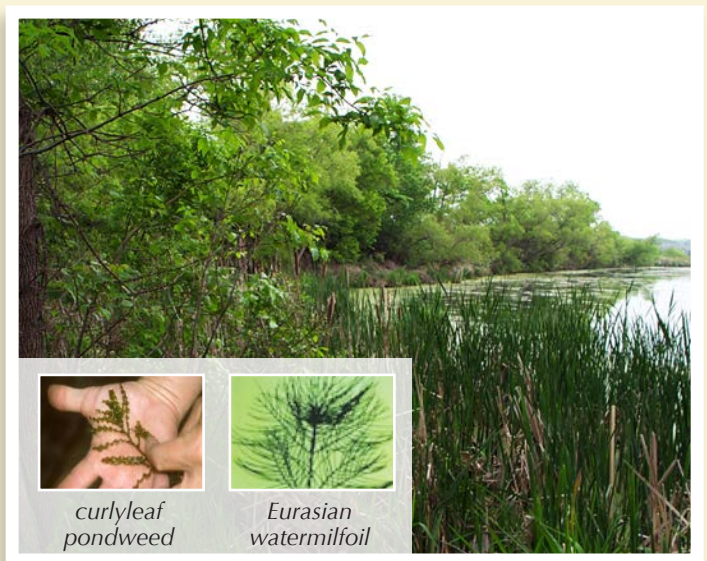
- <http://septic.umn.edu/septic-system-owners>
- <http://www.extension.umn.edu/environment/housing-technology/moisture-management/septic-system-owner-guide/>



Positive Trend Continues on Orchard Lake

The BDWMO is pleased to report on Orchard Lake's continued good overall water quality. The 2017 summer-average Secchi disc transparency (a measure of water clarity) was 2.6 meters (8.5 feet), which is better than the MPCA deep-lake water quality standard of 1.4 meters. In addition to measuring water clarity with a Secchi disc, concentrations of chlorophyll-a (a measure of algal abundance) and total phosphorus (the limiting nutrient for algal growth) were also monitored in Orchard Lake. Orchard Lake summer average concentrations of total phosphorus, chlorophyll-a, and Secchi disc transparency continue to be better than the MPCA deep-lake water quality standards, although there was a statistically significant trend of worsening water quality (transparency) for the most recent 10-yr period.

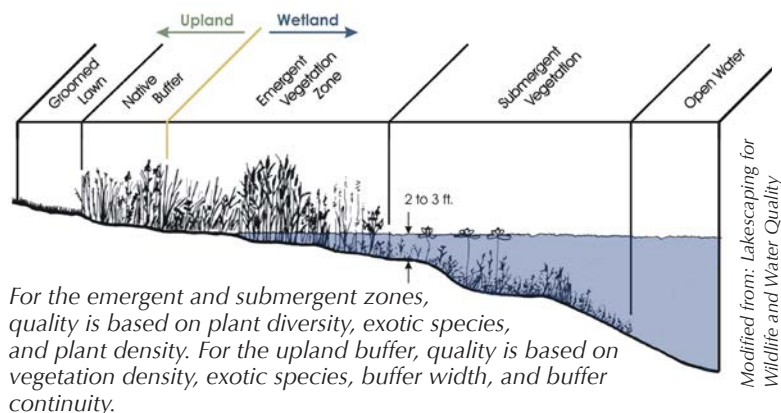
Orchard Lake is a 243-acre lake located in Lakeville. The maximum depth of the lake is 33 feet, and 75% of the lake is 15 feet deep or less. The lake is primarily used for fishing, but swimming, boating, and aesthetic and wildlife viewing are also popular recreational uses of the lake. The City of Lakeville has managed the non-native aquatic plant curlyleaf pondweed in Orchard Lake with mechanical harvesting (2004-2008) and herbicide treatments (2009-2012, 2015-2017). Curlyleaf pondweed is a non-native aquatic plant that grows early and dies off in mid-summer, releasing phosphorus into the lake, contributing to mid-summer algae growth and a reduction in lake clarity. Previous to management activities, curlyleaf pondweed would grow to the lake surface and create nuisance



conditions. Eurasian watermilfoil, another non-native plant, was identified at one location in Orchard Lake in 2017. Non-native aquatic plants can be spread to other lakes by transport of seeds and/or plant fragments, and lake users should take care in removing all plant fragments from boats and other equipment when leaving the water to avoid spreading non-native plants to other waterbodies. The BDWMO will continue to monitor the water quality of Orchard Lake in 2018. Habitat monitoring is scheduled again for Orchard Lake in 2022.

Habitat Monitoring Program

In 2002, the BDWMO created 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.



In 2017, the BDWMO and the City of Lakeville monitored the habitat quality of Orchard Lake. Monitoring included transect, plot, and meandering surveys in, within, and along the fringe of Orchard Lake (in the submergent, emergent, and upland buffer zones). Photographs were taken to document conditions. Analysis and reporting of the monitoring data included a floristic quality assessment and a four-tiered rating system (poor, moderate, high, and excellent). Private versus public ownership was identified along the shoreline. The BDWMO used the survey results, along with parcel data, to identify possible locations for restoration and preservation.

The City of Lakeville conducts annual herbicide treatments to control curlyleaf pondweed. Aquatic plant surveys conducted in 2017 after herbicide treatment indicate that the treatment was effective. The continued curlyleaf pondweed management efforts may be a contributing factor in the resulting excellent ratings for number of native species and density of native species.

See page 7 for Orchard Lake monitoring results. See the BDWMO's website at www.blackdogwmo.org for the full report.

Water Quality Monitoring Program

The BDWMO and member cities continued to monitor several of its lakes during 2017 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 Orchard 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).

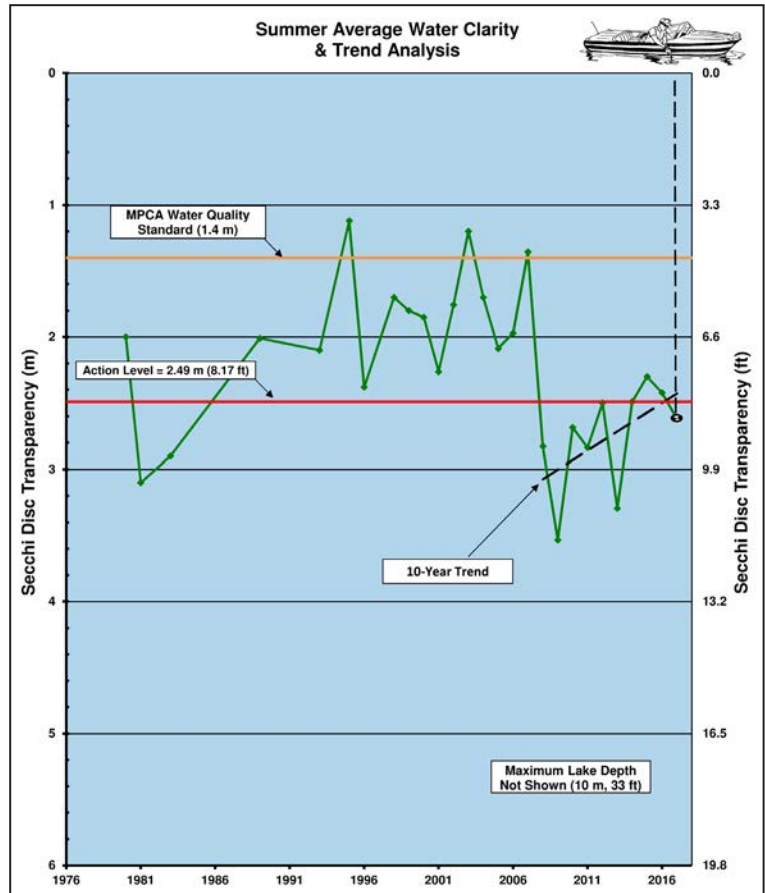
Long-term monitoring is important because lakes can change from year to year. Only when several years of data are compiled do trends become apparent. Because the MPCA periodically evaluates water quality data from the most recent ten-year period to determine if a lake violates applicable swimmable use 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.

Orchard Lake Water Quality Monitoring—In 2017, the BDWMO performed more detailed management level monitoring on the lake (see story on page 4). Habitat monitoring is scheduled again for Orchard Lake in 2022.

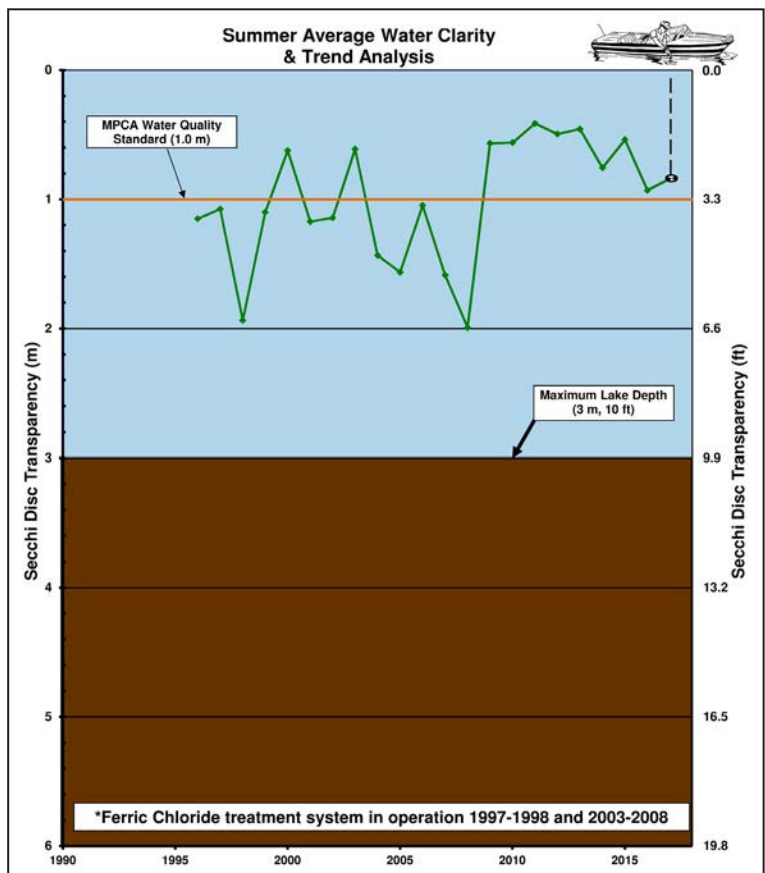
Keller Lake Water Quality Monitoring—The 2017 Secchi disc transparency summer average was 0.84 meters (2.8 feet), which was slightly worse than the 2016 summer-average, and is worse than the MPCA's shallow lake standard of 1.0 meter. The 2017 summer-average of chlorophyll-*a* (17 µg/L) was better than the MPCA's shallow lake standard of 20 µg/L, and the best observed since 2008. The summer-average total phosphorus (69 µg/L) was also the best observed since 2008, but was still worse than the MPCA shallow lake standard of 60 µg/L.

Trend analyses were not completed for Keller Lake because there is less than 10 years of data since the ferric chloride treatment system was permanently shut down (end of 2009). Water quality has generally degraded since the shutdown of the ferric chloride system. 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 2018. Habitat monitoring is scheduled for Keller Lake in 2020.

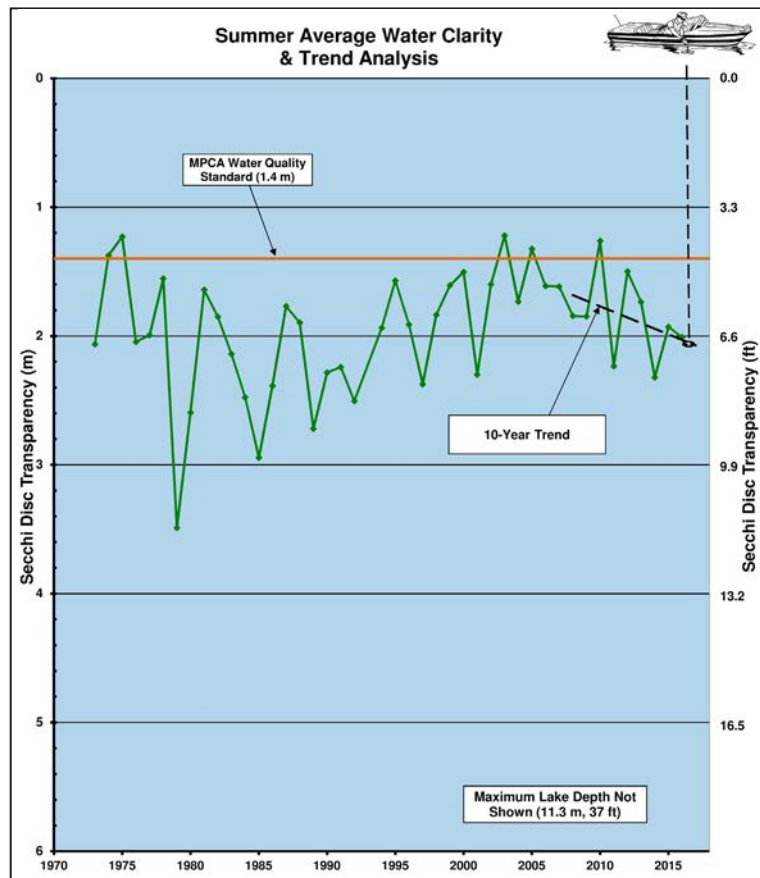
Orchard Lake (Lakeville)



Keller Lake (Burnsville & Apple Valley)



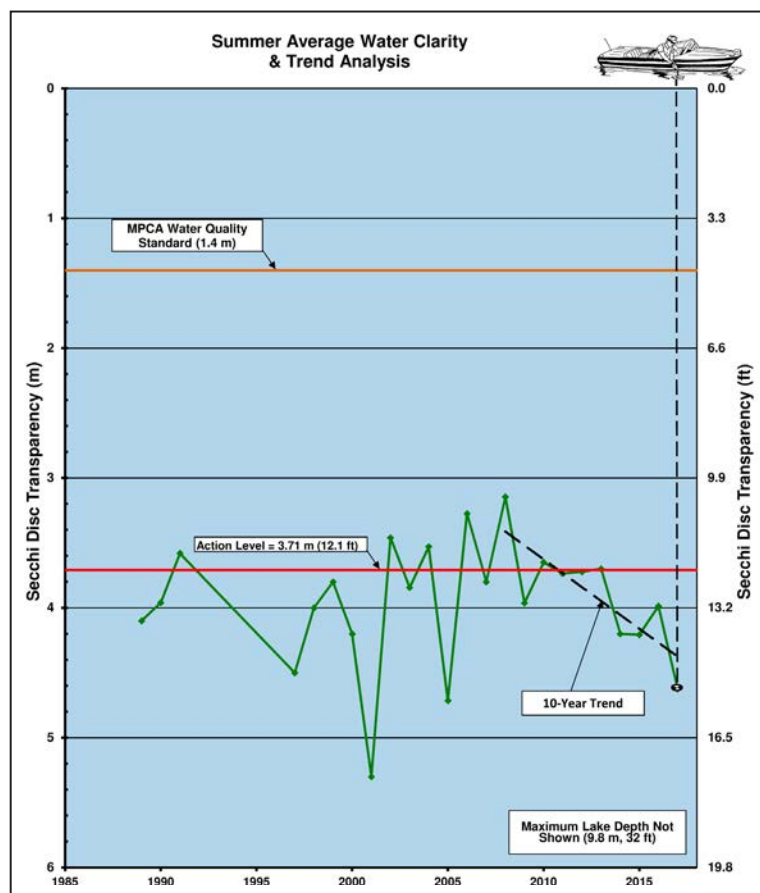
Crystal Lake (Burnsville & Lakeville)



Water Quality Monitoring—Data from 2017 show good water quality in Crystal Lake, with 2 of 3 parameters meeting water quality standards. The 2017 summer-average Secchi disc transparency of 2.1 m (6.9 ft) was better than the MPCA's deep lake standard of 1.4 meters. The 2017 summer-average of chlorophyll-a was 17 $\mu\text{g/L}$, which is slightly worse than the chlorophyll-a standard of 14 $\mu\text{g/L}$ for deep lakes. The 2017 summer-average total phosphorus was 26 $\mu\text{g/L}$, which is better than the deep lake standard of 40 $\mu\text{g/L}$. The summer averages of total phosphorus show a statistically significant improving trend for the most recent 10-year period (2008-2017). Summer-averages of transparency and chlorophyll-a also show improving trends over the same period, but the trends are not statistically significant.

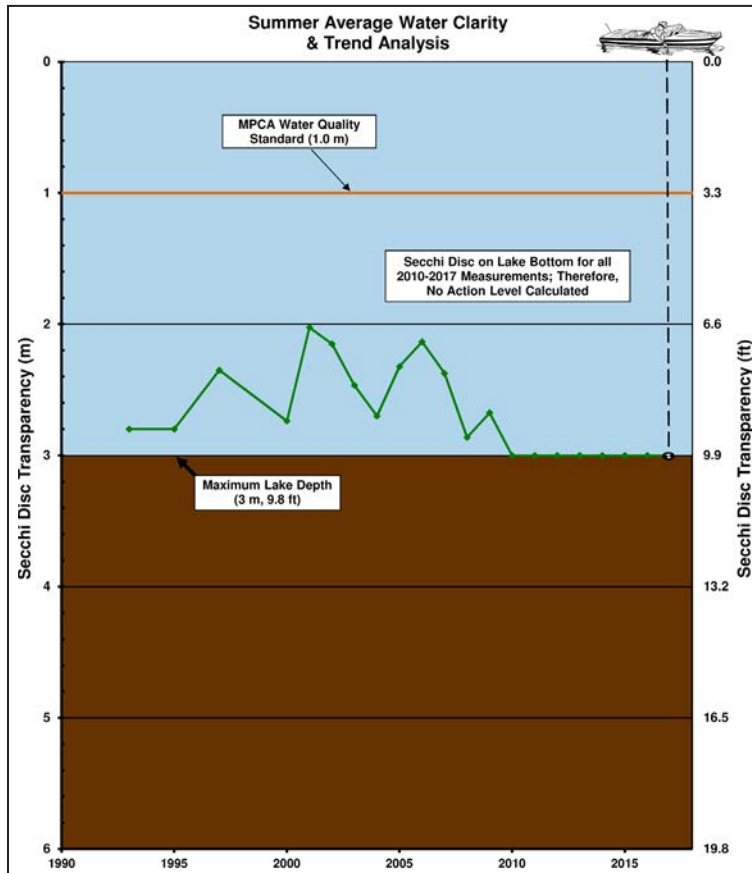
There is a Total Maximum Daily Load (TMDL) in place for Crystal Lake, with the goal of removing it from the impaired waters list. The BDWMO will continue to monitor the water quality of Crystal Lake in 2018, including management level monitoring that is conducted every 3 years. Habitat monitoring is scheduled for Crystal Lake in 2018.

Lac Lavon (Apple Valley & Burnsville)



Water Quality Monitoring—The 2017 summer-average Secchi disc transparency was 4.6 meters (15 feet), the best it has been in 12 years, and indicates continued excellent water quality. The 2017 summer averages of total phosphorus (13 $\mu\text{g/L}$) and chlorophyll-a (3.5 $\mu\text{g/L}$) further indicate excellent water quality for Lac Lavon. Summer averages of Secchi disc transparency and total phosphorus show statistically significant improving trends for the most recent 10-year period of 2008-2017. There was no significant trend in summer averages of chlorophyll-a for the same period. The BDWMO will continue to monitor the water quality of Lac Lavon in 2018. Habitat monitoring is scheduled again for Lac Lavon in 2019.

Kingsley Lake (Lakeville)

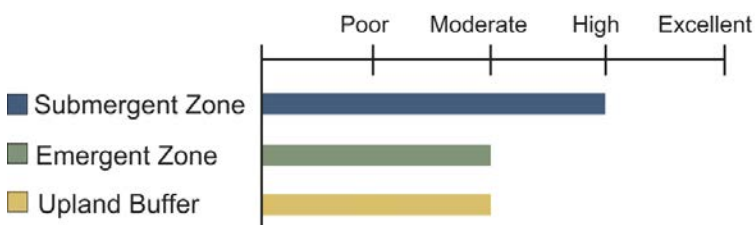


Water Quality Monitoring—Water quality monitoring data from 2017 show continued excellent water quality in Kingsley Lake. Water is often clear enough that the Secchi disc used to measure transparency can still be seen when resting on the bottom of the lake.* The 2017 summer averages of total phosphorus (17 µg/L) and chlorophyll-a (3.1 µg/L) concentrations in 2017 were similar to 2016, and are considerably better than the MPCA's shallow lake standards. The BDWMO will continue to monitor the water quality of Kingsley Lake in 2018. Habitat monitoring is scheduled for Kingsley Lake in 2021.

* 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.

Orchard Lake Habitat Monitoring Results for 2017

As mentioned in the article on page 4, Orchard Lake habitat monitoring was conducted in 2017. The BDWMO made the following quality ratings, based on the monitoring results:



**Exotic plant species in upland buffer include burdock, thistle, knapweed, leafy spurge, honeysuckle, bird's foot trefoil, sweet clover, plantain, Kentucky bluegrass, and mullein.

Submergent zone quality rating = High

Rating based on averaging four criteria:

1. excellent total number of native species (16)
2. excellent average native plant density (1.2)
3. moderate rating for average exotic species density (1.1)
4. moderate coefficient of conservatism value (mean C-value) (5.2)

Curlyleaf pondweed (common every year in the lake in early spring) often out-competes native vegetation early in the growing season and dies off in early to mid-summer. This creates a sudden loss of habitat and releases nutrients into the water that can produce algal blooms and create turbid water conditions. The treatments conducted by the City of Lakeville to control this invasive species is detailed on page 4.

The BDWMO recommends continued monitoring of this invasive species.

Emergent vegetation zone quality rating = Moderate

Rating based on averaging four criteria:

1. excellent number of native plant species (50)
2. moderate % coverage of exotic species (51-75%)
3. a poor mean C-value rating (2.7)
4. high rating for total vegetative cover (51-75%)

Invasive cattails are dominant in the south and northeastern portions of the vegetated emergent. At the northeastern portion, the cattails are growing with many native species including sedges, burr-reed, iris, bluejoint, and marsh fern. Channels and pools of shallow open water are present within the cattail marsh where native watershield and bladderwort are dominant. The northeastern portion provides amphibian and wildlife habitat. Purple loosestrife is another invasive species with little wildlife value found in the lake's emergent zone.

The BDWMO recommends continued management of purple loosestrife where feasible.

Upland buffer zone quality rating = Moderate

- 25 native species and 21 exotic species observed
- Exotic plant species** >40% of upland vegetative cover. Native plants with high C-values include purple prairie clover, lance-leaf twisted stalk, oaks, autumn willow and ferns.
- Upland buffer around the lake averages <10' wider and surrounds 0-25% of the lake, which is insufficient to protect water quality, prevent erosion, and provide wildlife habitat.
- Nearly all of the properties were identified as having the potential to increase naturalized upland buffer widths to protect water quality and prevent erosion (25-50'). A few residential and city-owned properties have the potential to increase the buffer width to provide wildlife habitat (100').
- 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:

Roger Baldwin, Chair
(serving since 1996)
Tom Harmening, Commissioner
(serving since 2002)
Mike Hughes, Commissioner
(serving since 2008)
Curtis Enestvedt, Alternate
(serving since 2014)

Representing Apple Valley and Eagan:

Greg Helms, Vice Chair
(serving since 2011)
Vacant, Alternate

Representing Lakeville:

Scott Thureen, Secretary/Treasurer
(serving since 2008)
Doug Anderson, Alternate
(serving since 2017)

Engineering Consultant:

Karen Chandler, P.E., Barr Engineering Co.
Henry Runke, Ph.D., Barr Engineering Co.

Legal Consultant:

Roger Knutson, 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:

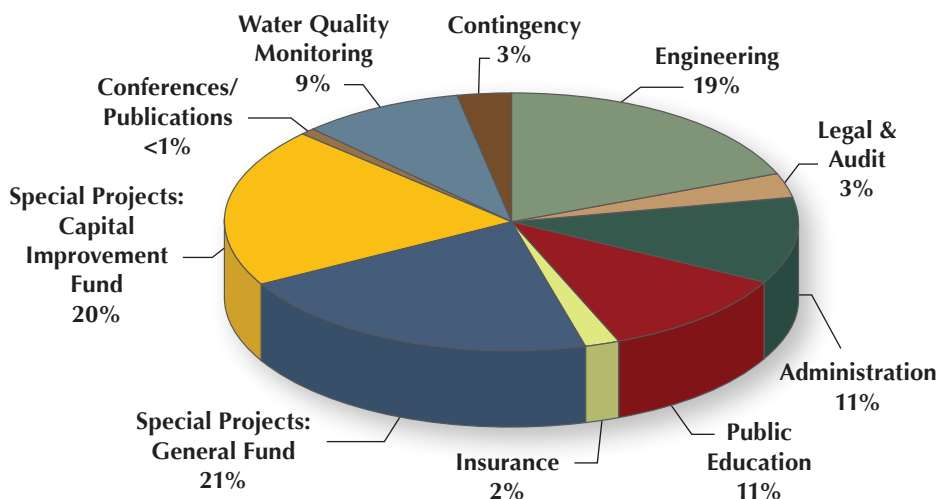
Daryl Jacobson, Administrator
Black Dog WMO
City of Burnsville
13713 Frontier Court
Burnsville, MN 55337
Telephone: 952-895-4574
Fax: 952-895-4531

Website: www.blackdogwmo.org

2018 Expenditures

Engineering	\$31,000
Legal and Audit	\$4,400
Administrative Services	\$18,000
Public Education	\$18,675
Insurance	\$3,000
Special Projects – General Fund	\$34,700
Special Projects – Capital Improvement Fund	\$33,000
Conference/Publications	\$500
Water Quality Monitoring	\$14,550
Contingency	\$5,000

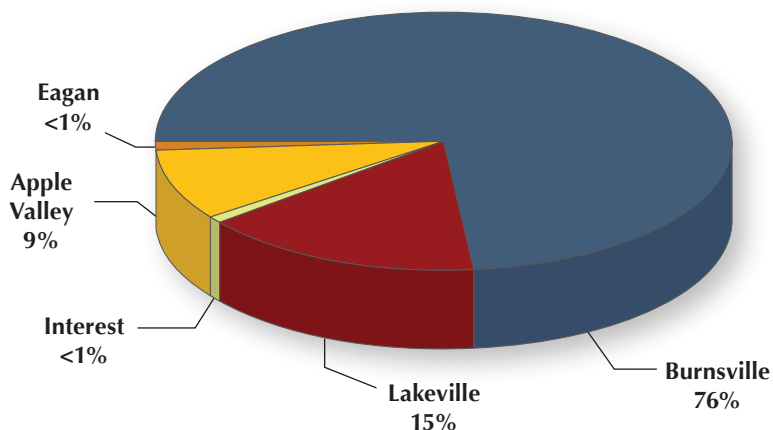
Total Expenditures **\$162,825**



2018 Income

Member Contributions	\$131,000
Member Contributions – Capital Improvement Fund	\$22,000
Interest	\$40

Total Income **\$153,040**



NOTE: Difference between expenditures and income (\$9,785) to come out of Fund Balance