Black Dog
Watershed Management Organization

2006 Watershed Annual Report

Published March 2007

Our mission is . . .

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

Evaluating our Success

The BDWMO watershed management plan calls for the BDWMO 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:

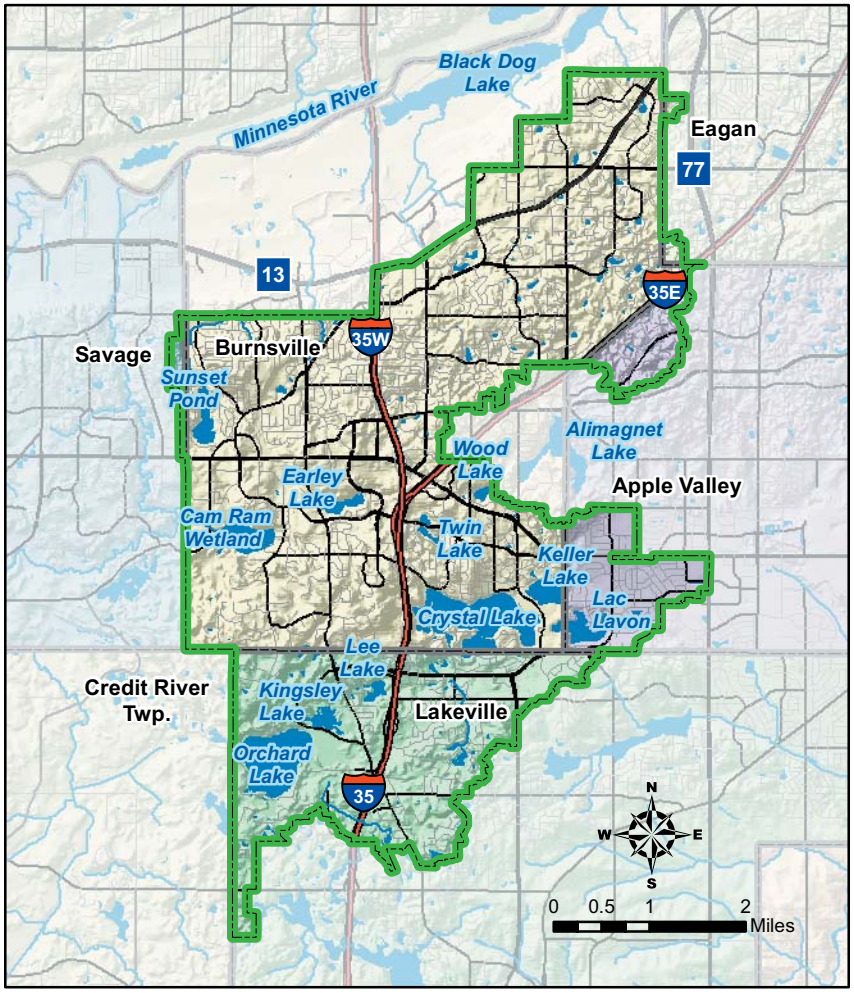
- **Trend Analysis**—The BDWMO collects water quality information to track water quality trends.
- **Performance Analysis**—The BDWMO works with the member cities to implement improvement projects, such as water quality treatment, and to measure the success of these projects.
- **Habitat Quality Analysis**—The 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 2006, and plans for 2007 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, Eagan, and Savage.

The total area of the Black Dog watershed is 17,550 acres; 70 percent of the watershed lies within the city of Burnsville, 21 percent of the area is within the city of Lakeville, and 8 percent is within the city of Apple Valley. The cities of Eagan and Savage represent less than 1 percent of the drainage area.

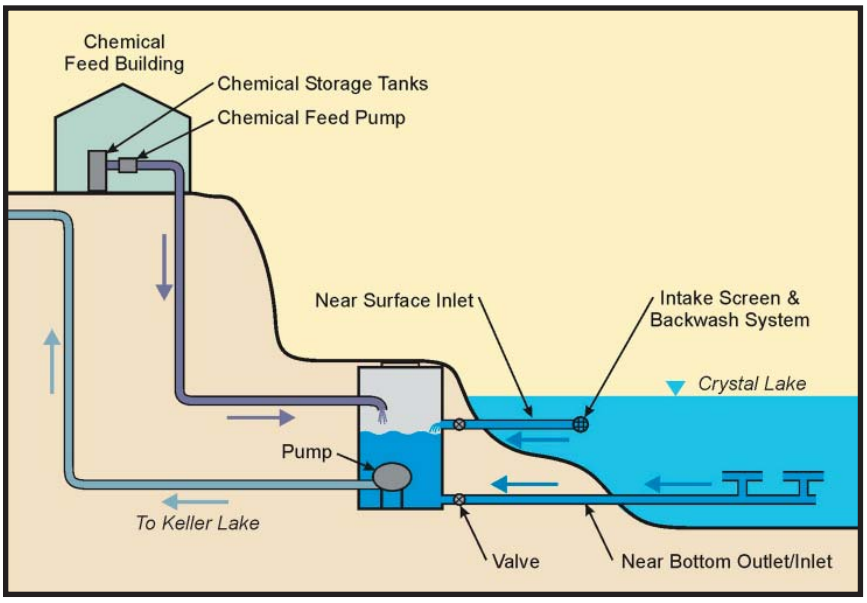


Water Quality Improvement Projects in Crystal and Keller Lakes

As part of the BDWMO implementation program to improve the water quality of Crystal and Keller lakes, several projects have been completed or continued on an ongoing basis in 2006. These projects include:

Water Treatment—Under a permit now issued by the Minnesota Pollution Control Agency, the BDWMO has been operating a ferric chloride (i.e., iron) treatment system since 1997 to treat water from Crystal Lake. Ferric chloride is used to reduce high phosphorus levels in the treated Crystal Lake water and in Keller Lake (which receives the treated water). The high phosphorus levels cause nuisance algal growth, which may impair the recreational use of these resources. When iron is added to the lake waters, it combines with the phosphorus in the lake to form an inert chemical precipitate (solid) called a floc, which settles to the lake bottom.

In 2006, the Crystal/Keller Lakes ferric chloride treatment system operated for approximately 6 months, from late-April through November. Over the course of that time, approximately 5,291 pounds of iron—about 20 percent less than in 2005—were added to lake waters pumped from Crystal Lake into a constructed conveyance channel that discharges into Keller Lake. In 2006, the total phosphorus concentration in Keller Lake rose back to elevated levels last observed in 2003. Likely explanations for the increased phosphorus concentrations include 1) the reduced amount of iron applied in 2006; and 2) the very few runoff-producing rain storms that occurred during the summer of 2006. The fewer rain storms meant the iron floc tended to settle in the runoff channel, rather than being flushed into Keller Lake, where it could strip phosphorus from the water column. In 2006, Keller Lake also experienced a significant increase in the abundance of the exotic, invasive aquatic plant curlyleaf pondweed, as compared to 2004 and 2005, most likely due to the same factors that resulted in increased phosphorus concentrations. The BDWMO will conduct similar operations in 2007, with comparable performance monitoring to assess the impacts of the system on Crystal and Keller Lakes.



Water treatment system in Crystal and Keller lakes

Curlyleaf Pondweed Harvesting—Harvesting of this exotic, invasive aquatic plant is done mechanically each year in Crystal and Keller lakes. Removal of curlyleaf pondweed is critical because it can be a significant source of phosphorus.

Curlyleaf pondweed was first found in Minnesota in 1910.

Have you ever wondered...

How the Crystal Lake outlet came about? Or why Crystal Lake's elevation is maintained at 933.4 feet above sea level? For answers to these questions, one must look to the history books. Because Crystal Lake had no natural outlet, its elevation fluctuated wildly based on rainfall. During dry years, the lake's recreational value was compromised. During wet years, homes were flooded.

Finally, in late 1972, after years of litigation, the City of Burnsville (known then as the Village of Burnsville) passed a resolution requesting that the Department of Natural Resources set a lake level for Crystal Lake. On January 31, 1973, following a public hearing, the DNR decided on a level that would protect as many homes as possible while maximizing public recreation. The DNR also called for the installation of an outlet control structure to maintain the new runout level. Built in late 1973, the Crystal Lake outlet improved the way residents enjoy Crystal and Keller Lakes to this day.

Water Quality Improvement Projects in Crystal and Keller Lakes Implementation Program

Based on the recommendations in the Crystal and Keller lakes use attainability analysis (UAA), the BDWMO developed an implementation program to improve the water quality of Crystal and Keller lakes. The table below summarizes the implementation program, the year of implementation, and funding source for each element of the program.

	Implementation Program Elements	Implementation Date	Funding Source
1	Phosphorus fertilizer limitation	2003 & ongoing	N/A
2	Excavate and enhance Redwood Pond	2005	City of Apple Valley
3	Add two regional infiltration basins		
	3a Regional infiltration basin (north of Valley Middle School)	2010	City of Apple Valley
	3b Regional infiltration basin (west of Buck Hill Park)	2005	City of Burnsville, BDWMO, and $32,000 Metropolitan Council MetroEnvironment Partnership Grant
4	Upgrade select existing ponds to NURP design criteria		
	4a Enlarge and excavate 153rd St. Pond	2010	City of Apple Valley
	4b Excavate north of Southcross Drive & Keller Lake Drive	2007	City of Burnsville
	4c Excavate Keller Lake Pond	2007	City of Burnsville
	4d Excavate northeast edge of Keller Lake	2007	City of Burnsville
	4e Excavate Bluebill Pond	2005	City of Lakeville
5	Add regional water quality treatment pond—Whitney Pond (southeast edge Keller Lake)	2008	City of Apple Valley and $60,000 Clean Water Legacy Nonpoint Source Restoration & Protection Fund Grant
6	Resume operation of ferric chloride ($FeCl_3$) treatment system in near-surface withdrawal mode	2003 & ongoing	Black Dog WMO
7	Mechanical harvesting of curlyleaf pondweed in Crystal Lake	2003 & ongoing	Lakeshore homeowners and City of Burnsville
8	Mechanical harvesting of curlyleaf pondweed in Keller Lake	2004 & ongoing	Lakeshore homeowners, City of Apple Valley, and City of Burnsville

If all of the recommended program elements are implemented, the Crystal and Keller lakes UAA predicts Crystal Lake water clarity would improve to a summer-average Secchi disc transparency of 2.1 m (6.9 ft), and Keller Lake would improve to a summer-average Secchi disc transparency of 1.8 m (6.0 ft).

Measuring Water Quality

One method of measuring a lake's water quality is by Secchi disc transparency. A Secchi disc is a black-and-white disc that is lowered into the water until it disappears from view. The depth at which the disc is no longer visible is measured numerous times each season. These measurements are then tracked over time. The water transparency, or Secchi depth, is dependent on the amount and type of suspended materials in the water.

Depending on the relationship between current Secchi disc readings, the water quality trends over time, and the lake's use classification, water quality management actions may be required. Examples of such actions include more intensive lake monitoring, preparation of diagnostic feasibility studies, or implementation of stormwater management practices.

As part of the BDWMO Habitat Monitoring Program, Daryl Jacobson (City of Burnsville) assesses the emergent zone vegetation on Sunset Pond.

Water Quality Monitoring Program

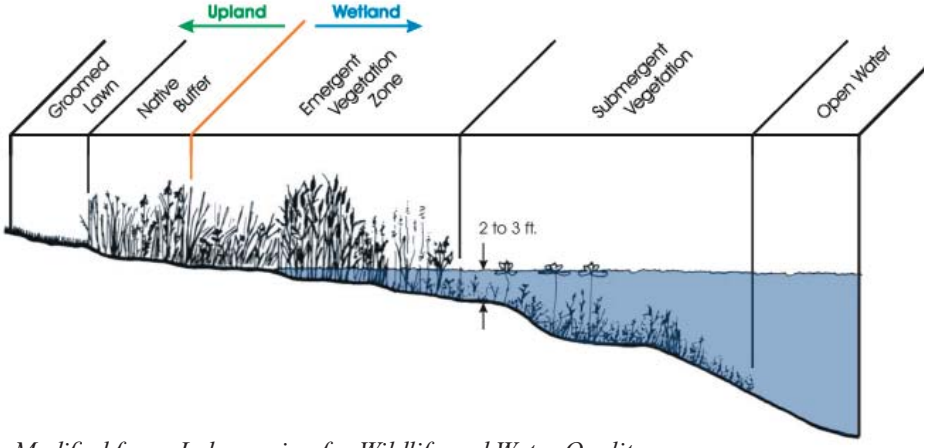
The BDWMO and member cities participate in the Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). This program provides a low-cost means for measuring water quality on an approximately bi-weekly basis from spring through fall. In addition, BDWMO periodically undertakes more detailed monitoring of selected lakes.

Long-term monitoring is important because lakes can change from year to year. Only when years of data are put together can we see trends in water quality. Graphs on the subsequent pages show historic trends in water quality.

Habitat Monitoring Program

In 2002, the BDWMO created a program for monitoring the habitat quality of strategic water resources in the watershed. Implementation of the program began in 2003 and continued in 2004–2006. The program includes monitoring of biological and physical indicators, such as upland and aquatic vegetation, buffer zones, erosion, sedimentation, and non-native exotic species. The program also recommends actions based upon monitoring results.

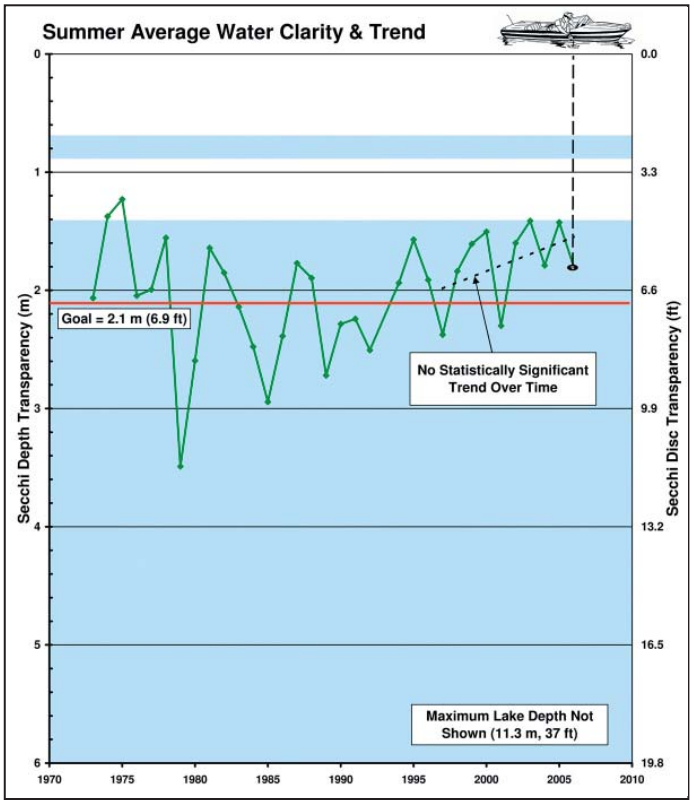
Each lake is divided into a submergent zone, an emergent zone, and an upland buffer zone—as shown in the figure below—with quality ratings for each zone. For the emergent and submergent zones, quality is based on plant diversity, exotic species, and plant density. For the upland buffer, quality is based on vegetation density, exotic species, buffer width, and buffer continuity.



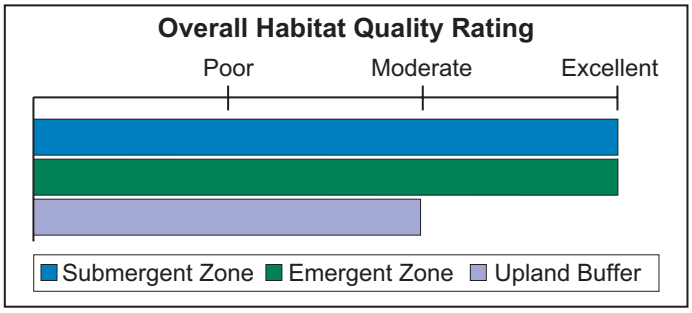
Modified from: Lakescaping for Wildlife and Water Quality

2006 Monitoring Results

Crystal Lake

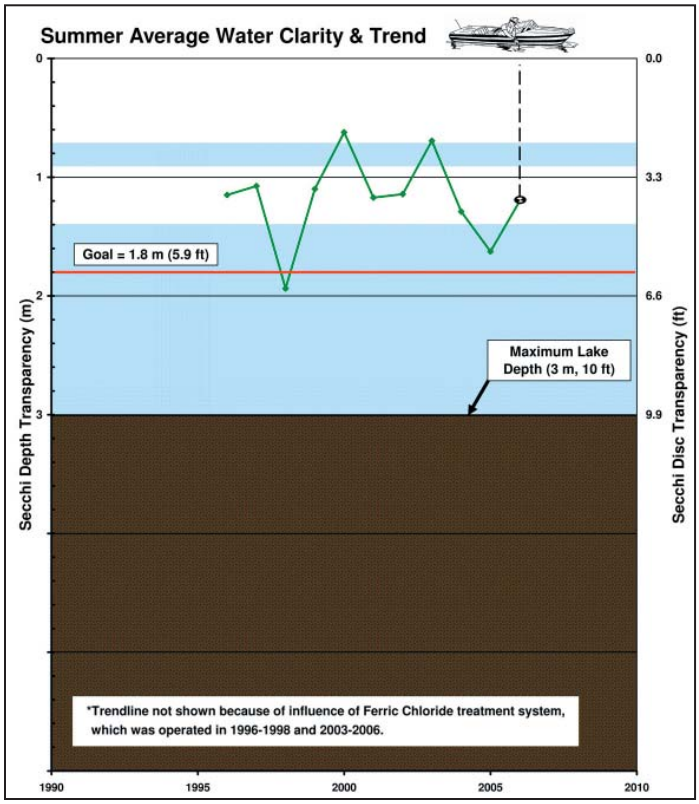


Water Quality Monitoring—Management level monitoring was performed in 2006. The diagnostic feasibility study completed for Crystal Lake (and Keller Lake) focused on ways to achieve the BDWMO's water quality goals for both lakes. The BDWMO and member cities are implementing the best management practices recommended in the study (see table on page 3).

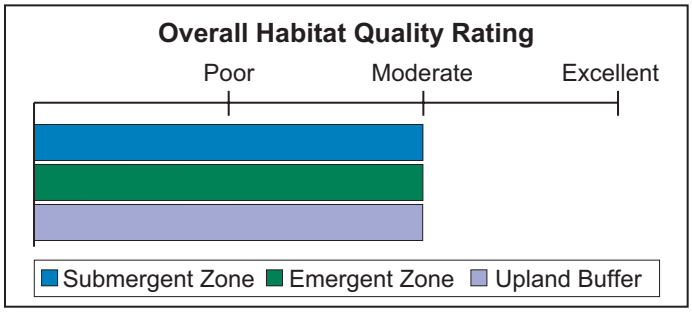


Habitat Monitoring—Crystal Lake has excellent quality submergent vegetation due to an above average number of native species, an average exotic species density, and an average native plant density rating. However, the presence of Eurasian watermilfoil and curlyleaf pondweed are problematic. While the emergent vegetation zone has excellent diversity, the presence of cattails and reed canary grass minimizes the wildlife benefits. The upland buffer around Crystal Lake provides little wildlife value. ***Critical Actions***—Continue to control curlyleaf pondweed and Eurasian watermilfoil to allow native species to flourish.

Keller Lake

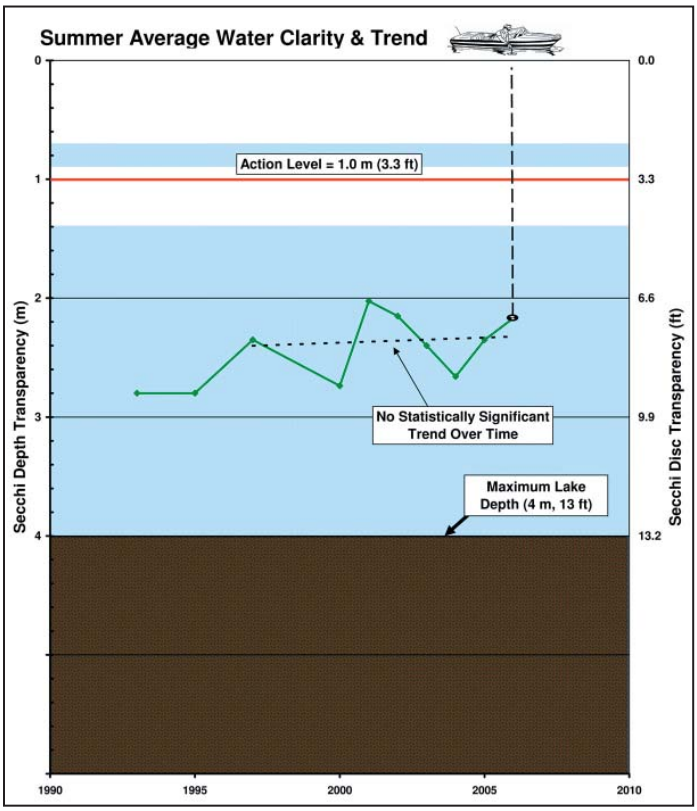


Water Quality Monitoring—Management level monitoring was performed in 2006. The diagnostic feasibility study completed for Keller Lake (and Crystal Lake) focused on ways to achieve the BDWMO's water quality goals for both lakes. The BDWMO and member cities are implementing the best management practices, recommended in the study (see table on page 3).

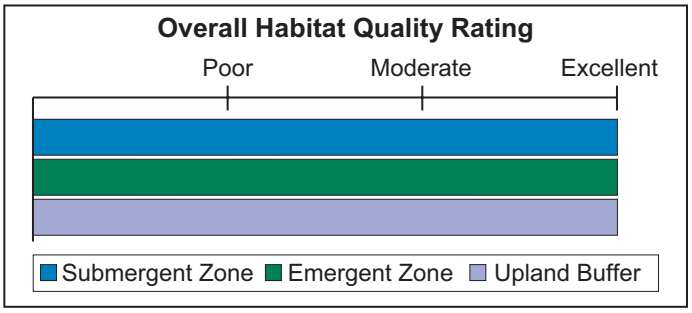


Habitat Monitoring—The submergent vegetation within Keller Lake is limited to only 5 native species. This, coupled with an average exotic species density and an average native plant density rating, results in moderate submergent zone quality. The emergent zone is rated moderate due to the dominance of cattails and reed canary grass, with only 7 native species in limited distribution. The natural upland buffer is very narrow, with a near dominance of exotic species limiting the wildlife benefits. ***Critical Actions***—Continue to control curlyleaf pondweed and Eurasian watermilfoil. Continue stormwater treatment improvements, which may benefit the submergent plant community.

Kingsley Lake

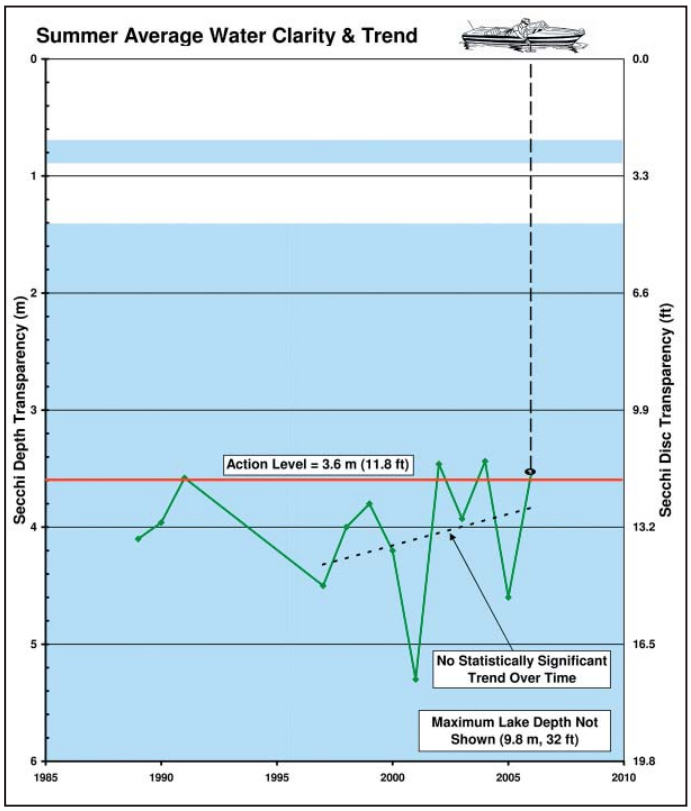


Water Quality Monitoring—The BDWMO will continue to monitor the water quality of Kingsley Lake.

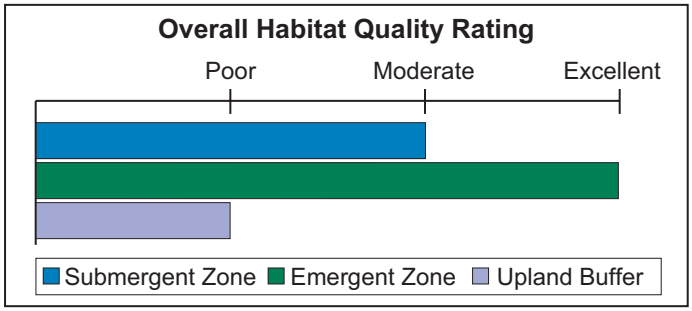


Habitat Monitoring—Kingsley Lake has excellent submergent vegetative quality, chiefly due to an ideal native vegetative density. However, an average number of native species and an average exotic species density also contributed to the high rating. The emergent zone is rated excellent for overall quality due to a dominance of diverse native plant species and limited coverage of exotic species. The upland buffer also has a relatively small number and limited coverage of exotic species, but common buckthorn is dominant in certain areas around the lake. ***Critical Actions***—Continue to monitor and consider control of curlyleaf pondweed. Perform an early-growing-season submergent vegetation survey to best document the extent of curlyleaf pondweed. Any attempts to control the invasive plant should be made early in the growing season. Perform another submergent vegetation survey in early June.

Lac Lavon

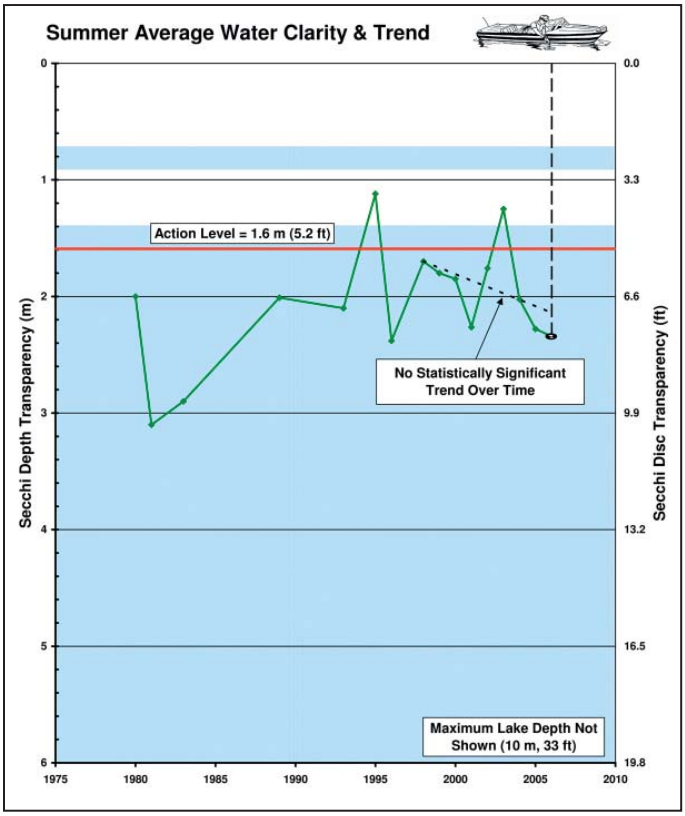


Water Quality Monitoring—Lac Lavon has excellent water quality, although it has recently experienced water clarity that is worse than the action level. The BDWMO will consider if additional lake management actions should be taken.

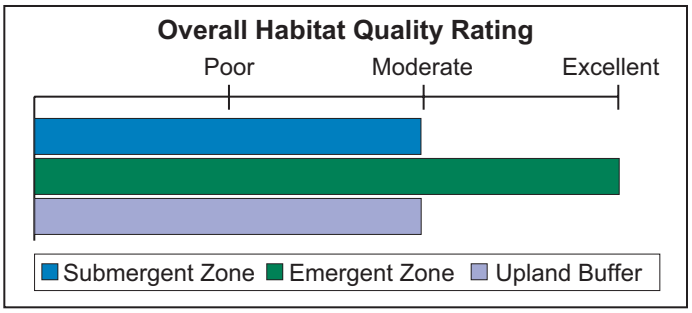


Habitat Monitoring—Lac Lavon is rated moderate for submergent vegetative quality due to an average number of native species and high density of exotic plants, which is somewhat countered by an average overall native plant density. Both Eurasian watermilfoil and curlyleaf pondweed—two aggressive, nonnative species—were documented in 2004–2006. The emergent zone is rated excellent even though little emergent vegetation is present (<5 percent total areal coverage) due to the maintenance of sand beaches and riprap walls by many lakeshore owners. The upland buffer is rated poor because it is dominated by manicured lawns, which provide little or no wildlife habitat. ***Critical Actions***—Continue to control curlyleaf pondweed and Eurasian watermilfoil to allow native species to flourish.

Orchard Lake

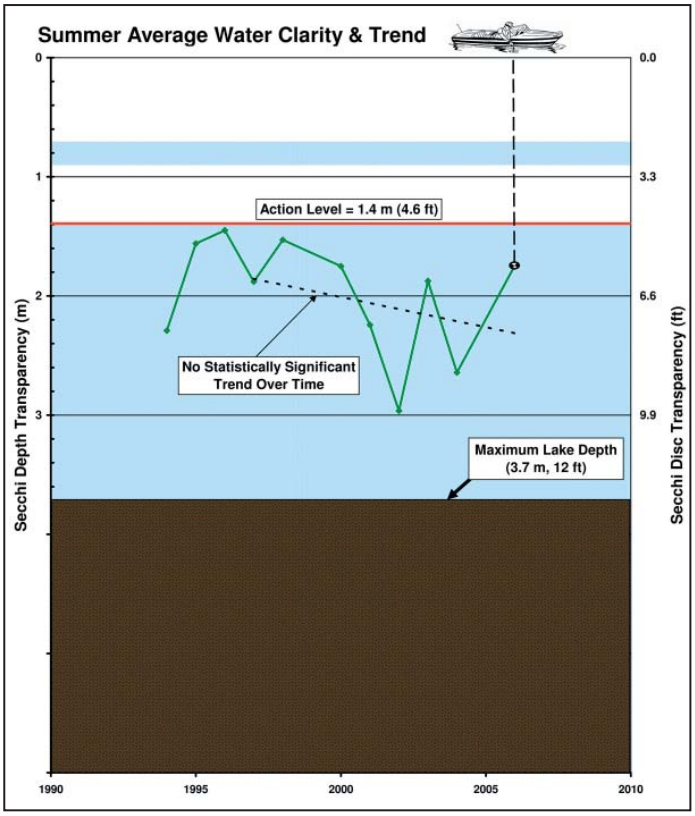


Water Quality Monitoring—Management level monitoring was performed in 2006. Lake management actions for Orchard Lake have already been taken, including completion of a diagnostic feasibility study, completion of a lake management plan, and implementation of best management practices, such as harvesting of curlyleaf pondweed in 2006.

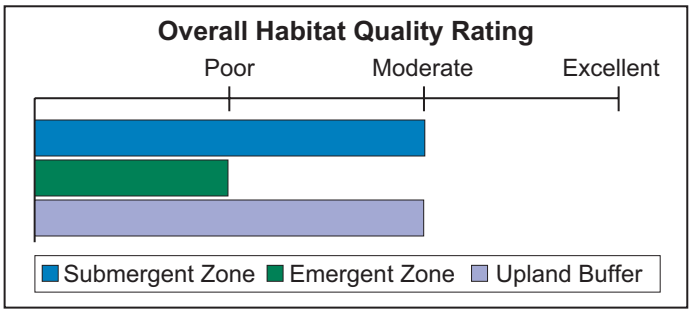


Habitat Monitoring—The submergent zone of Orchard Lake has 13 native species although it is dominated by curlyleaf pondweed during early summer, resulting in a moderate rating for overall quality. Exotic species make up 26–50% of the emergent zone vegetation, but 18 native species are also present. The upland buffer provides little wildlife benefit; it is very narrow, surrounds less than half the lake, and is dominated by exotic species. ***Critical Actions***—Continue to control curlyleaf pondweed, which could increase functions and values for water quality, wildlife habitat, vegetative diversity, aesthetics, and recreation.

Sunset Pond



Water Quality Monitoring—Water quality sampling resumed in 2006; the BDWMO will continue monitoring the water quality of Sunset Pond.



Habitat Monitoring—Sunset Pond is rated moderate for submergent vegetation due to an average vegetative occurrence, an average number of native species, and an average exotic plant density. The upland buffer does a good job of protecting water quality based on its good vegetative cover, the continuity of the buffer, and the relatively low density of exotic species. However, the presence of lawn grasses and many weed species contributes to the degraded value for wildlife. The overall emergent vegetation zone quality is rated poor for Sunset Pond, primarily due to the dominance of 3 exotic species covering 76–100% of the emergent vegetation zone. ***Critical Actions***—Control the influx of sediment and nutrients into Sunset Pond. Manage the upland buffer and monitor curlyleaf pondweed. Consider the creation of a "fish navigating channel."

Black Dog

Watershed Management Organization

Board of Commissioners

Representing Burnsville:
Roger Baldwin, Chair
Loren Knott, Commissioner
John Oravis, Treasurer/Secretary
Tom Harmening, Alternate

Representing Apple Valley and Eagan:
Mary Hamann-Roland, Vice Chair
Stephen David, Alternate

Representing Lakeville and Savage:
John Berg, Commissioner
David Luick, Alternate

Engineering Consultant:
Jim Langseth, Barr Engineering Co.
Karen Chandler, 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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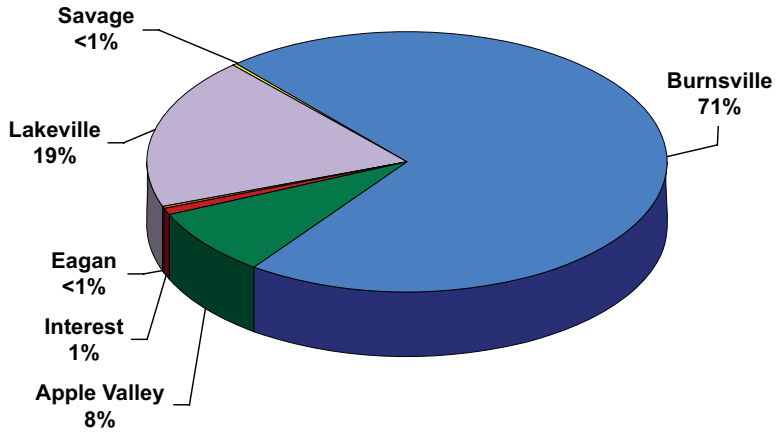
Black Dog WMO
City of Burnsville
13713 Frontier Court
Burnsville, MN 55337
Telephone: 952-895-4505
Fax: 952-895-4531

Website: www.dakotacountyswcd.org/watersheds/blackdogwmo

2007 Budget

Engineering Fees	$22,000
Legal and Audit Fees	$7,200
Administrative Services	$11,000
Public Education	$6,600
Insurance	$3,000
Training	$500
Water Quality Monitoring	$18,200
Monitoring and Operation of Crystal and Keller Lakes Ferric Chloride Dosing System	$57,000
Contingency	$5,500
Total	**$131,000**

2007 Income



2007 Expenditures