

## Black Dog Watershed Management Organization 2019 WATERSHED ANNUAL REPORT

**Published April 2020** 

## 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, captial 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 2019, and plans for 2020 and beyond.

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# 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.



### More Improvements for Keller Lake

#### Phase I of the Keller Lake Alum Treatment is 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 treatment was divided into two phases to increase the long-term effectiveness. Phase I occurred in June, 2019 when 21,109 gallons of chemical precipitant were applied to Keller Lake (see page 5 for story on Keller Lake water quality monitoring). It is expected that, following completion of both phases of the in-lake aluminum treatment, the annual average TP (total phosphorus) load to Keller Lake will be reduced 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.

Secondary benefits of this project include improving water clarity and providing the means for attaining a healthy native plant community in the lake. This project will also improve the water quality of Crystal Lake, which is immediately downstream of Keller Lake. Protecting the water quality of Crystal Lake is also important as it was recently removed from the impaired waters list for eutrophication (see page 6 for story on Crystal Lake water quality monitoring).



Alum treatment in action

#### **How Does Alum Treatment Work?**

When aluminum is applied to lake water, it binds with phosphorus in the lake sediment, forming a compound. After it binds with the aluminum, the phosphorus no longer supplies nutrients to lake algae, reducing its growth.

Two forms of aluminum are typically applied to lakes: alum and sodium aluminate. When alum is added to a lake, it will lower the pH (make it more acidic), while sodium aluminate will raise the pH (more basic). Therefore, these two chemicals are often added in combination to neutralize the pH effects during treatment.



#### City of Burnsville is Developing Use Attainability Analysis for Keller Lake

Based on the updated lake and watershed condition, the City of Burnsville is developing an Use Attainability Analysis (UAA) of Keller Lake. The specific purpose of the UAA is to assess and develop an achievable water clarity goal for Keller Lake using the results of watershed and in-lake water quality modeling. The study approach includes a detailed evaluation of the historical lake water quality dataset for Keller Lake to assess what level of water clarity can be achieved based on what is known about the current lake and watershed conditions. This assessment will require an evaluation of the long-term trends and interrelationships of all of the water quality and ecological variables, including consideration of the applicable state standards and goals from other similar lakes in the region. As a part of the process, stakeholders will learn more about how varying levels of lake water clarity (and associated variables) correspond with the potential lake uses. Knowing what uses are intended for Keller Lake will ultimately inform the decision-making on the recommended lake water quality goals. A public meeting and draft UAA report are planned for summer 2020.

## Landscaping for Clean Water—A Look at the Past Decade

As we enter 2020, it's instructive to look back on the progress made over the past decade. From 2009 through 2019, hundreds of people participated in the Dakota SWCD's Landscaping for Clean Water program workshops. Nearly 160 projects were completed within the BDWMO

through the support of the BDWMO for the program. The map below shows the project locations, color-coded by year. Projects included the creation of native gardens, raingardens, or native shorelines that stabilize soil. A few past projects are featured in the photos below.



### Who Can Get a Grant?

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.

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. In 2019, 97 homeowners attended Landscaping for Clean Water Introductory classes hosted by the BDWMO; 54 went on to design projects. The BDWMO provided 19 construction funding grants—10 grants went to landowners who

attended the Burnsville introductory workshops, with the other 9 grants going to landowners who live in the BDWMO, but attended the Introductory Class in another city or previous year. The BDWMO will fund up to 18 Landscaping for Clean Water projects in 2020. 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. For more information, call 651-480-7777 or go to www.dakotaswcd. org/costshare.html.

## Looking at Lac Lavon

The BDWMO is pleased to report that Lac Lavon continues to have excellent water quality. The summer-average Secchi disc transparency (a measure of water clarity) in 2019 was 4.0 meters (13 feet), which is significantly 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 nutrient that drives algal growth) were also monitored in Lac Lavon. The summer-average concentrations of chlorophyll-a (2.8  $\mu$ g/L) and total phosphorus (13  $\mu$ g/L) were both better than the MPCA deep-lake water quality standards of 14 µg/L and 40 µg/L, respectively. Lac Lavon is a flooded former gravel pit with a small watershed, and receives much of its water from groundwater inflow. Therefore, the amount of external phosphorus entering Lac Lavon is relatively small, and the process of eutrophication (i.e. the process by which nutrients build up in a waterbody) in Lac Lavon is expected to be slow.

Surveys of Lac Lavon's aquatic vegetation were performed in June and August of 2019. The vegetation surveys found an abundance of both native and non-native aquatic plants. A total of 12 native species were identified in the submergent zone of Lac Lavon. The density of native plants was relatively moderate, including three species that are considered indicative of good water quality: longleaf pondweed, muskgrass, and white water crowfoot. The non-native aquatic plants that were found in 2019 include curly-leaf pondweed and Eurasian watermilfoil. Curly-leaf pondweed dies off in mid-summer, earlier than native plants, releasing nutrients that can contribute to summer algae blooms. Eurasian watermilfoil was found to

## 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.





be growing in high densities in a few areas of Lac Lavon, and may be crowding out native plants in these areas. The non-native purple loosestrife, an emergent wetland plant, was also found along the shoreline in several locations. The non-native brittle naiad was found in Lac Lavon in previous years, but was not encountered during the 2019 surveys. Lac Lavon is one of only a handful of Minnesota lakes that are known to be infested with brittle naiad. True to its name, brittle naiad easily breaks into fragments, which can spread and grow into new plants. Invasive 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 nonnative plants to other waterbodies.

The BDWMO will continue to monitor the water quality of Lac Lavon in 2020. Habitat monitoring is scheduled again for Lac Lavon in 2024.

In 2019, the BDWMO monitored the habitat quality of Lac Lavon. 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.

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.)

See page 7 for Lac Lavon habitat monitoring results. See www.blackdogwmo.org for the full report.

### Water Quality Monitoring Program

The BDWMO and member cities continued to monitor several of its lakes during 2019 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 Lac Lavon (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.

#### Lac Lavon (Apple Valley & Burnsville)

**Water Quality Monitoring**—In 2019, the BDWMO performed more detailed management level monitoring on the lake (see story on page 4). Habitat monitoring was also performed in 2019 (see page 7 for results).

#### Keller Lake (Burnsville & Apple Valley)

Water Quality Monitoring—An alum treatment was conducted on Keller Lake in spring 2019, resulting in improved water quality. (See story on page 2). The 2019 Secchi disc transparency summer average was 1.3 meters (4.3 feet), which is better than it has been since 2008, and is better than the MPCA's shallow lake standard of 1.0 meter (3.3 feet). The summer-average total phosphorus (40 µg/L) was also better than it has been since 2008, and was better than the MPCA shallow lake standard of 60 µg/L. The 2019 summer-average of chlorophyll-*a* (25 µg/L) was worse than the MPCA's shallow lake standard of 20 µg/L.

Trend analyses were not completed for Keller Lake because of the alum treatment that was conducted in spring 2019. 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 2020. Habitat monitoring is also scheduled for the lake in 2020.



## **2019 Monitoring Results**





#### **Orchard Lake** (Lakeville)

**Water Quality Monitoring**—The 2019 summeraverage Secchi disc transparency was 2.3 meters (7.6 feet), which is the same as the 2018 summer average, and better than the MPCA deep-lake water quality standard of 1.4 meters. The 2019 summer average of total phosphorus (19 µg/L) was better than the 2018 summer average, and is better than the MPCA's deep lake standard (40 µg/L). The summer-average chlorophyll-a (8.2 µg/L) was worse than the 2018 summer average, but better than the MPCA's deep lake standard (14 µg/L). The BDWMO will continue to monitor the water quality of Orchard Lake in 2020. Habitat monitoring is scheduled for the lake in 2022.



### Crystal Lake (Burnsville & Lakeville)

Water Quality Monitoring—The 2019 summeraverage Secchi disc transparency was 1.9 meters (6.2 feet), which is similar to other recent summer averages, and better than the MPCA deep-lake water quality standard of 1.4 meters. The 2019 summer average of total phosphorus (35  $\mu$ g/L) was worse than the 2018 summer average, but better than the MPCA's deep lake standard (40  $\mu$ g/L). The summer-average chlorophyll-a (14  $\mu$ g/L) was worse than the 2018 summer average, and is equal to the MPCA's deep lake standard (14  $\mu$ g/L). The BDWMO will continue to monitor the water quality of Crystal Lake in 2020. The next Crystal Lake habitat monitoring is scheduled for 2023.



## **2019 Monitoring Results**



### Kingsley Lake (Lakeville)

Water Quality Monitoring—Water quality monitoring data from 2019 show continued excellent water quality in Kingsley Lake. The lake 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 2019 summer averages of total phosphorus (25 µg/L) was the highest it's been since 2006, but still considerably better than the MPCA shallow lake standard (60 µg/L). The 2019 summer average chlorophyll-*a* (3.7 µg/L) was similar to years 2015-2018, and is considerably better than the MPCA's shallow lake standard (20 µg/L). The BDWMO will continue to monitor the water quality of Kingsley Lake in 2020. 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.

#### Lac Lavon Habitat Monitoring Results for 2019

As mentioned in the article on page 4, Lac Lavon habitat monitoring was conducted in 2019. The BDWMO made the following quality ratings, based on the monitoring results:



#### Submergent zone quality rating = Moderate

Rating based on averaging four criteria:

- 1. high total number of native species (12)
- 2. moderate average native plant density (1.5)
- 3. moderate rating for average exotic species density (1.7)
- 4. moderate coefficient of conservatism value (mean C-value) (4.5)

Curly-leaf pondweed, a dominant species found every year in Lac Lavon, was present at 29 percent of sample points shallower than the maximum depth of plant growth in June. In August, (after seasonal die-off) only a handful of the plants were observed. This die-off creates a sudden loss of habitat and releases nutrients into the water that can produce algal blooms and create turbid water conditions. Eurasian watermilfoil was also found in Lac Lavon in 2019 and in previous years. Eurasian watermilfoil has fast growing stems and often branches out and covers the water surface, which impedes boating, makes water recreation difficult, and often shades out slower-growing native plants.

## The BDWMO recommends continued monitoring, control, and management of these invasive species.

- **Emergent vegetation zone quality rating = Moderate** Rating based on averaging four criteria:
  - 1. excellent number of native wetland plant species (38)
  - 2. high rating for % coverage of exotic species (26-50%)
  - 3. a poor mean C-value rating (2.4)
  - 4. poor rating for total vegetative cover (0-25%)

Narrowleaf cattail is a dominant non-native invasive species found in the lake. Purple loosestrife, another nonnative invasive plant species, is present in shallow open water and along the shoreline and has been managed for years through the release of beetles, which eat the plants. At the southwest portion of the lake, the emergent shoreline adjacent to the Burnsville prairie restoration project was seeded with native emergent vegetation.

## The BDWMO recommends continued control and management of purple loosestrife.

#### Upland buffer zone quality rating = Poor

- 56 native species and 41 exotic species observed
- Exotic plant species > 40% of upland vegetative cover. The mean C-value rating is 2.0 (poor).
- Upland buffer (within city-owned property) along the western and northeastern portions of the shoreline is wide, providing wildlife habitat and shoreline protection.
- The majority of residential properties are dominated by maintained lawn grasses and sand beaches with little to no naturalized vegetation. The majority of the residential shoreline properties on Lac Lavon have the potential to provide a 50-foot naturalized buffer without altering any structures. One residential property has a naturalized buffer width adequate for wildlife protection (≥100 feet).
- 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) Rollie Greeno, Alternate (serving since 2018)

#### Representing Lakeville:

Scott Thureen, Secretary/Treasurer (serving since 2008) Vacant, Alternate

*Engineering Consultant:* Karen Chandler, P.E., 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:

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Website: www.blackdogwmo.org

## 2020 Expenditures

Engineering	\$31,000
Legal and Audit	\$8,400
Administrative Services	\$18,000
Public Education	\$17,900
Insurance	\$3,000
Special Projects – General Fund	\$36,500
Special Projects – Capital Improvement Fund	\$7,000
Special Projects – General Fund Reserve	\$10,000
Conference/Publications	\$500
Water Quality Monitoring	\$15,400
Contingency	\$5,000
Total Expenditures	\$152,700



## 2020 Income

Total Income \$1	53.040
Interest	\$40
Member Contributions\$	153,000

