

3.0 Basin and Watershed Characteristics

3.1 Basin Characteristics

3.1.1 Crystal Lake

Crystal Lake, located in the cities of Burnsville and Lakeville (Dakota County), covers an area of approximately 292 acres, consisting of five basins: Bluebill Bay, Mystic Bay, Maple Island Bay, Buckhill Bay, and the main lake basin (Figure 3-1). The lake outlet is located at the northwest end of the lake in Buckhill Bay, and consists of a box weir with an overflow elevation of 933.5. Overall, the lake has 5.3 miles of shoreline and a mean depth of 10 feet. The area of the lake shallow enough for aquatic plants to grow (the littoral zone) is approximately 208 acres. Maple Island Bay is the smallest bay with respect to surface area and volume (see Table 3-1). This bay has a small tributary watershed area and receives very little direct storm sewer inflows. Mystic Bay on the other hand has a major storm sewer inflow, which conveys significant quantities of runoff to the bay, along the southwest shore. Bluebill, Mystic, and Maple Island Bays all discharge to the main lake basin. The main lake basin discharges to the north end of Buckhill Bay, which in turn discharges through the weir outlet structure.

Table 3-1 Crystal Lake Morphometry

Characteristic	Bluebill Bay	Mystic Bay	Maple Island Bay	Buckhill Bay	Main Lake Basin	Whole Lake
Lake MDNR ID	--	--	--	--	--	19-0027
Normal Water Level (NWL)	933.5	933.5	933.5	933.5	933.5	933.5
Surface Area (acres)	40.3	39.8	3.7	21.9	186.6	292.3
Mean Depth (feet)	3.1	4	3.8	4.5	13.4	10
Maximum Depth (feet)	7	7	7	8	38	38
Volume (below the NWL) (acre-feet)	126.3	159.7	13.9	98.9	2531.8	2930.6
Stratified Conditions	Not Observed	Not Observed	Not Observed	Not Observed	Yes	Yes
Watershed Area (acres)*	417.6	1,256.5	19.6	144.1	1,532.0**	3,369.8**

* Excludes basin water surface area.

** Includes the Keller Lake tributary watershed and lake water surface areas but excludes Lac Lavon watershed because it is landlocked.

3.1.2 Keller Lake

Keller Lake, located in both the cities of Burnsville and Apple Valley, covers an area of about 54.7 acres. Keller Lake, has a 1,387-acre immediate watershed (excluding the 54.7 acres of lake water surface area depicted in the 2000 aerial photos at 933.7 feet mean sea level), an approximate maximum depth of 7 feet, storage volume below its outlet of 203 acre-feet and a mean depth of 3.7 feet (see Table 3-2). Because the lake is so shallow, aquatic plants can grow over the entire lake bed and a summer thermocline is not usually present. The lake may also be subject to intermittent wind mixing. The Keller Lake watershed was divided into subwatershed areas (also shown on Figure 3-1) to facilitate hydrologic and phosphorus modeling. Stormwater currently discharges over a weir structure, at Elevation 933.7, and through a 72-inch RCP arch to Crystal Lake.

Table 3-2 Keller Lake Morphometry

Characteristic	Whole Lake
Lake MDNR ID	19-0025
Normal Water Level (NWL)	933.7
Surface Area (acres)	54.7
Mean Depth (feet)	3.7
Maximum Depth (feet)	7
Volume (below the NWL) (acre-feet)	202.9
Stratified Conditions	Not Observed
Watershed Area (acres)*	1,387.2

* Excludes basin water surface area.

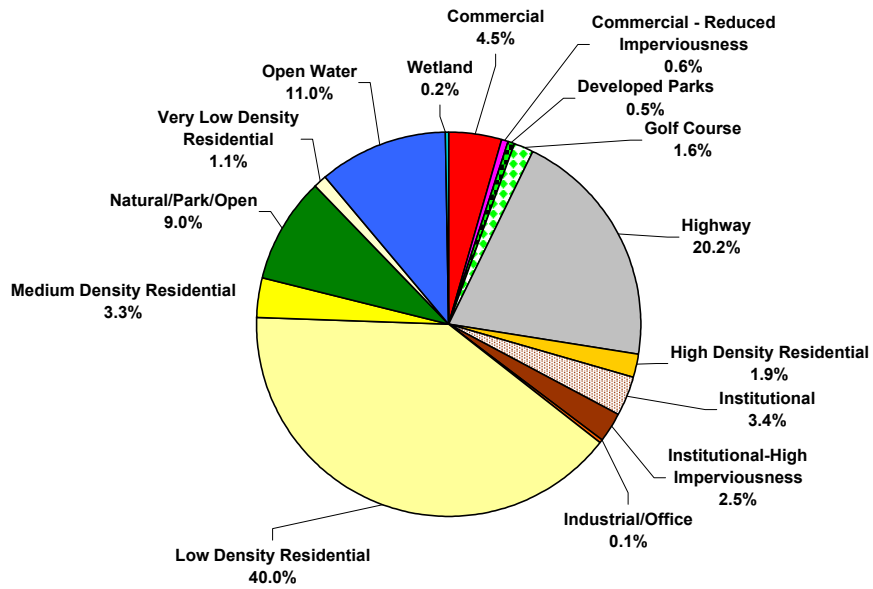
3.2 Watershed Characteristics

The Crystal Lake watershed consists of 3,662.1 acres (including lake surface areas but excluding Lac Lavon's surface area and its watershed). Runoff from the watershed enters the lake from overland flow, storm sewer outfalls, and culverts at various points along the lakeshore. Existing (2002) and full-development land use patterns within the watershed were identified for the purpose of predicting changes in runoff volumes and annual phosphorus loads before and after development (Figures 3-2 and 3-3).

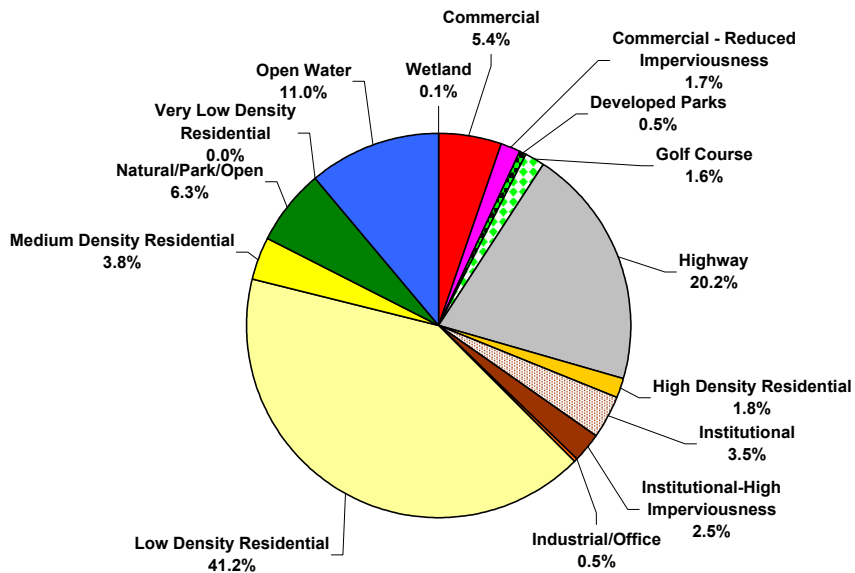
Figure 3-1 Crystal and Keller Lake Watersheds (1.8 MB)

Figure 3-2 Crystal and Keller Lake Watersheds: Existing and Full Development Land Use (3.5 MB)

**Crystal Lake Watershed (3,662 acres including lake surface)
Existing Land Use**



**Crystal Lake Watershed (3,662 acres including lake surface)
Full Development (Ultimate) Land Use**



**Figure 3-3
Crystal Lake Watershed: Existing and Full
Development Land Uses**

Existing (2002) land use conditions were determined using 2000 Metropolitan Council aerial photographs and land use information from the various cities, which was updated to reflect changes in land use that have occurred between 2000 and the spring of 2002. The existing land use conditions are summarized in Table 3-3a.

Full-development land use conditions were determined from the City of Burnsville's, Apple Valley's and Lakeville's planning and zoning GIS databases. Because the cities are committed to preserving all wetlands within the municipal boundaries, all wetlands present during 2002 were assumed to be preserved under full-development conditions. Full-development land use conditions are summarized in Table 3-3b.

The Crystal Lake watershed was divided into six "drainage districts" and numerous smaller subwatershed areas to facilitate hydrologic and phosphorus modeling. The six drainage districts are defined based on the receiving waterbody, two lake basins (Crystal or Keller) and the four Crystal Lake bays (Bluebill, Mystic, Maple Island, and Buckhill). Stormwater and phosphorus contributed to the lake from each drainage district was estimated. Stormwater from approximately 74 percent (roughly 877 acres) of the study area currently drains through some form of wet detention before it enters either Keller or Crystal Lake. Each district is described below:

- **Keller Lake Drainage District**—This 1,387-acre drainage district (excluding the 54.7-acre Keller Lake surface area) represents roughly 40 percent of the Crystal Lake watershed. Runoff from this district enters Keller Lake prior to being conveyed to the northeast corner of Crystal Lake through a 72-inch RCP arch. Roughly 44 percent of this drainage district (629 acres) is within the City of Burnsville while the remaining area is within the City of Apple Valley (see Table 3-4). Because of the timing of their development the cities of Burnsville and Apple Valley were allowed to use Keller Lake for stormwater detention and water quality treatment. As a result, runoff from roughly 644 acres (46 percent) of this drainage district enters Keller Lake without first passing through some form of wet detention for water quality treatment. Nearly the entire drainage district is developed, with the majority of the land use being low-density residential (53 percent), with some roadway right-of-way (ROW) (21 percent), institutional (7 percent), commercial (4 percent), park/open space (9 percent), and higher-density residential (2 percent) uses. There is also a large wetland area adjacent to the southwest side of Keller Lake.

Table 3-3a. Crystal Lake -- Existing (2002) Land Use Conditions

Subwatershed Name	Land Use (acres)															TOTAL
	Commercial	Commercial - Reduced Imperviousness	Developed Parks	Golf Course	Highway	High Density Residential	Institutional	Institutional-High Imperviousness	Industrial/ Office	Low Density Residential	Medium Density Residential	Natural/Park /Open	Very Low Density Residential	Open Water	Wetland	
A1	1.6	0.0	0.0	0.0	36.9	0.0	28.3	0.0	0.0	123.6	0.9	14.9	0.0	1.8	0.0	208.0
A12a	0.0	0.0	0.0	0.0	3.4	0.0	2.9	0.0	0.0	4.6	0.0	1.4	0.0	0.7	0.0	13.0
A13a	9.8	0.0	0.0	4.9	41.5	36.8	3.7	0.0	0.0	69.2	0.0	26.2	2.2	0.0	0.0	194.3
A13b	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.0	8.6	0.0	0.3	10.1	0.0	0.0	23.7
A13b-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.5	0.0	0.0	0.0	4.7
A13b-3	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	3.7	0.0	0.8	0.0	0.0	0.0	5.1
A2	0.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	76.5	0.0	10.2	0.0	0.0	0.0	108.7
A22a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	1.0	0.0	3.6
A22b	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.8	1.7	11.1	0.0	6.1	0.0	21.3
A22c	66.7	0.0	0.0	0.0	27.7	4.6	2.1	0.0	0.0	0.5	0.0	6.2	0.0	0.0	0.0	107.8
A22c-1	0.5	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	7.0
A23	0.0	0.0	0.0	0.0	6.5	0.0	2.3	0.0	0.0	9.3	12.3	1.4	0.0	0.0	0.0	31.8
A24a	0.0	0.0	2.0	0.0	3.7	0.0	0.0	0.0	0.0	26.6	0.0	6.5	0.0	185.0	0.0	223.7
A24b	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	64.5	7.3	1.1	0.0	42.9	0.0	136.8
A24c	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	4.5	0.0	23.4
A3	10.3	0.0	0.0	0.0	14.1	11.8	1.6	0.0	0.0	16.4	0.0	2.9	0.0	1.4	0.0	58.4
A35	0.3	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.1	0.0	6.3
A36	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.2	0.0	5.6
A37-38	0.1	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.1	0.0	11.4
A39a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.5	0.0	1.9
A39b	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.5	0.0	7.2
A40	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0	12.1
A41a	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	9.2	0.0	0.0	0.0	0.4	0.0	10.8
A41b	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.9
A46a	0.0	0.0	0.0	0.0	13.4	0.0	4.4	8.6	0.0	19.4	0.0	0.0	0.0	1.0	0.0	46.8
A46b	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	2.4	0.0	0.0	0.0	0.5	0.0	4.6
A46c	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.3	0.0	4.6
A46d	0.0	0.0	0.0	0.0	1.9	0.0	0.3	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	5.1
A6a	0.0	0.0	0.0	0.0	26.4	0.9	0.0	0.7	0.0	54.7	6.6	9.1	0.0	3.2	0.0	101.5
A6b	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.5	0.0	9.2	0.0	0.0	0.0	11.8
A6c	0.0	0.0	0.0	0.0	12.6	8.5	3.9	0.0	0.0	23.2	0.0	0.0	0.0	0.0	0.0	48.1
A7a	1.5	0.1	8.1	0.0	94.6	0.0	40.0	0.0	0.0	264.1	17.5	67.3	0.0	58.0	0.0	551.2
A7b	0.0	0.0	0.0	0.0	36.7	0.0	0.0	0.0	0.0	106.9	0.0	3.5	0.0	0.0	0.0	147.1
A7c	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0	1.0	0.0	21.8
BBBay	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	30.5	0.0	0.9	0.0	42.7	0.0	80.5
BHBay	0.0	0.0	0.0	0.0	0.4	0.0	4.0	0.0	0.0	0.0	0.0	21.8	0.0	21.4	0.0	47.6
CL-10	21.8	0.1	0.0	0.0	29.4	5.8	0.0	4.0	0.0	23.8	0.3	7.8	0.2	0.0	0.0	93.2
CL-11a	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	5.1	0.0	9.0	0.0	0.0	0.0	15.6
CL-12a	11.4	0.0	0.0	0.0	39.5	0.0	0.0	4.8	0.0	33.0	0.0	5.8	0.6	23.1	4.8	123.0
CL-12a-1	0.0	0.0	0.0	0.0	2.2	0.0	0.0	11.4	0.0	0.0	0.0	2.3	0.0	0.0	0.0	16.0
CL-13a	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	7.1	0.0	1.6	0.0	1.1	0.0	14.1
CL-13b	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	9.2	0.0	0.1	5.3	0.0	0.0	20.7
CL-13c	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	4.0	0.0	0.6	0.0	0.0	0.0	5.7
CL-13d	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	5.5
CL-13e	0.0	0.0	0.0	0.0	5.2	0.0	2.0	0.0	0.0	7.4	0.0	0.0	0.0	0.0	0.0	14.6
CL-13f	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.3	0.0	0.0	4.0	0.6	0.0	6.2
CL-15	0.0	0.0	0.0	0.0	16.5	0.0	0.0	1.3	0.0	36.8	32.2	0.6	1.0	0.0	0.0	88.4
CL-16	0.0	0.0	0.0	0.0	1.6	0.0	0.0	31.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	33.5
CL-18	0.0	0.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0	71.4	0.0	12.7	7.5	0.0	2.4	114.4
CL-19	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	8.3	0.1	8.2	1.0	0.0	0.0	19.5
CL-20a	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.8	0.2	0.3	0.0	0.0	0.0	3.4
CL-20b	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.5	0.0	1.3	0.0	0.0	0.0	3.0
CL-20c	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	7.3
CL-20d	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	4.1
CL-20e	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.8
CL-21	2.3	0.0	0.0	1.9	40.6	0.0	19.4	0.9	0.0	46.2	6.9	8.6	0.4	0.0	0.0	127.3

Subwatershed Name	Land Use (acres)															
	Commercial	Commercial - Reduced Imperviousness	Developed Parks	Golf Course	Highway	High Density Residential	Institutional	Institutional-High Imperviousness	Industrial/ Office	Low Density Residential	Medium Density Residential	Natural/Park /Open	Very Low Density Residential	Open Water	Wetland	TOTAL
CL-23	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	6.4	0.6	0.7	0.0	0.0	0.0	9.4
CL-25	0.0	0.0	0.0	24.4	1.9	0.0	2.6	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	30.2
CL-26Aa	0.0	0.0	0.0	0.0	0.8	0.0	0.0	11.5	0.0	0.6	0.0	0.0	0.0	0.0	0.0	12.8
CL-26Ab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
CL-29a	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	4.5
CL-29b	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.1	4.9	0.0	0.0	0.0	0.0	6.3
CL-29c	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2
CL-29d	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	2.3	4.7	0.1	6.6	0.0	0.0	20.3
CL-2a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.9	0.0	2.8	0.0	10.5
CL-2b	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	6.2	0.0	0.7	0.0	0.8	0.0	10.2
CL-2c	0.0	5.6	0.0	0.0	12.0	0.0	0.0	0.0	0.0	3.4	6.7	13.4	0.0	1.3	0.0	42.4
CL-30	0.0	0.0	0.0	13.3	13.0	0.0	0.0	0.0	0.0	15.7	3.8	0.0	0.0	0.0	0.0	45.9
CL-31-2	0.0	0.0	9.1	0.0	3.2	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	14.0
CL-31a	0.0	0.0	0.0	3.3	1.7	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	13.6
CL-31b	0.0	0.0	0.0	9.9	0.5	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	12.4
CL-31c	0.0	0.0	0.0	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.0
CL-32a	0.0	0.0	0.0	0.0	10.9	0.0	0.0	2.4	0.0	14.4	0.0	0.0	0.0	0.0	0.0	27.7
CL-33a	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	0.0	0.0	28.7
CL-33b	0.0	0.0	0.0	0.0	3.7	0.0	0.0	1.5	0.0	8.0	0.0	0.0	0.0	0.1	0.0	13.3
CL-3A	0.0	0.0	0.0	0.0	16.8	0.0	0.0	0.5	0.0	51.3	5.4	0.3	0.5	0.0	0.0	74.8
CL-3B	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.1	0.0	7.3	0.5	0.4	0.0	0.0	0.0	12.9
CL-4A	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.7	0.0	11.4	0.0	0.0	0.0	13.4
CL-5a	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	5.6	0.0	2.2	0.0	0.0	0.0	9.6
CL-7A1a	0.0	0.0	0.0	0.0	21.4	0.0	0.1	0.0	0.0	0.0	1.7	2.6	0.0	0.0	0.0	25.7
CL-7B	0.0	3.9	0.0	0.0	9.8	0.0	0.0	7.2	0.0	16.7	0.0	11.7	0.0	0.0	0.0	49.2
CL-7Ca	1.0	12.8	0.0	0.0	10.3	0.0	0.0	0.0	3.7	2.6	0.0	13.3	0.0	0.0	0.0	43.6
CL-7Cb	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	0.0	7.3
CL-8	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	15.1	0.0	0.5	0.0	0.0	0.0	20.6
CL-8Aa	0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
WVR-43a	38.0	0.0	0.0	0.0	22.5	0.0	4.8	0.0	0.0	2.0	0.3	0.1	0.0	0.0	0.0	67.7
Total	165.3	22.5	19.2	60.4	739.9	68.3	125.7	92.9	3.7	1,465.2	121.2	328.2	39.7	402.8	7.2	3,662.1
%	4.5%	0.6%	0.5%	1.6%	20.2%	1.9%	3.4%	2.5%	0.1%	40.0%	3.3%	9.0%	1.1%	11.0%	0.2%	100.0%

Table 3-3b. Crystal Lake -- Full Development (Ultimate) Land Use Conditions

Subwatershed Name	Land Use (acres)															TOTAL
	Commercial	Commercial - Reduced Imperviousness	Developed Parks	Golf Course	Highway	High Density Residential	Institutional	Institutional-High Imperviousness	Industrial /Office	Low Density Residential	Medium Density Residential	Natural/Park/Open	Very Low Density Residential	Open Water	Wetland	
A1	1.6	0.0	0.0	0.0	36.9	0.0	28.3	0.0	0.0	123.6	0.9	14.9	0.0	1.8	0.0	208.0
A12a	0.0	0.0	0.0	0.0	3.4	0.0	2.9	0.0	0.0	4.2	0.5	1.4	0.0	0.7	0.0	13.0
A13a	26.5	0.0	0.0	4.9	41.5	36.8	3.7	0.0	0.0	69.2	2.0	9.8	0.0	0.0	0.0	194.3
A13b	3.3	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.0	6.4	9.0	0.3	0.0	0.0	0.0	23.7
A13b-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.9	0.5	0.0	0.0	0.0	4.7
A13b-3	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	1.3	2.4	0.8	0.0	0.0	0.0	5.1
A2	0.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	76.5	0.0	10.2	0.0	0.0	0.0	108.7
A22a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	1.0	0.0	3.6
A22b	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.8	1.7	11.1	0.0	6.1	0.0	21.3
A22c	66.7	0.0	0.0	0.0	27.7	4.6	2.1	0.0	0.0	0.5	0.0	6.2	0.0	0.0	0.0	107.8
A22c-1	3.0	0.0	0.0	0.0	2.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
A23	0.0	0.0	0.0	0.0	6.5	0.0	2.3	0.0	0.0	9.8	12.3	0.9	0.0	0.0	0.0	31.8
A24a	0.0	0.0	2.0	0.0	3.7	0.0	0.0	0.0	0.0	26.6	0.0	6.5	0.0	185.0	0.0	223.7
A24b	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	64.8	7.3	0.8	0.0	42.9	0.0	136.8
A24c	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	4.5	0.0	23.4
A3	10.3	0.0	0.0	0.0	14.1	11.8	1.6	0.0	0.0	16.4	0.0	2.9	0.0	1.4	0.0	58.4
A35	0.3	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.1	0.0	6.3
A36	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.2	0.0	5.6
A37-38	0.1	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.1	0.0	11.4
A39a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.5	0.0	1.9
A39b	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.5	0.0	7.2
A40	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0	12.1
A41a	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	9.2	0.0	0.0	0.0	0.4	0.0	10.8
A41b	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.9
A46a	0.0	0.0	0.0	0.0	13.4	0.0	4.4	8.6	0.0	19.4	0.0	0.0	0.0	1.0	0.0	46.8
A46b	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	2.4	0.0	0.0	0.0	0.5	0.0	4.6
A46c	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.3	0.0	4.6
A46d	0.0	0.0	0.0	0.0	1.9	0.0	0.3	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	5.1
A6a	0.0	0.0	0.0	0.0	26.4	0.9	0.0	0.7	0.0	54.7	6.6	9.1	0.0	3.2	0.0	101.5
A6b	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.5	0.0	9.2	0.0	0.0	0.0	11.8
A6c	0.0	0.0	0.0	0.0	12.6	8.5	5.1	0.0	0.0	21.9	0.0	0.0	0.0	0.0	0.0	48.1
A7a	1.5	0.1	8.1	0.0	94.6	0.0	40.0	0.0	0.0	264.1	17.5	67.3	0.0	58.0	0.0	551.2
A7b	0.0	0.0	0.0	0.0	36.7	0.0	0.0	0.0	0.0	107.0	0.0	3.4	0.0	0.0	0.0	147.1
A7c	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0	1.0	0.0	21.8
BBBay	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	30.5	0.0	0.9	0.0	42.7	0.0	80.5
BHBay	0.0	0.0	0.0	0.0	0.4	0.0	4.0	0.0	0.0	0.0	0.0	21.8	0.0	21.4	0.0	47.6
CL-10	21.8	9.8	0.0	0.0	29.4	0.0	0.0	4.0	0.0	23.8	0.3	3.9	0.2	0.0	0.0	93.2
CL-11a	0.0	8.4	0.0	0.0	1.5	0.0	0.0	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.0	15.6
CL-12a	14.6	6.3	0.0	0.0	39.5	0.0	0.0	4.8	0.0	34.5	0.0	0.2	0.0	23.1	0.0	123.0
CL-12a-1	0.0	0.8	0.0	0.0	2.2	0.0	0.0	11.4	0.0	0.0	0.0	1.5	0.0	0.0	0.0	16.0
CL-13a	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	8.3	0.0	0.4	0.0	1.1	0.0	14.1
CL-13b	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	14.5	0.0	0.1	0.0	0.0	0.0	20.7
CL-13c	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	4.0	0.0	0.6	0.0	0.0	0.0	5.7
CL-13d	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	5.5
CL-13e	0.0	0.0	0.0	0.0	5.2	0.0	2.0	0.0	0.0	7.4	0.0	0.0	0.0	0.0	0.0	14.6
CL-13f	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.6	0.0	6.2
CL-15	0.0	0.0	0.0	0.0	16.5	0.0	0.0	1.3	0.0	38.4	32.2	0.1	0.0	0.0	0.0	88.4
CL-16	0.0	0.0	0.0	0.0	1.6	0.0	0.0	31.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	33.5
CL-18	0.0	0.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0	90.6	0.0	1.0	0.0	0.0	2.4	114.4
CL-19	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	17.5	0.1	0.0	0.0	0.0	0.0	19.5
CL-20a	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.8	0.2	0.3	0.0	0.0	0.0	3.4
CL-20b	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.5	0.0	1.3	0.0	0.0	0.0	3.0
CL-20c	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	7.3
CL-20d	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	4.1
CL-20e	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.8
CL-21	7.6	0.0	0.0	1.9	40.6	0.0	19.4	0.9	0.0	46.6	6.9	3.3	0.0	0.0	0.0	127.3
CL-23	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	6.4	1.3	0.0	0.0	0.0	0.0	9.4
CL-25	0.0	0.0	0.0	24.4	1.9	0.0	2.6	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	30.2
CL-26Aa	0.0	0.0	0.0	0.0	0.8	0.0	0.0	11.5	0.0	0.6	0.0	0.0	0.0	0.0	0.0	12.8

Subwatershed Name	Land Use (acres)															
	Commercial	Commercial - Reduced Imperviousness	Developed Parks	Golf Course	Highway	High Density Residential	Institutional	Institutional-High Imperviousness	Industrial /Office	Low Density Residential	Medium Density Residential	Natural/Park/Open	Very Low Density Residential	Open Water	Wetland	TOTAL
CL-26Ab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
CL-29a	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	4.5
CL-29b	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.1	4.9	0.0	0.0	0.0	0.0	6.3
CL-29c	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.2
CL-29d	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	9.0	4.7	0.0	0.0	0.0	0.0	20.3
CL-2a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	2.9	0.0	2.8	0.0	10.5
CL-2b	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	6.2	0.0	0.7	0.0	0.8	0.0	10.2
CL-2c	0.0	5.6	0.0	0.0	12.0	0.0	0.0	0.0	0.0	3.4	6.7	13.4	0.0	1.3	0.0	42.4
CL-30	0.0	0.0	0.0	13.3	13.0	0.0	0.0	0.0	0.0	15.7	3.8	0.0	0.0	0.0	0.0	45.9
CL-31-2	0.0	0.0	9.1	0.0	3.2	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	14.0
CL-31a	0.0	0.0	0.0	3.3	1.7	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	13.6
CL-31b	0.0	0.0	0.0	9.9	0.5	0.0	0.0	0.0	0.0	2.0	0.1	0.0	0.0	0.0	0.0	12.4
CL-31c	0.0	0.0	0.0	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	3.0
CL-32a	0.0	0.0	0.0	0.0	10.9	0.0	0.0	2.4	0.0	14.4	0.0	0.0	0.0	0.0	0.0	27.7
CL-33a	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	0.0	0.0	28.7
CL-33b	0.0	0.0	0.0	0.0	3.7	0.0	0.0	1.5	0.0	8.0	0.0	0.0	0.0	0.1	0.0	13.3
CL-3A	0.0	0.0	0.0	0.0	16.8	0.0	0.0	0.5	0.0	51.8	5.5	0.2	0.0	0.0	0.0	74.8
CL-3B	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.1	0.0	7.3	0.5	0.4	0.0	0.0	0.0	12.9
CL-4A	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	1.7	0.0	11.4	0.0	0.0	0.0	13.4
CL-5a	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	5.6	0.0	2.2	0.0	0.0	0.0	9.6
CL-7A1a	0.0	0.0	0.0	0.0	21.4	0.0	0.1	0.0	0.0	0.0	1.7	2.6	0.0	0.0	0.0	25.7
CL-7B	0.0	12.1	0.0	0.0	9.8	0.0	0.0	7.2	0.0	16.7	0.0	3.5	0.0	0.0	0.0	49.2
CL-7Ca	1.0	18.0	0.0	0.0	10.3	0.0	0.0	0.0	9.9	2.6	1.7	0.2	0.0	0.0	0.0	43.6
CL-7Cb	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	7.3
CL-8	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	15.1	0.0	0.5	0.0	0.0	0.0	20.6
CL-8Aa	0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
WVR-43a	38.0	0.0	0.0	0.0	22.5	0.0	4.8	0.0	0.0	2.0	0.3	0.1	0.0	0.0	0.0	67.7
Total	196.3	61.1	19.2	60.4	739.9	64.4	126.9	92.9	16.8	1,507.2	140.3	231.5	0.2	402.8	2.4	3,662.1
%	5.4%	1.7%	0.5%	1.6%	20.2%	1.8%	3.5%	2.5%	0.5%	41.2%	3.8%	6.3%	0.0%	11.0%	0.1%	100.0%

Table 3-4. Watershed Areas within Municipalities

Drainage District	Area within the Municipality (acres)					Area within the Municipality (%)*			
	Apple Valley*	Burnsville*	Lakeville*	Total*	Basin Water Surface Area	Total w/o Basin Open Water	Apple Valley	Burnsville	Lakeville
Bluebill Bay	4	98	355	457.9	40.3	417.6	0.9%	21.5%	77.6%
BuckHill Bay	0	166	0	166.0	21.9	144.1	0.0%	100.0%	0.0%
Keller Lake	813	629	0	1441.8	54.7	1387.1	56.4%	43.6%	0.0%
Main Crystal Lake	0	272	5	276.8	186.6	90.2	0.0%	98.1%	1.9%
Maple Island Bay	0	22	1	23.3	3.7	19.6	0.0%	94.9%	5.1%
Mystic Bay	0	232	1065	1296.3	39.8	1256.5	0.0%	17.9%	82.1%
Total	817	1419	1426	3662.1	347.0	3315.1	22.3%	38.7%	38.9%

* Includes water surface areas

- Bluebill Bay Drainage District**—The 418-acre drainage district (excluding the 40-acre Bluebill Bay water surface area) represents about 13 percent of the overall Crystal Lake watershed. This district is located primarily south of Bluebill Bay with about 78 percent of the district within the City of Lakeville (see Table 3-4). Most of the runoff from this district is conveyed to Bluebill Pond (Pond CL-21) prior to entering Bluebill Bay. This pond is providing water quality treatment for its immediate watershed as well as providing additional treatment for runoff from areas upstream and, therefore, is acting as a regional treatment pond. The dominant land use in this district is also low-density residential (roughly 35 percent). Roadway ROW comprises 22 percent of this district while the Crystal Lake Golf Course covers an additional 12 percent of the district. Other land uses in the district include, institutional (10 percent), medium-density residential (6 percent), and parks and open areas (4 percent).
- Mystic Bay Drainage District**—This district covers approximately 38 percent (1,257 acres, excluding the 39.8-acre Mystic Bay water surface area) of the study area and is located south and southwest of Mystic Bay. The majority of this district (82 percent) is within the City of Lakeville. The remaining 18 percent of this district is within the City of Burnsville. Except for the watershed areas directly tributary to Mystic Bay (about 97 acres), all of the stormwater drains through some form of wet detention before it enters Mystic Bay because the runoff is routed through three ponds in Oak Shores Park. Lee Lake and its watershed are located within this district. Lee Lake’s water surface area is approximately 22 acres and it has a maximum depth of 17 feet. The Lee Lake 36-inch gated outlet is located on the east side of the lake; the outflows from the lake are carried to Crystal Lake. According to City of Lakeville staff, the gated outlet is normally left open and the water surface of Lee Lake is typically below the outlet. Existing watershed land uses are low-density residential (38 percent), ROW (23 percent), natural/park areas (12 percent), commercial (5 percent, including land adjacent to the Lee Lake), institutional (6 percent), medium-density residential (4 percent), high-density residential (3 percent) and wetlands (1 percent). The commercial portion of the watershed lies along the I-35 corridor; the undeveloped land in this corridor is projected to convert to commercial or office land use in the future. However, the City of Lakeville is requiring that this development result in less than a 70 percent total imperviousness in order to help mitigate both stormwater quantity and quality concerns.

- **Maple Island Bay Drainage District**— This district has the smallest watershed area (19.6 acres, excluding the water surface area of Maple Island Bay). Runoff from the watershed drains directly to the bay without any form of wet detention water quality treatment. The land use is 65 percent low-density residential, 20 percent ROW and the remaining 15 percent open water.
- **Buckhill Bay Drainage District**— This 144-acre district is located directly west of Buckhill Bay and is entirely within the City of Burnsville. The majority of the runoff is routed to a small water quality pond located along Maple Island Road (the east I-35 frontage road) prior to entering Buckhill Bay. This district is dominated by commercial land use (41 percent, the majority of this land use is the Buckhill Ski Area). Natural/open space and ROW land use cover 21 percent and 18 percent, respectively. Other land uses include institutional (4 percent), high-density residential (3 percent), and open water (13 percent). The public boat landing on Crystal Lake is located within this district at the northwest corner of Buckhill Bay. The Buckhill Drainage District also receives runoff from the Main Crystal Lake Basin Drainage District because the lake outlet structure is also located in this district.
- **Main Crystal Lake Basin Drainage District**—Runoff from this 90-acre district (excluding the 187-acre main Crystal Lake basin water surface area) drains directly to Crystal Lake without passing through a detention pond. This drainage district also receives stormwater runoff from four upstream drainage districts (Keller Lake, Mystic Bay, Bluebill Bay, and Maple Island Bay Drainage Districts). The Crystal Lake Beach is located at the east end of this district. Existing land use includes: 14 percent low-density residential, 8 percent open/parks, 5 percent medium-density residential, 4 percent ROW, 1 percent institutional, and open water over the remaining land area.