

Published March 2005

### What is the Black Dog Watershed Management Organization?

The Black Dog Watershed Management Organization (BDWMO) is active in management of surface water located in the Black Dog and Credit River watersheds within Dakota County. The Black Dog Watershed Management Organization (BDWMO) is made up of the five cities having territory within the Black Dog watershed.

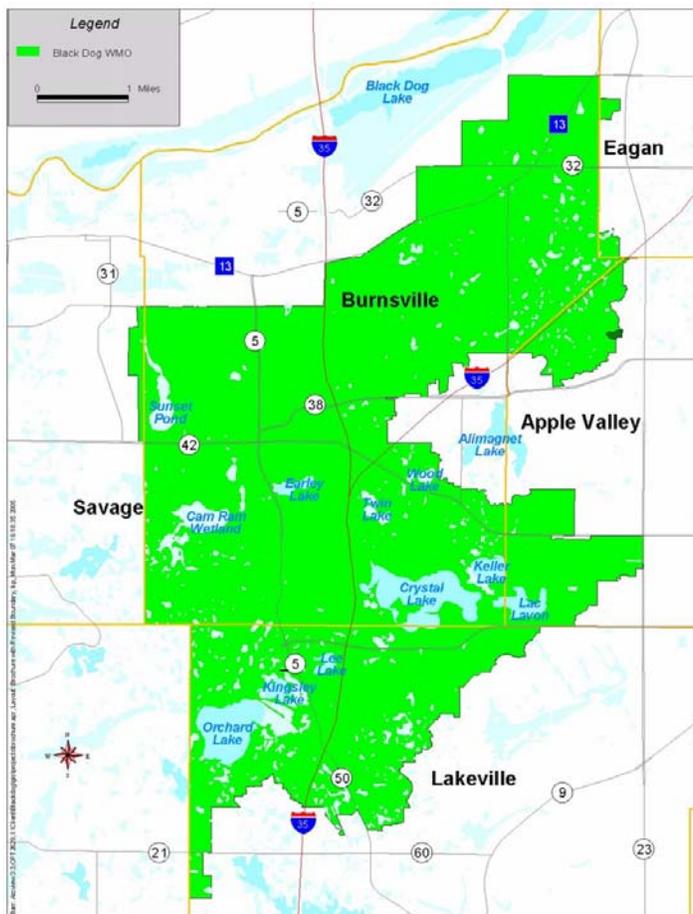
The total area within the Black Dog watershed is 17,730 acres; 72% of the Black Dog watershed area lies within the city of Burnsville, 19% of the area is within the city of Lakeville, and 8% is within the city of Apple Valley. The cities of Eagan and Savage have less than 1% of the drainage area inside their municipal boundaries.

Objectives of the BDWMO include assisting member cities in proper management of surface water runoff, developing and implementing plans that address water quality issues, and responding to drainage issues that transcend municipal boundaries. The BDWMO is represented by commissioners who are appointed by the cities within the watershed.

### Evaluation and Accountability

The BDWMO watershed management plan calls for the WMO and its member cities to identify outcome-based goals for specific resources, and to meet annually to discuss progress. 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 schedule implementation tasks.
- Habitat Quality Analysis—The BDWMO collects habitat quality data to detect changes that would trigger a need for management actions.



The Black Dog WMO Boundaries

### The BDWMO's Mission

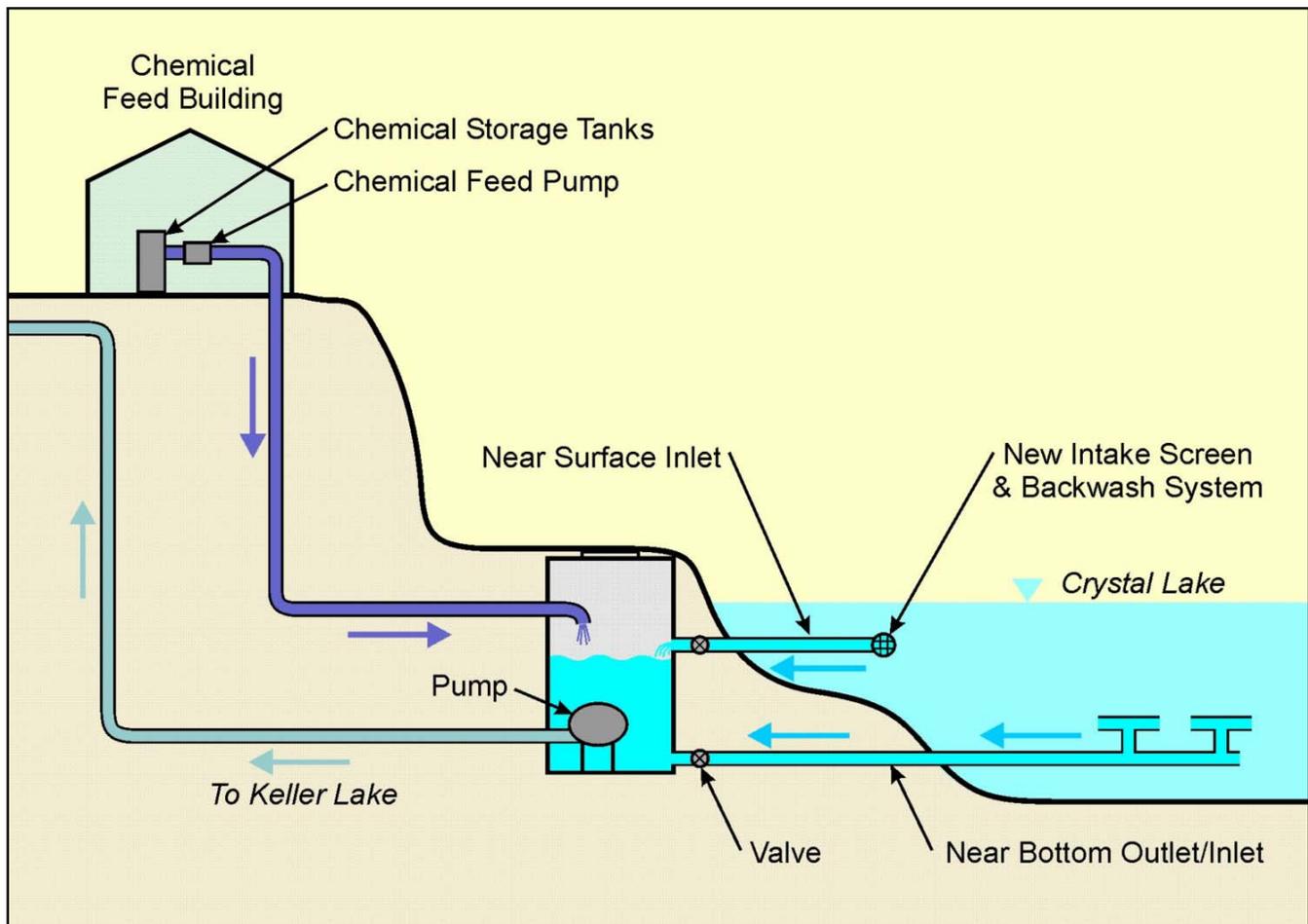
*Provide leadership in the management and stewardship of the water resources in northwestern Dakota County, Minnesota through the cooperation of five cities and the involvement of local stakeholders*

## Ferric Chloride Treatment System Resumed Operation in 2004

As part of the BDWMO implementation program to improve the water quality of Crystal and Keller Lakes, the BDWMO resumed operation of the ferric chloride treatment system. The ferric chloride system began operation in 1997, but its operation was halted in 1999 because of odor-generation problems associated with the withdrawal of deep zone waters. The system was reconfigured in 2003 and a near-surface inlet was added to avoid the odor problems. 2004 was the first year of full, continuous operation of the system, in near-surface withdrawal mode, following the addition of an intake screen and backwash system to prevent system clogging by lake weeds that are abundant each summer.

The system operated for approximately eight months in 2004. Over the course of that time, the amount of iron discharged into Keller Lake dramatically reduced the lake's phosphorus concentration. Keller Lake also experienced a significant reduction in the abundance of curlyleaf pondweed, an exotic, invasive aquatic plant, which may have been the result of the iron in the water.

The BDWMO will continue to operate the ferric chloride treatment system in 2005, and will analyze the impacts on Crystal and Keller Lakes.



**How the system works:** Water is pumped from Crystal Lake, dosed with ferric chloride, and discharged to a storm sewer that empties into Keller Lake. Phosphorus attaches to the ferric chloride, which settles out of the water, resulting in removal of phosphorus from the lake.

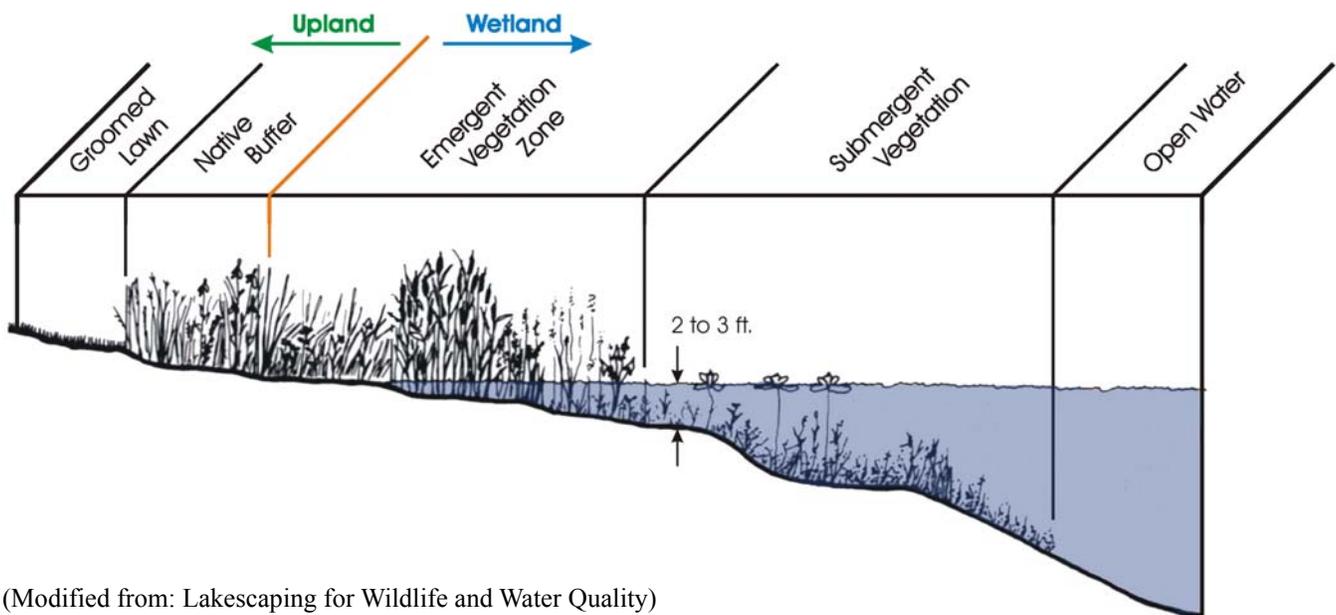
# BDWMO Monitoring of Strategic Water Bodies Guides Management Actions

The BDWMO monitors both the habitat quality and water quality of strategic water bodies in the watershed.

## 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. 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.



## Water Quality Monitoring Program

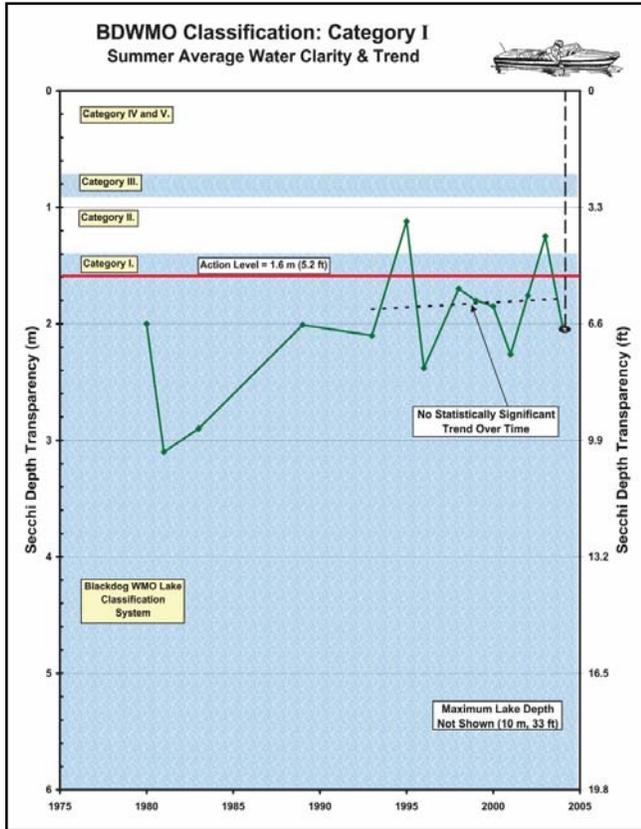
The BDWMO and member cities participate in the Metropolitan Council's Citizen Assisted Monitoring Program (CAMP). This program provides a low-cost means for measuring water quality on an approximately bi-weekly basis from spring through fall. In addition, BDWMO periodically undertakes more detailed monitoring 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. One measure of water quality is Secchi disc transparency. A Secchi disc is a black and white disc that is lowered into the water until it cannot be seen. The depth at which it is no longer visible is called the Secchi depth. The water transparency, or Secchi depth, is dependent on the density of suspended materials in the water. The following graphs show the historic Secchi disc transparencies through 2004.

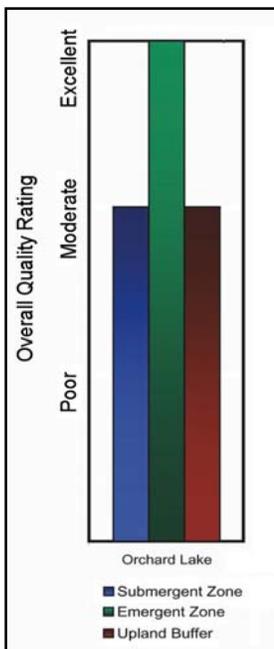
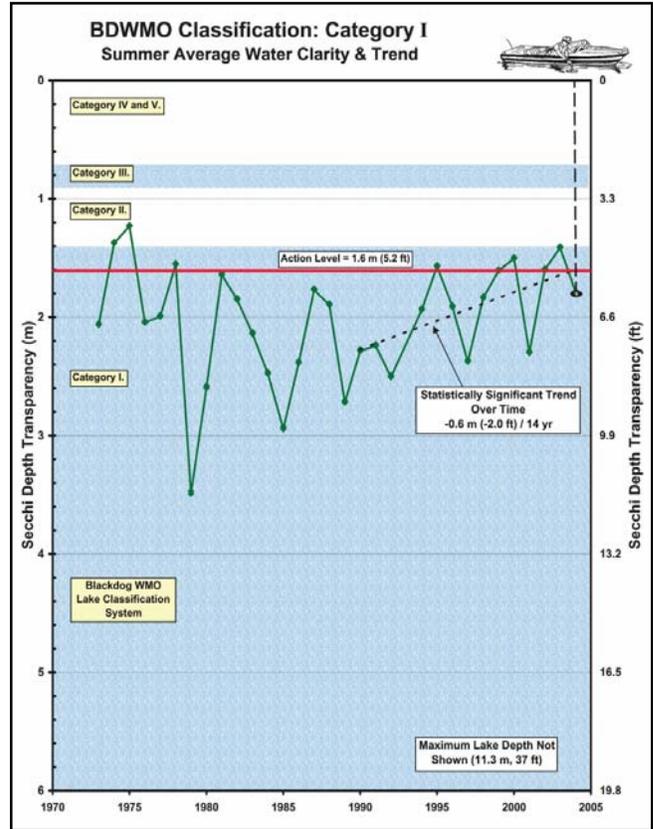
Depending on the relationship between current Secchi disc readings, the water quality trend and the action level, certain water quality management actions will be required. Such actions include more intensive lake monitoring, preparation of diagnostic feasibility studies, etc.

# Summaries of Water Body Monitoring Programs

## Orchard Lake



## Crystal Lake

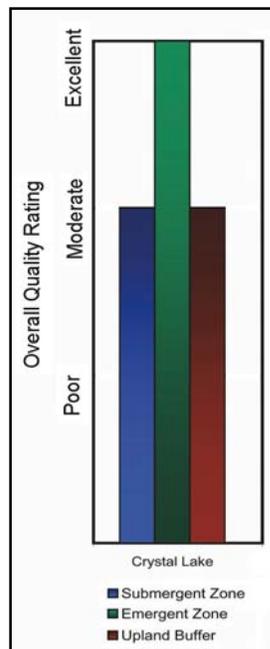


### Water Quality Monitoring

—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. More intensive monitoring will occur in 2005.

**Habitat Monitoring**—The submergent zone of Orchard Lake boasts 13 native species although it is dominated by curlyleaf pondweed, resulting in a moderate rating for overall quality.

The emergent zone is covered by nearly an equal coverage of exotic (5) and native species (17). 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 to allow native species to flourish.



### Water Quality Monitoring

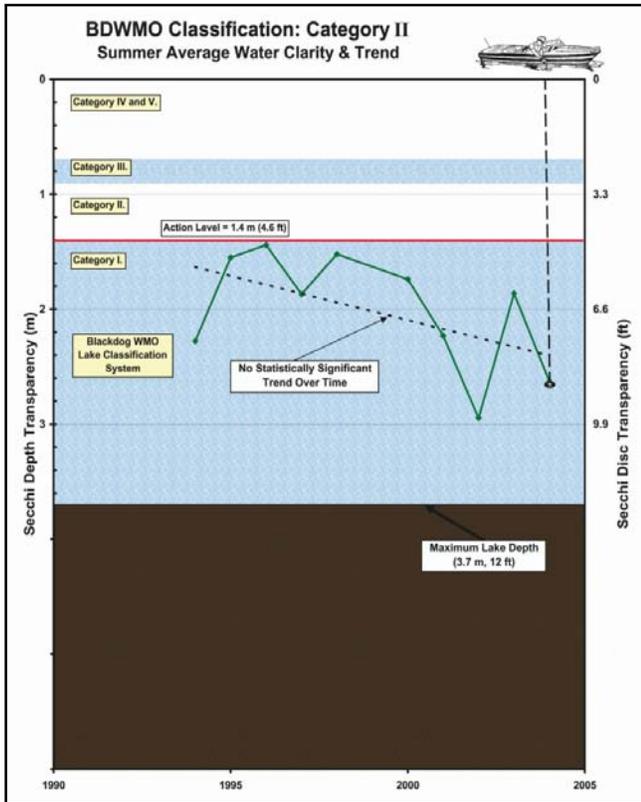
—The diagnostic-feasibility study completed for Crystal Lake (and Keller Lake) focused on ways to achieve the BDWMO's water quality goals for both lakes. The BDWMO and member cities are implementing the best management practices recommended in the study (see table, pg. 7).

### Habitat Monitoring

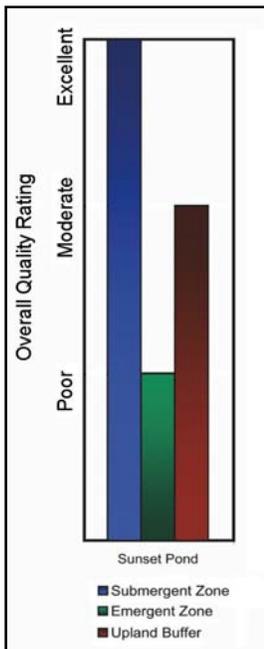
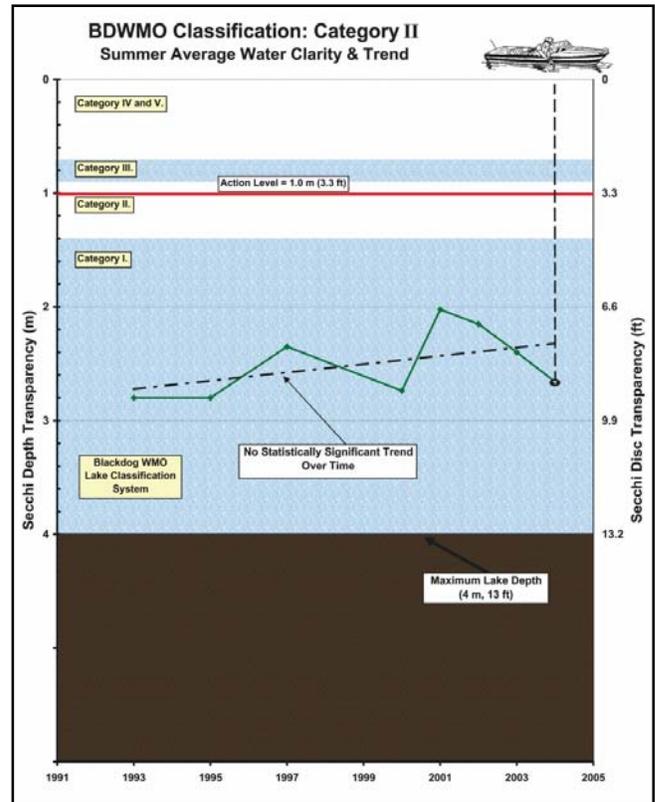
—Crystal Lake has moderate quality submergent vegetation due to good plant diversity and density.

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 monitoring exotic species and continue control programs.

## Sunset Pond



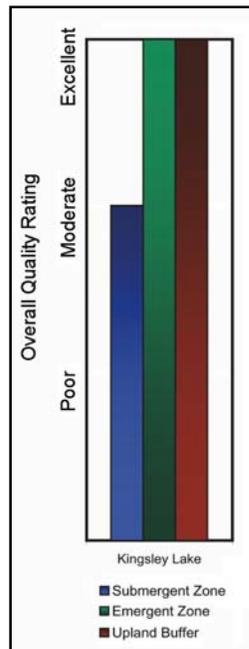
## Kingsley Lake



**Water Quality Monitoring**—The BDWMO will continue to monitor the water quality of Sunset Pond.

**Habitat Monitoring**—Sunset Pond is rated excellent for overall submergent vegetation due to good overall vegetative density, a fairly high number of native species (11), and no observed exotic species. The upland buffer does a good job of protecting the water quality of the pond due to 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 three exotic species covering 50 to 75 percent of the emergent vegetation zone. **Critical Actions**—The removal of sediment from the southeast portion of the pond and controlling the influx of sediment and nutrients into the pond in the future.

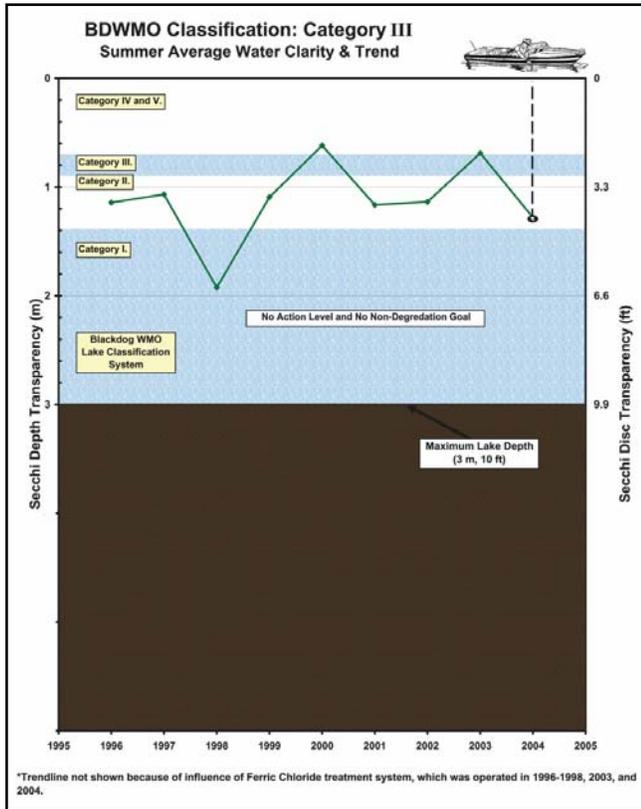


**Water Quality Monitoring**—The BDWMO will continue to monitor the water quality of Kingsley Lake.

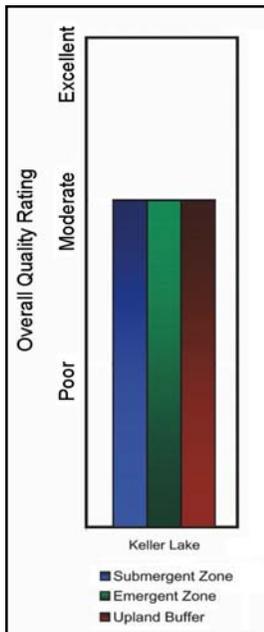
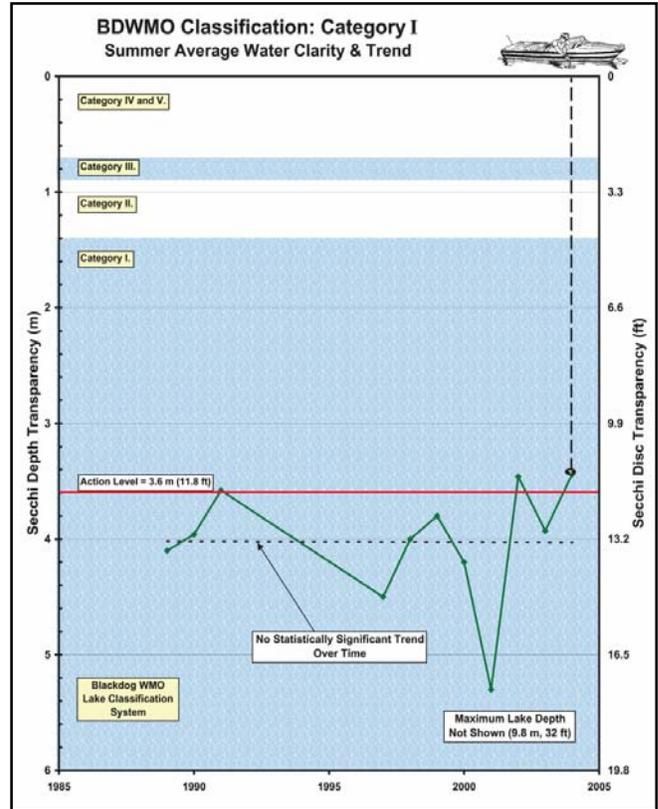
**Habitat Monitoring**—Very few exotic species were observed within the submergent and emergent vegetation zones within Kingsley Lake. The emergent zone is rated excellent for overall quality due to a dominance of diverse native plant species and limited coverage of exotic species. The upland buffer also has a relatively small number and coverage of exotic species, but common buckthorn is

dominant in certain areas around the lake. **Critical Actions**—Evaluate the extent of common buckthorn, followed by removal of the shrubs. Control purple loosestrife and reed canary grass in the emergent zone. (Control of exotic species is easiest and most effective when their densities are limited, as they are now).

## Keller Lake



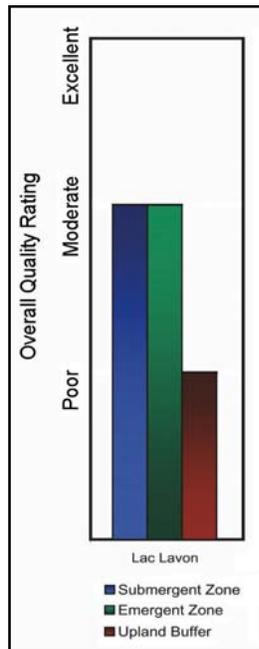
## Lac Lavon



**Water Quality Monitoring**—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, pg. 7).

**Habitat Monitoring**—The submergent vegetation within Keller Lake is limited to only five native species and a reduced density of curlyleaf pondweed from

2003, resulting in moderate submergent zone quality. The emergent zone is rated moderate due to the dominance of cattails and reed canary grass with only six 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**—Increase the connectivity and width of a native upland buffer and emergent community around the lake fringe.



**Water Quality Monitoring**—Lac Lavon has excellent water quality, although it has recently experienced summer average 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 the emergent and submergent zones. The moderate submergent zone rating is primarily due to past herbicide treatments to control Eurasian watermilfoil. Low plant densities reduce wildlife benefits because it becomes

difficult for wildlife to find suitable habitat and food. In addition, both Eurasian watermilfoil and curlyleaf pondweed—two aggressive, non-native species—were documented in 2004. The upland buffer is rated poor because it is dominated by manicured lawns, which provide little or no wildlife habitat. **Critical Actions**—Continue to manage Eurasian watermilfoil and curlyleaf pondweed and establish more extensive unmanicured, native upland buffer areas.

## Black Dog Watershed Management Organization Implementation Program—Water Quality Improvement of Crystal and Keller Lakes

Based on the recommendations in the Crystal and Keller Lakes Use Attainability Analysis, the BDWMO developed an implementation program to improve the water quality of Crystal and Keller Lakes. The table below summarizes the implementation program—it provides a cost estimate, proposed year of implementation, and proposed financing method for each element of the program.

**Recommended Implementation Program to Improve Water Quality of Crystal and Keller Lakes**

Implementation Program Elements	Implementation Date	Capital Cost	Annual Operation & Maintenance Cost	Proposed Funding Source
1 Phosphorus Fertilizer Limitation	2003 & ongoing	\$0	\$0	n/a
2 Excavate and Enhance Redwood Pond	2005	\$105,315	\$843	City of Apple Valley
3 Add Two Regional Infiltration Basins				
3a Regional Infiltration Basin Located North of Valley Middle School	2005	\$48,899	\$416	City of Apple Valley
3b Regional Infiltration Basin Located in West Buckhill Park	2005	\$97,000	\$776	City of Burnsville & Black Dog WMO (\$32,000 Metropolitan Council MetroEnvironment Partnership Grant)
4 Upgrade Select Existing Ponds to NURP Design Criteria				
4a 153rd St. Pond (Just South of Old Kmart) - Enlarge and Excavate	2007	\$52,728	\$422	City of Apple Valley
4b North of the Intersection of Southcross Drive and Keller Lake Drive - Excavate	2005	\$13,755	\$110	City of Burnsville
4c Keller Lake Park Pond - Excavate	2005	\$45,850	\$367	City of Burnsville
4d Northeast Edge of Keller Lake - Excavate	2005	\$18,340	\$147	City of Burnsville
4e Bluebill Pond - Excavate	2005	\$41,265	\$330	City of Lakeville
5 Add a Regional Water Quality Treatment Pond at the Southeast Corner of Keller Lake	2006	\$462,000	\$3,696	City of Apple Valley
6 Resume Operation of Ferric Chloride (FeCl <sub>3</sub> ) Treatment System in Near-Surface Withdrawal Mode	2003 & ongoing	\$13,125	\$36,520	Black Dog Watershed Management Organization
7 Mechanical Harvesting of Curlyleaf Pondweed in Crystal Lake	2003 & ongoing	\$0	\$54,600	Lakeshore Homeowners, City of Burnsville, & City of Lakeville
8 Mechanical Harvesting of Curlyleaf Pondweed in Keller Lake	2004 & ongoing	\$0	\$14,359	Lakeshore Homeowners, City of Apple Valley, & City of Burnsville
<b>Total</b>		<b>\$898,277</b>	<b>\$112,586</b>	

If all of the recommended implementation program elements are implemented, the Crystal and Keller Lakes Use Attainability Analysis 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).

For more information go to [www.dakotacountyswcd.org/watersheds/blackdogwmo](http://www.dakotacountyswcd.org/watersheds/blackdogwmo)

# Black Dog

Watershed Management Organization

**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  
 Karen Chandler  
 Barr Engineering Company

**Legal Consultant:**

Roger Knutson  
 Campbell Knutson, P.A.

**For more information, please contact:**

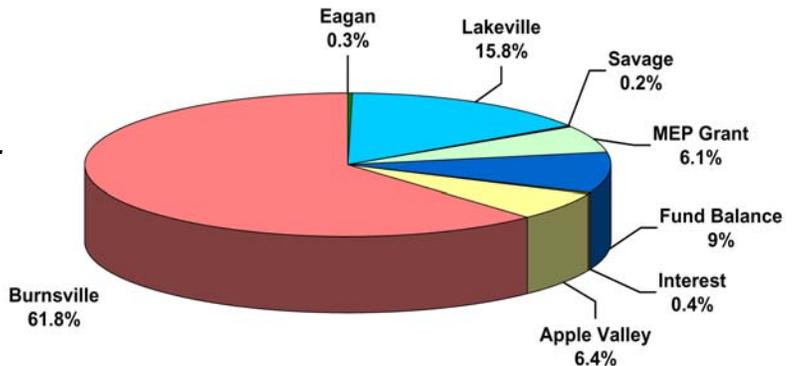
Terry Schultz, Administrator  
 Black Dog Watershed Management Organization  
 City of Burnsville  
 13713 Frontier Court  
 Burnsville, MN 55337  
 952-895-4505 (phone) • 952-895-4531 (fax)

**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.**

**2005 Budget**

Engineering Fees .....	\$21,000
Legal and Audit Fees .....	\$6,700
Administrative Services .....	\$11,000
Public Information .....	\$7,700
Insurance .....	\$3,000
Training .....	\$500
Water Quality Monitoring .....	\$15,700
Special Projects (Management-Level Monitoring of Orchard Lake and Complete West Buck Hill Project in Burnsville) .....	\$9,800
Monitoring and Operation of Crystal/Keller Lake Ferric Chloride Dosing System .....	\$48,000
Contingency .....	\$4,300
<b>Total .....</b>	<b>\$127,700</b>

**2005 Income**



**2005 Expenditures**

