2022 Rice Creek Watershed
Lake Water Quality Monitoring Summary

The Rice Creek Watershed contains 55 lakes. Water quality monitoring is conducted annually on most of those lakes; in 2022, 32 lakes were monitored (Figure 1). The Rice Creek Watershed District (RCWD) funds this work. Monitoring work is accomplished with RCWD staff, volunteers in the *Citizen Assisted Monitoring Program* (CAMP), and by partners at Ramsey County and Anoka Conservation District.
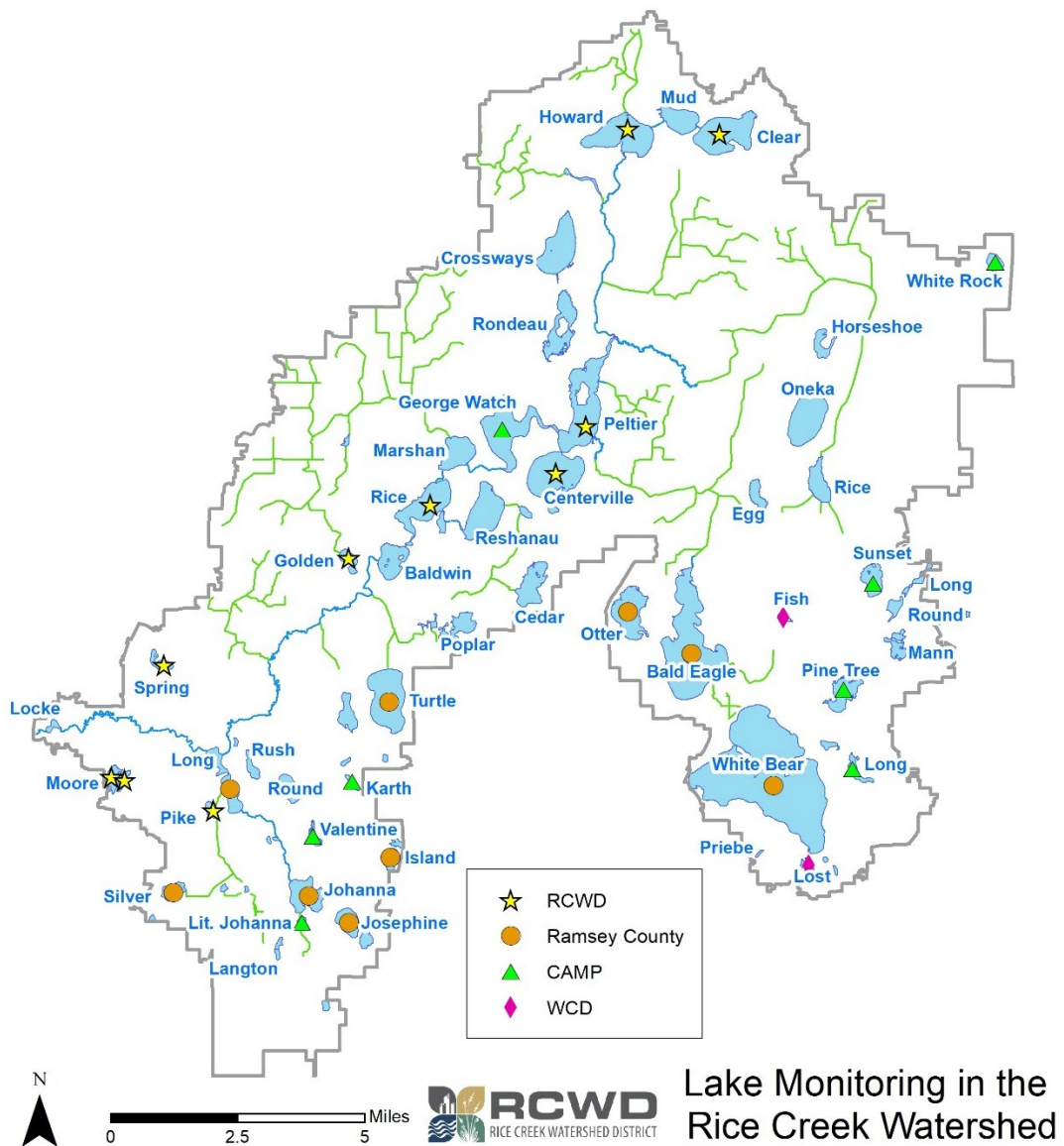

Figure 1 Lake monitoring in the Rice Creek Watershed, 2022.

Figure 2 provides a summary of results from lake monitoring in 2022. Lake water quality monitoring is focused on algae, water clarity, and nutrients and feed algae (primarily phosphorus). Typically, more phosphorus means more algae, and lower water quality. Figure 2 summarized monitoring data with summer averages of phosphorus and algae (chlorophyll-a). "Summer" means June through September; this is the same time scale as used by the Minnesota Pollution Control Agency for assessing lakes against water quality standards. The June-September timeframe is the typical growing season for algae in lakes. The 'A' through 'F' grading system is meant to summarize the overall water quality condition of each lake, based on phosphorus concentrations. This system is used by Metropolitan Council, making it a good tool for regional comparison. However, it does not account for natural differences in lake productivity between shallow (typically more productive) and deep lakes (typically less productive). For example, West Moore Lake received a 'C' grade, with a total phosphorus average 37 ug/L. Algae in West Moore, however, were *very* low, at only 5 ug/L. That stands in contract to Long Lake South, which has a lower total phosphorus average of 33, but a much higher algae concentration of 22 ug/L. Both lakes received a 'C' grade, but West Moore is an example of a healthy shallow lake with a robust native plant population, and very clear water. This highlights how a healthy shallow lake with robust native plants can assimilate more phosphorus in non-algae pathways.

Trends in summer phosphorus concentrations were assessed with a Mann-Kendall statistical test. Due to high natural variability, it is unusual to detect a statistically significant trend; most lakes in the Rice Creek Watershed show no trend.

Notes from the 2022 lake monitoring season:

- Centerville Lake is one of two lakes with a statistically significant increasing trend of phosphorus. Algae blooms are frequent and occasionally severe. In this photo, algae in Centerville Lake are shown along with a a chlorophyll-a filtering device used by RCWD staff. The green colored filter paper is submitted to a commercial lab for analysis; results are summarizing in Figure 2 (and specifically, the Chl-a column).

- Golden Lake is one of three lakes with a decreasing trend in phosphorus. In 2022, phosphorus and algae were 18% and 32% lower than the 10-year average, respectively. Native aquatic plants, shown in this photo, provide food and habitat for fish, invertebrates, waterfowl, and other critters. Native aquatic plants also stabilize lake sediments, and take-up nutrients that would otherwise fuel algae.
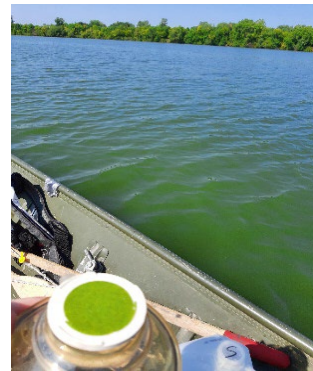
- Among all lakes monitored in 2022, the average phosphorus concentration compared to the 10-year average was even. This suggests no regional trends or drivers in phosphorus concentrations. There was, however, a 17% higher algae concentration among all lakes, compared to the 10-year average. This suggests that a regional factor – perhaps climatic[1] – influenced algae growth in 2022.
- Peltier Lake has exceptionally high phosphorus concentrations in 2022. The average – approximately 418 ug/L – was not driven by an outlier. Rather, phosphorus concentrations were typically between 300 and 575 ug/L. Interestingly, algae concentrations were about average, suggesting either 1) factors other than phosphorus concentrations are driving algae, or 2) algae were concentrated along shorelines, away from the monitoring location in the center of the lake, or both.
- The Rice Creek Watershed has several very healthy shallow lakes, with abundant and diverse native aquatic plants. Howard, Karth, Long (Wash. Co), Moore West, Sunset, and White Rock lakes all fall into this category. In this photo from Howard Lake, wild rice (*Zizania palustris*) is growing along the southern shoreline.

- The overall lowest phosphorus and algae concentrations are found in White Bear Lake. While White Bear has always had low phosphorus and algae concentrations, they've been driven lower by zebra mussels. White Bear is one of two lakes (Bald Eagle) were zebra mussels have been found in the Rice Creek Watershed.

- Phosphorus concentrations in Rice Lake (Anoka) have been high for many years. While phosphorus remained high in 2022, algae concentrations dropped by nearly 60%, compared to the 10-year average. This may be due to aggressive management of common carp by the RCWD. Over 56,000 carp (over 300,000 lbs) have been removed from the Long Lake / Lino Chain of Lakes system since 2016. Carp density has been cut by 85%. Observations from monitoring in Rice Lake indicate that aquatic plants are frequent and dense. In this heathier system, phosphorus remains a problem, but natural ecological processes (e.g. zooplankton grazing) assimilate the phosphorus in non-algae cycles.

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[1] Record heat was recorded in June; also, a record was set in 2022 for most consecutive days of at least 70-degrees (118 days)

RICE CREEK WATERSHED   2022 LAKE WATER QUALITY REPORT CARD

Lake	Acres	DNR ID	Phosphorus Average (ug/L)	Grade	Phos. Trend	Chl-a (Algae) Average (ug/L)	Carlson TSI
Bald Eagle	1043	62000200	49	C	=	36	59
Centerville	472	02000600	99	D	-	44	66
Clear	433	82016300	25	B	=	10	51
Fish	21	82013700	41	C	=	23	58
Golden	59	02004500	40	C	+	12	54
Howard	433	02001600	28	B	=	5	49
Island	43	62007500	61	C	=	42	64
Johanna	210	62007800	26	C	=	7	49
Josephine	116	62005700	33	C	=	19	55
Karth	16	62007200	34	C	+	12	52
Little Johanna	18	62005800	45	C	=	6.5	53
Long (Wash. Co.)	50	82013000	30	B	=	2.6	47
Long, North (Rams. Co.)	72	62006700	80	D	=	35	65
Long, South (Rams.Co.)	116	62006700	33	C	=	22	56
Lost NW*	22	82013400	68	C	n/a	16	60
Moore, East*	28	200750200	39	C	n/a	21	59
Moore, West	68	200750100	37	C	n/a	5	51
Peltier	574	02000400	418	F	=	42	75
Pike	35	62006900	102	D	n/a	58	68
Pine Tree	179	82012200	17	A	=	3	43
Rice (Anoka Co.)	442	02000800	160	F	=	18	68
Silver	73	62008300	51	C	=	41	62
Spring	47	02007100	59	C	-	36	63
Sunset	142	82015300	15	A	=	3	43
Turtle	440	62006100	24	B	=	9	50
White Bear	2398	82016700	14	A	=	3	41
White Rock	53	82007200	28	B	+	7	51

Grade

Grade is determined by the most recent summer-average for phosphorus. The scale used to assign grades is the same used by Metropolitan Council.

A <23
B 23-32
C 32-68
D 68-152
F >152

Carlson Trophic State Index Average

This index is based on relationships among phosphorus, chlorophyll-a (algae), and water clarity. Higher values indicate a greater frequency and intensity of algae blooms.

Phosphorus Trend

+ Indicates improving trend (decrease) in phosphorus concentrations

- Indicates worsening trend (increase) in phosphorus concentrations

= Indicates no trend

* Data from 2021

Figure 2 RCWD Lake Monitoring Report Card