



Watermilfoil Found Floating on the Lake Surface of Lake Carlos, June 15, 2021

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## Eurasian Watermilfoil Meandering Survey for Lake Carlos, Douglas County, Minnesota, 2021

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Eurasian Watermilfoil Meandering Survey: June 15, 2021

Prepared for:  
Lake Carlos Area Association  
Douglas County, MN



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June 2021

# Eurasian Watermilfoil Meandering Survey for Lake Carlos, Douglas County, Minnesota, 2021

## Summary

Lake Carlos (MnDNR ID: 21-005700) is a 2,605 acre lake located in Douglas County, Minnesota. An Eurasian watermilfoil (EWM) meandering survey was conducted by Blue Water Science on June 15, 2021 and 582 sites were sampled with a fixed head rake on a telescoping pole (Figure 1). Three treatment areas were delineated for EWM treatment in Lake Carlos. EWM was generally observed at light densities and sparse distribution on June 15, 2021. An herbicide application treated a total of 1.93 acres (Figure 1).

Lake Carlos Eurasian Watermilfoil Meander Survey  
June 15, 2021

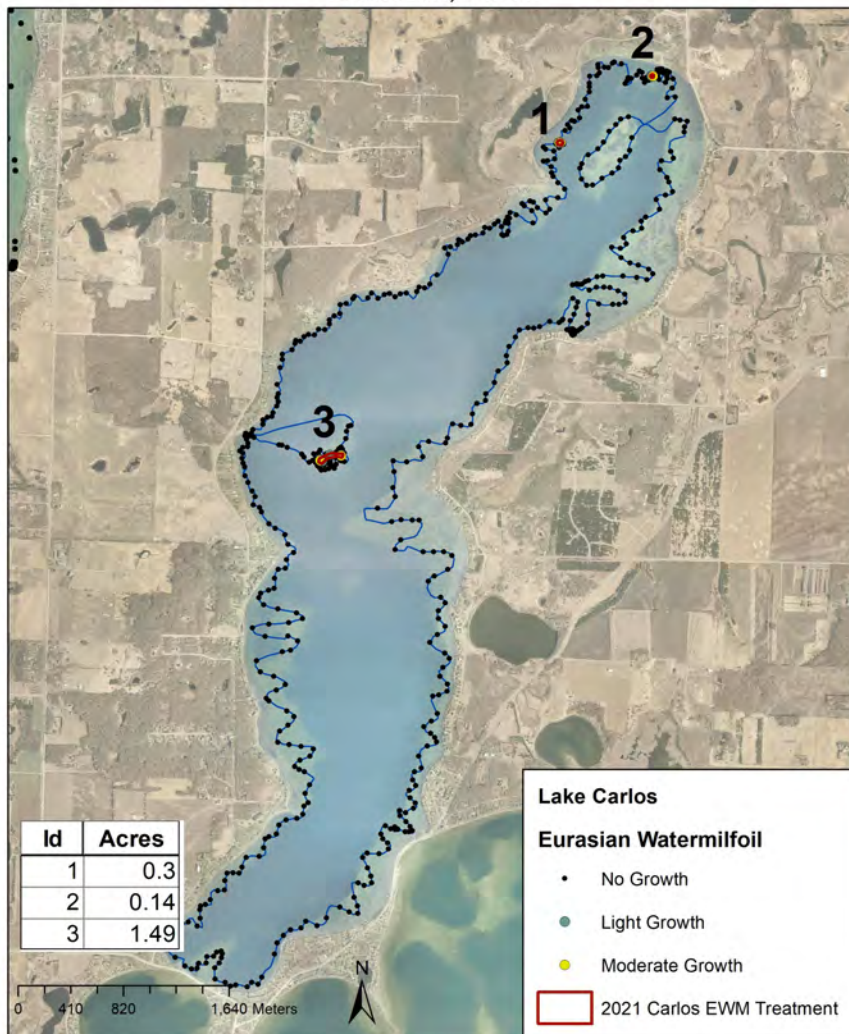


Figure 1. EWM delineation with 3 treatment polygons for June 15, 2021. Key: green dots = light growth, yellow dots = moderate growth, red dots = heavy growth, and black dots = no EWM growth.

# Additional Information on the Eurasian Watermilfoil Meandering Survey for Lake Carlos, Douglas County, Minnesota, 2021

Lake Carlos, Douglas County (ID: 21-005700)  
Lake Area: 2,605 acres (MnDNR)  
Littoral Area: 922 acres (MnDNR)  
Maximum depth: 163 ft (MnDNR)  
Mean depth: 50 feet (MnDNR)

## Project Setting

Lake Carlos has a variety of native and non-native aquatic plants. The objectives of the 2021 Eurasian watermilfoil (EWM) meandering survey was to delineate areas of Eurasian watermilfoil.

## Methods

**Eurasian Watermilfoil Meandering Delineation:** Eurasian watermilfoil delineation was conducted by Blue Water Science on June 15, 2021. The delineation involved cruising around the entire lake and observing milfoil growth and sampling aquatic plants with a fix head rake. A total of 582 sample sites were checked. Areas to be treated were selected based on the grouping of EWM. All EWM that was observed was treated.

## Chart of EWM Density Ratings for EWM



Figure 2. Eurasian watermilfoil rake density ratings from 1 to 3. Milfoil that was sampled on the rake was collected in the boat and not returned to the lake.

# Details of EWM Observations

Lake Carlos Eurasian Watermilfoil Meander Survey  
June 15, 2021

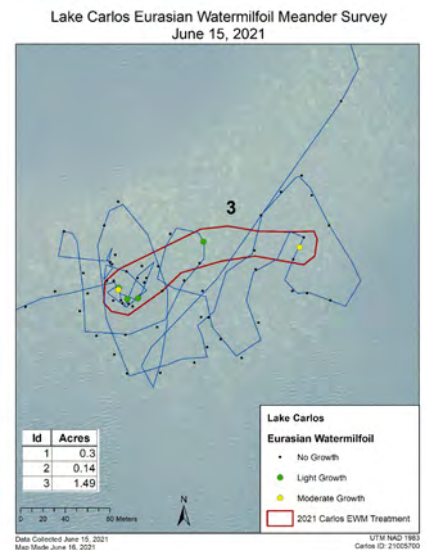
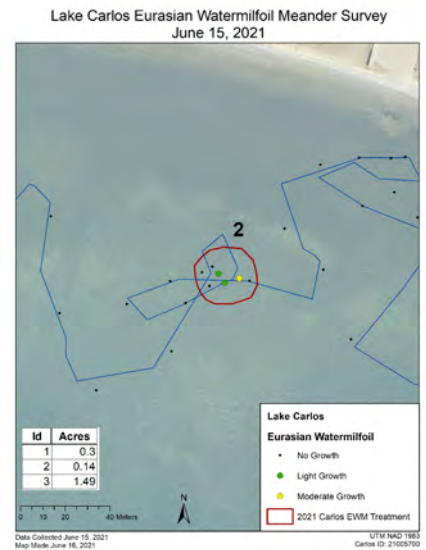
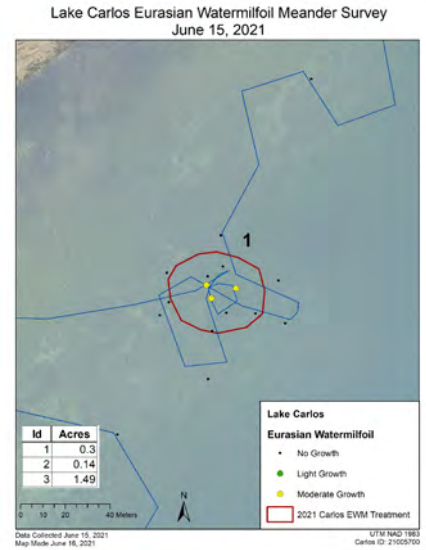
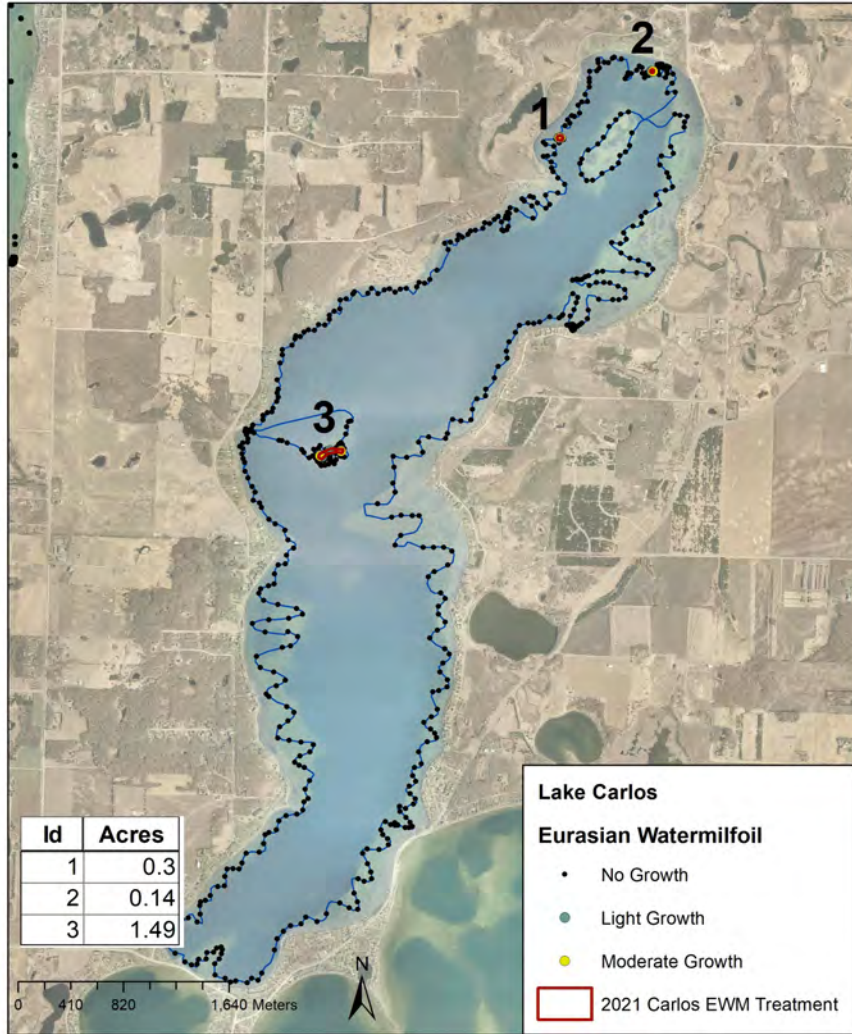
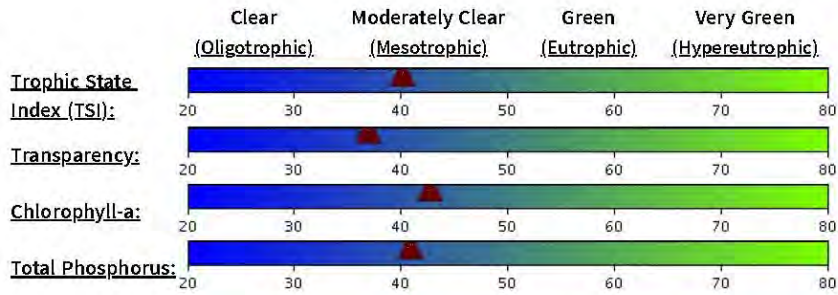


Figure 3. [left] EWM delineation with 3 treatment polygons for June 15, 2021. [right] Close up of the 3 treatment polygons. Key: green dots = light growth, yellow dots = moderate growth, red dots = heavy growth, and black dots = no EWM growth.

# Water Quality Summary and Transparency for Lake Carlos

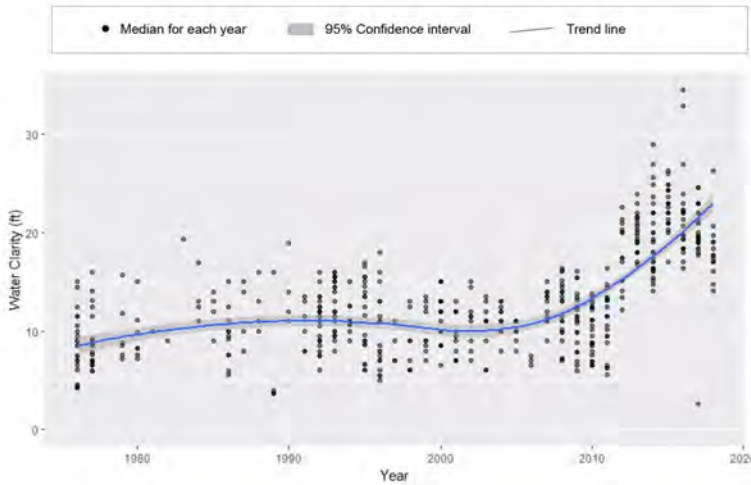


Overall Trophic State Index for This Lake: 40

Parameter	10-Year average of all summer samples	Parameter TSI	Expected TSI range for lakes in same ecoregion	Number of samples
Transparency (meters)	5	37	43 - 54	121
Chlorophyll-a (parts per billion)	3	43	46 - 61	106
Total Phosphorus (parts per billion)	13	41	49 - 61	106

## Lake Transparency Trend

**Trend analysis result:** For years 1976 to 2018 there is evidence of improving water clarity at this lake, of approximately 1.4 feet per decade. For the most recent year of the analysis, median water clarity was 5.25 feet higher than the watershed median.



Source: TSI and Secchi Transparency from MnDNR LakeFinder

The **Trophic State Index (TSI)** is a number that summarizes a lake's overall nutrient richness. Nutrient richness ranges from clear lakes, low in nutrients (oligotrophic), to green lakes, with very high nutrient levels (hypereutrophic). The chart to the left shows the overall TSI rating for this lake (top bar), followed by TSI ratings for the individual parameters that contribute to nutrient richness. The TSI calculations are based on data collected between June and September 1976 to 2018.