

Round Lake (in Little Canada)

Lake Status Report

*Prepared for
Ramsey-Washington Metro Watershed District*

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Round Lake (in Little Canada) Lake Status Report

Table of Contents

1.0 Introduction.....	1
2.0 Lake Status Summary	5
2.1 Round Lake (in Little Canada).....	5
2.1.1 Lake and Watershed Characteristics	5
2.1.1.1 Description of Round Lake	5
2.1.1.2 Watershed Characteristics	5
2.1.1.3 Recreational-Uses.....	5
2.1.2 Water Quality Data	13
2.1.2.1 Water Quality Analysis	13
2.1.2.2 P8 Modeling Results	13
2.1.3 Recommendations.....	14
2.1.3.1 Water Quality Goals.....	14
2.1.3.2 Recreational-Use Level	14
2.1.3.3 Further Studies	14
3.0 Conclusions.....	16
References.....	17

List of Tables

Table 1-1	Summary of RWMWD Recreational-Use Level (2006 Draft Plan), Preliminary RWMWD Water Quality Goals (2006 Draft Plan), Proposed RWMWD Goals (Result of LSR), and Management Class (2006 Draft Plan) as well as 303(d) Impaired Waters and MDNR Ecological Management Class	4
Table 2-1	P8 Estimated Watershed Runoff and TP Loads to Round Lake under Wet, Dry, and Average Climatic Conditions	13
Table 3-1	Summary of the Proposed RWMWD Recreational-Use Level, Water Quality Goals, and Management Class	16

List of Figures

Figure 1-1	Location Map	2
Figure 2-1	Round Lake (Little Canada) Approximate Bathymetry	7
Figure 2-2	Round Lake (Little Canada) Historic Lake Levels 1934—2006	8
Figure 2-3	Round Lake in Little Canada (a) and its outlet (b & c)	9
Figure 2-4	Extent of the Critical 100-Year Flood for Round Lake	10
Figure 2-5	Round Lake (Little Canada) Watershed Land Use	11
Figure 2-6	Round Lake (Little Canada) Subwatersheds & Drainage	12

1.0 Introduction

One of the primary goals of the Ramsey-Washington Metro Watershed District (District) is to maintain or improve the quality of surface waters to meet or exceed the water quality necessary to support the District's designated beneficial uses. In 1997 the District established beneficial use categories based on desired recreational activities for a waterbody; and revisited again with the 2006 update as part of the development of the *Ramsey-Washington Metro Watershed District Watershed Management Plan* (Plan) (Barr, 1997; Barr, 2006 [draft]). The recreational-use categories are ranked from Level 1 through Level 5, with Level 1 water bodies having the highest number of recreational uses and best water quality.

In order to help achieve desired water quality goals established in Plan, many of the lakes within the District have been studied in Strategic Lake Management Plans (SLMPs). However, for many of the smaller lakes within the District, SLMPs have not yet been completed and District water quality goals have not been re-evaluated. Because of limited lake information and water quality data, the development of a complete SLMP would not be possible for many of these small water bodies. Instead, a Lake Status Report (LSR) will be developed and recommendations will be made to outline future studies for these lakes.

The purpose of this LSR is to summarize and evaluate the available information for Round Lake (in Little Canada) which has not been previously studied and to determine appropriate water quality goals based on the current and desired recreational uses, as outlined in the Plan, and through discussion with District staff. The watershed areas tributary to Round Lake has already been modeled as part of the development of the larger Phalen Chain of Lakes SLMP (Barr, 2004 [Draft]). Figure 1-1 shows the location of Round Lake.

The Plan (Barr, 2006 [draft]) includes preliminary water quality goals and management classes for each of the District-managed lakes. The water quality goals are defined in terms of total phosphorus (TP), chlorophyll *a* (Chl *a*), and Secchi disc (SD). The goals outlined in the Plan will remain preliminary until an SLMP or other similar study, such as this LSR, is completed and appropriate goals are determined. The preliminary goals are consistent with either the Minnesota Pollution Control Agency's (MPCA) proposed draft criteria for shallow lakes in the North Central Hardwood Forests (CHF) ecoregion (MPCA, 2005), or the goals listed in the 1997 Plan.

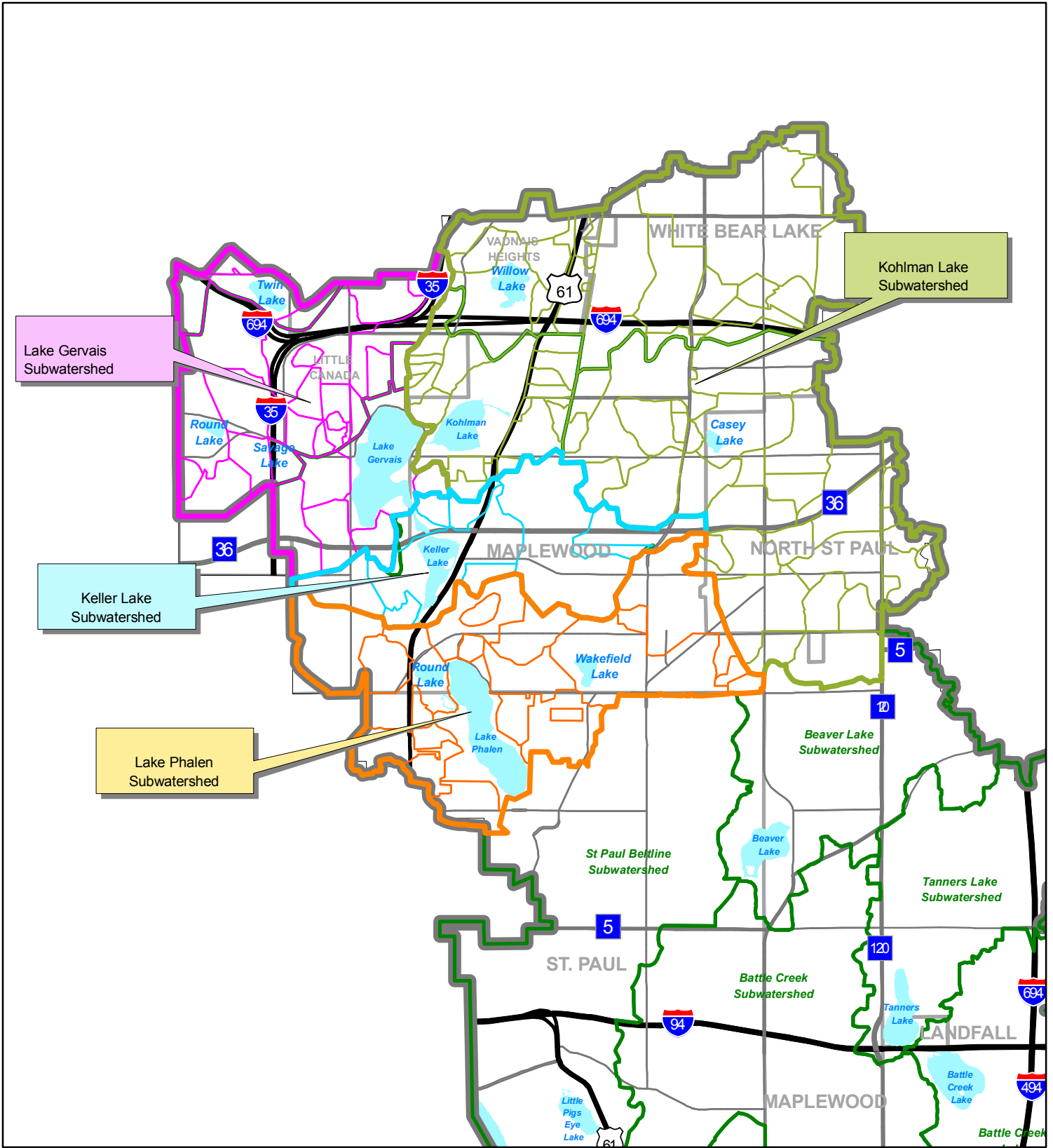


Figure 1-1

Location Map

For lakes, the District management classes are identified as either “Improvement” or “Prevent further degradation.” An “Improvement” class is warranted if the public perceives a need for water quality improvement and there are feasible management options that will accomplish water quality improvement. A “Prevent further degradation” class is assigned when current water quality meets the goals set for the lake. A “Prevent further degradation” class does not, however, imply inaction. Rather, development requirements, fisheries, shoreline, and macrophyte management; as well as additional water quality improvement projects; are pursued for the lake as opportunities and budgets allow.

For wetlands, the District has developed management Classes A, B, and C, based on a recent inventory and assessment of wetlands within the District. The wetland classification is based on the estimated quality of the wetland, with management Class A being the highest quality wetlands. Water bodies classified as “Water Quality Pond” are constructed treatment ponds only.

Additional classifications of the water bodies based on water quality include the Impaired Waters List under Section 303(d) of the *Federal Clean Water Act* (CWA). Those water bodies that do not meet the water quality standards established under the CWA are included on this list and future development of total maximum daily loads (TMDL) is required. The Minnesota Department of Natural Resources (MDNR) has developed another ecological management classification system for Minnesota lakes (Schupp, 1992) that is based on parameters such as lake size, depth, chemical fertility, and growing season length.

Table 1-1 summarizes the goals and classifications of Round Lake Lake. Note that for District-managed wetlands there are no water quality goals established. Additionally, note that the 2006 Preliminary RWMWD Water Quality Goals are those listed in the Plan (Barr, 2006 [draft]). The 2006 Proposed RWMWD Water Quality Goals are the result of this LSR and evaluation of the information available for the Lake.

Table 1-1 Summary of RWMWD Recreational-Use Level (2006 Draft Plan), Preliminary RWMWD Water Quality Goals (2006 Draft Plan), Proposed RWMWD Goals (Result of LSR), and Management Class (2006 Draft Plan) as well as 303(d) Impaired Waters and MDNR Ecological Management Class

Water Body	RWMWD Use Level	2006 Preliminary RWMWD Water Quality Goal	2006 Proposed RWMWD Water Quality Goal	RWMWD Management Class	303(d) Impaired Waters Pollutant	MDNR Ecological Class
Round Lake (Little Canada)	2	45-75 µg/L TP 20-40 µg/L Chla 2-3 ft SD	TBD¹ 45-75 µg/L TP 20-40 µg/L Chla 2-3 ft SD	Improvement	N/A	N/A

-
- 1- TBD – To Be Determined – Currently there is no water quality data for Round Lake to estimate the trophic status of the lake and determine whether or not the Preliminary District Goals are reasonable for this resource.

2.0 Lake Status Summary

2.1 Round Lake (in Little Canada)

2.1.1 Lake and Watershed Characteristics

2.1.1.1 Description of Round Lake

Round Lake is located just south of Little Canada Road in Little Canada (Township 29, Range 22, Section 6) and is a 12-acre District-managed lake. It is also classified as a Protected Public Water in the MDNR Public Waters Inventory (62-9P) and is considered a shallow lake, according to the MPCA's criteria (MPCA, 2005).

The maximum depth of Round Lake is 6.6 feet. Approximate bathymetric contours have been created using lake survey data gathered by the District in 2002 and can be seen in Figure 2-1. There is also historic lake level data available for Round Lake from 1934 to 2006 (as seen in Figure 2-2). The primary outlet is located on the eastside of Round Lake and is a 24-inch RCP with a flared-end section and discharges to Gervais Creek. The outlet can be seen in Figure 2-3. The NWL of Round Lake is 901.1 feet MSL. The 100-year flood elevation was determined to be 904.8 feet MSL during the development of the District *Watershed Management Plan* (Barr, 1997; Barr, 2006 [draft]). Figure 2-4 shows the extent of the 100-year critical flood.

2.1.1.2 Watershed Characteristics

The Round Lake watershed (including the lake surface area) covers a 214-acre area south of Owasso Boulevard and east of Highway 49 and is part of the larger Lake Gervais watershed. Commercial and low-density residential land uses are the major land uses with the breakdown within the watershed as follows: Agricultural (0.5%), Commercial (27.6%), High-density residential (12.1%), Industrial/office (9.7%), Low-density residential (33.3%), Natural/Park/Open (8.7%), Open water (5.8%), and Wetland (2.3%). See Figure 2-5 for a map of watershed land use.

Drainage from the watershed flows generally to the east. There are four storm sewer outfalls into Round Lake (per the District survey, 2002). Figure 2-6 shows the general drainage pattern in the Round Lake watershed.

2.1.1.3 Recreational-Uses


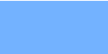



Round Lake is surrounded by primarily residential and commercial land uses, and there is no public land or access to the lake. Therefore, the recreational-use is limited to those living around the lake.

It currently is classified to have Level 2 recreational-uses according to the District's classification system. With a Level 2 classification, the major associated uses are canoeing, picnicking, and aesthetic viewing. However, there is question as to whether the lake is actually used for canoeing.



Legend

Depth

	0 - 1.5 ft
	1.5 - 4.3 ft
	4.3 - 6.1 ft
	6.1 - 6.6
	6.6+ ft

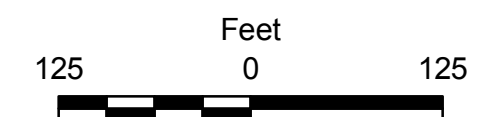


Figure 2-1

Round Lake (Little Canada)
Approximate Bathymetry

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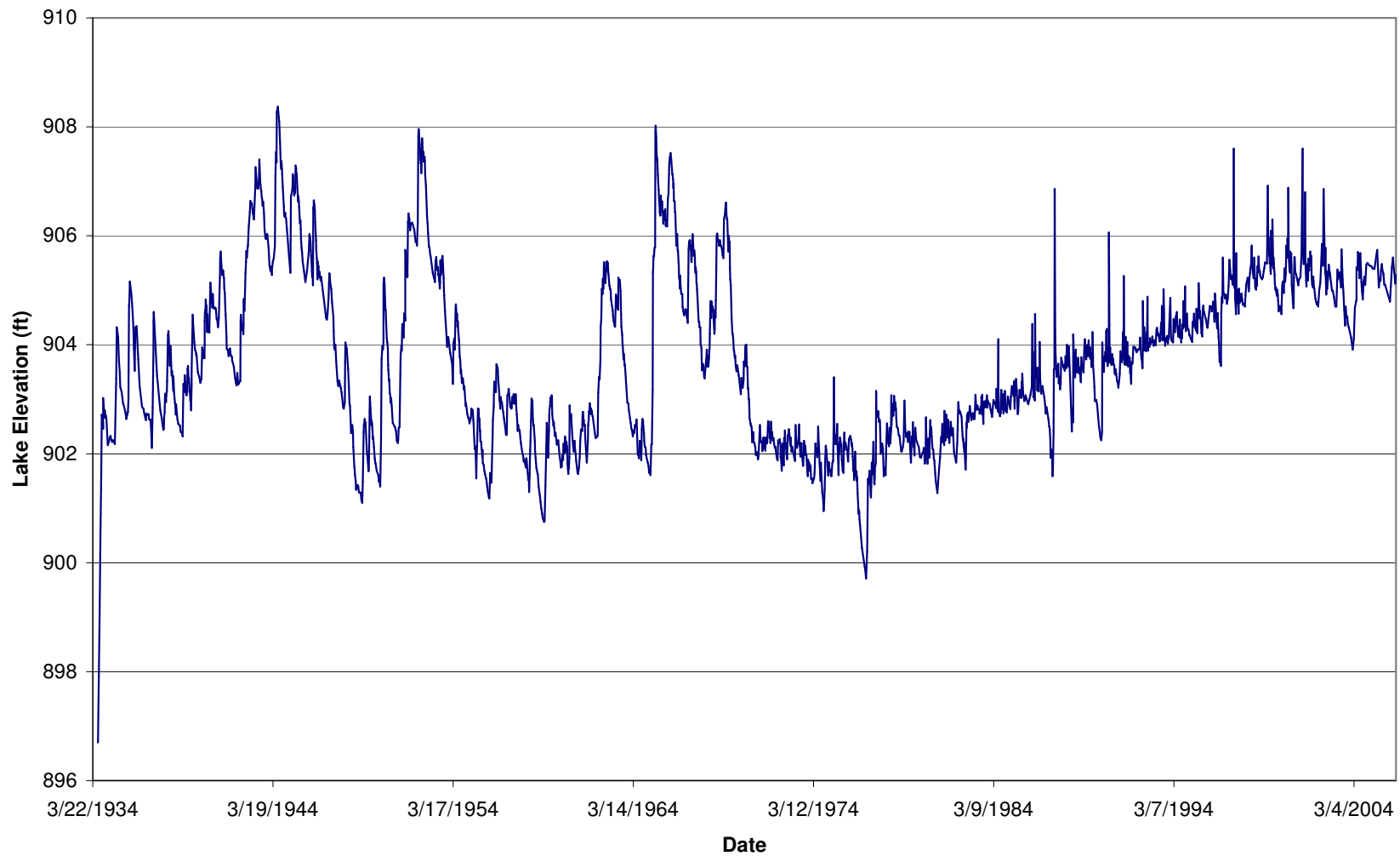


Figure 2-2
Round Lake (Little Canada)
Historic Lake Levels
1934-2006



(a)



(b)



(c)

Figure 2-3
Round Lake in Little Canada (a) and its outlet (b & c)
(Photos taken 5/11/2006)



Legend

 Flood Elevation = 904.8 ft MSL

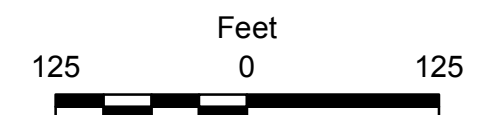
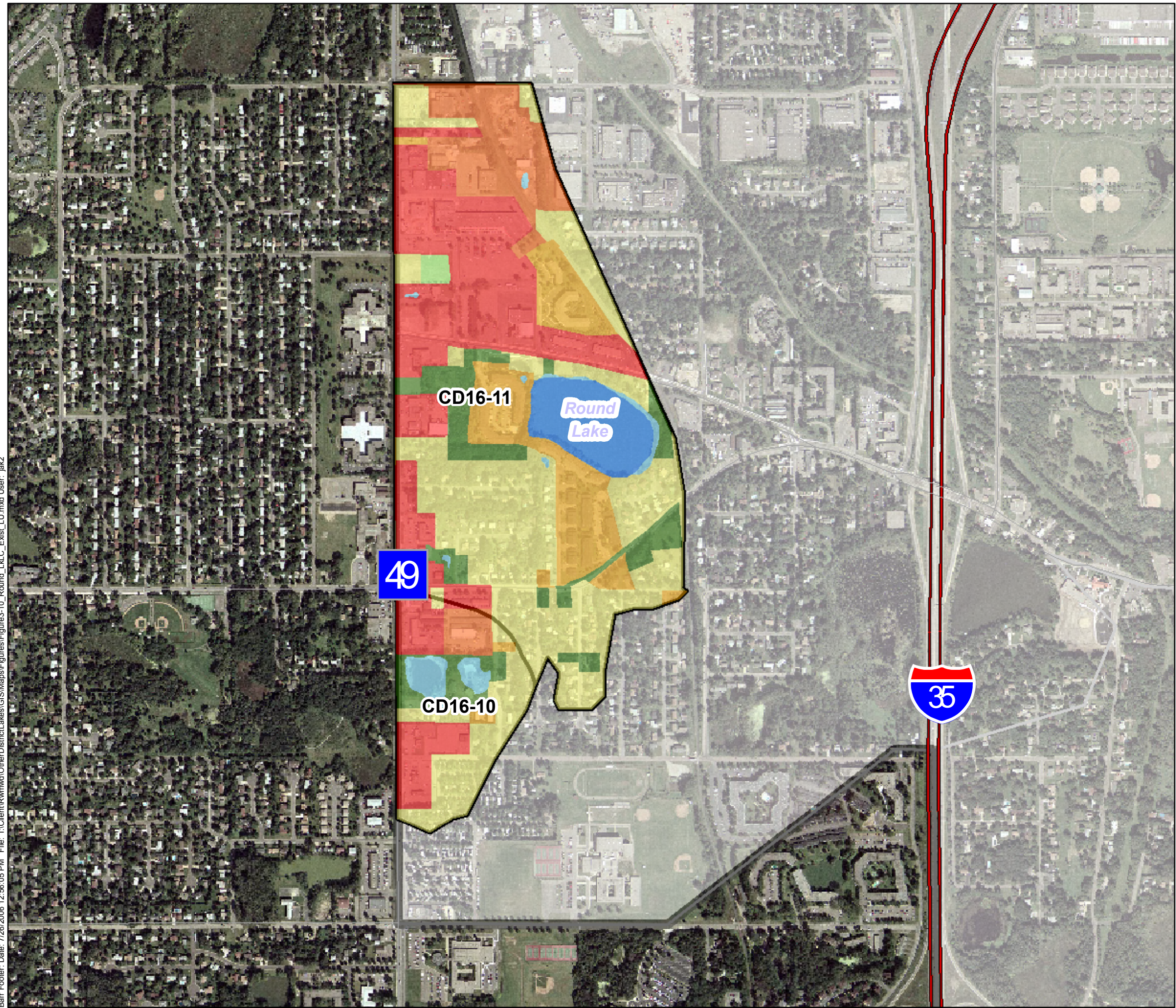


Figure 2-4

Round Lake (Little Canada)
Critical Flood Elevation

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Legend

Land Use

- Natural/Park/Open
- Developed Parkland
- Golf Course
- Agricultural
- Very Low Density Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Institutional
- Institutional - High Imperviousness
- Airport
- Highway
- Commercial
- Industrial/Office
- Other
- Open Water
- Wetland
- Round Lake Subwatersheds
- RWMWD Boundary

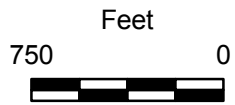


Figure 2-5
Round Lake (Little Canada) Watershed
Land Use

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2.1.2 Water Quality Data

2.1.2.1 Water Quality Analysis

There is no water quality data for Round Lake with the exception of single Secchi disc measurements from the summers of 1995 and 1996. Therefore, there was insufficient data to run a trend analysis on the data. The mean Secchi disc transparency based on the two observations from the summers of 1995 and 1996 was 0.6 meters. This resulted in a Carlson TSI, based only on Secchi disc values, of 68. This places Round Lake in the Eutrophic to Hypereutrophic state, indicating poor water quality and limited recreational-uses.

Visual observations from the same dates as the Secchi disc sampling suggest there was medium to high algae growth in the lake, which are consistent with an eutrophic to hypereutrophic state. No fishery, macroinvertebrate, phytoplankton, or zooplankton surveys have been collected for Round Lake. Additionally, concerns about Round Lake water quality have been expressed by a few shoreline residents as far back as 1995 (District, 2006).

2.1.2.2 P8 Modeling Results

The P8 Model of the Round Lake watershed was run for wet, dry, and average climatic conditions. Water and total phosphorus loads to Round Lake were determined for each climatic period. The results of this modeling are summarized in Table 2-1.

Table 2-1 P8 Estimated Watershed Runoff and TP Loads to Round Lake under Wet, Dry, and Average Climatic Conditions

Climatic Condition (Water Year)	Parameter		Load
Wet (10/1/01-9/30/02)	Flow	ac-ft	294.03
	TP	lbs	272.82
Average (10/1/00-9/30/01)	Flow	ac-ft	310.1
	TP	lbs	250.83
Dry (10/1/88-9/30/89)	Flow	ac-ft	210.5
	TP	lbs	212.59

It is important to note that climatic condition periods were selected based on depths of precipitation over a 17-month period that included the summer before the water year of interest because it is assumed that the water and TP load to the lake during this period affects the following year's spring TP concentration. During the 12-month period from October through September (the water year), however, the water load to the lake was slightly higher during the average year than the wet year.

Conversely, the TP load was higher in the wet year than in the average year over this 12-month period due to the fact that higher TP loading is often associated with the smaller, more frequent storm events like the ones that occurred between October 2001 and September 2002.

2.1.3 Recommendations

2.1.3.1 Water Quality Goals

Preliminary District water quality goals for TP, Chl *a*, and SD are listed in the updated 2006 draft Plan. These goals are the same as those listed in the 1997 Plan, and the District management class is listed as “Improvement.” Round Lake is not listed on the CWA 303(d) Impaired Waters List and it has no MDNR ecological class assigned. See Table 1-1 for a summary of applicable classifications and preliminary goals established for Round Lake.

The Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) is a screening tool for estimating lake conditions and for identifying “problem” lakes. In addition, MINLEAP modeling has been done in the past to identify Minnesota Lakes which may be better or worse than they “should be” based on their location, watershed area and lake basin morphometry.

Results from MINLEAP suggest that the expected water quality in a minimally impacted lake, similar to Round Lake (based on its location within the Central Hardwood Forest ecoregion and with its basic basin and watershed characteristics), would be within the following ranges for TP, Chl *a*, and SD; respectively: 55 to 98 µg/L, 17 to 58 µg/L, and 0.6 to 1.3 meters. When comparing these ranges to the 2006 Preliminary water quality goals established by the District, it appears that the water quality goals are on the low end of the expected ranges predicted by MINLEAP.

2.1.3.2 Recreational-Use Level

Although currently classified as a Level 2 lake, its recreational uses are limited to residents living around the lake, as there is no public access. It is questionable that Round Lake is used for canoeing due to its limited access. It is recommended that the District recreational use category be changed to a Level 3 or Level 4 classification with the desired recreational uses being predominantly aesthetic and wildlife viewing.

2.1.3.3 Further Studies

If the District identifies water quality in Round Lake as a high priority, the first recommendation would be to collect additional lake information, including concurrent water quality, macrophyte, and fishery data, as there is currently not sufficient data for Round Lake to establish the baseline water

quality for the lake. Only after understanding the lake's existing water quality can reasonable goals and direct management options be established for the lake.

3.0 Conclusions

In summary, for Round Lake there is little information available with regards to water quality, macrophytes, and fisheries. Because of limited information, updated District water quality management goals cannot be established. Table 3-1 below summarizes the proposed District recreational-use levels, water quality goals, and management classes based on evaluation of the data available for Round Lake.

Table 3-1 Summary of the Proposed RWMWD Recreational-Use Level, Water Quality Goals, and Management Class

Water Body	RWMWD Use Level	2006 RWMWD Water Quality Goal	RWMWD Management Class
Round Lake (Little Canada)	3-4	TBD ¹ 45-75 µg/L TP 20-40 µ g/L Chl _a 2-3 ft SD	Improvement

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- 1- TBD – To Be Determined – Currently there is no water quality data for Round Lake to estimate the trophic status of the lake and determine whether or not the Preliminary District Goals are reasonable for this resource.

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