Lake Trace Vegetation Survey Report

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Prepared By:
North Carolina State University
Aquatic Plant Management Program
Raleigh, NC 27607

Introduction:

Located in Sanford, North Carolina, Lake Trace is a 315-acre lake surrounded by a gated community known as Carolina Trace. Lake Trace was formed in the early 1970's after a dam was constructed along the Upper Little River. Carr Creek also feeds into the lake and has caused concerns related to sedimentation and reduced water quality. Lake Trace remains the centerpiece of the surrounding community and golf courses and has remained actively managed throughout the years. Access to the lake has been limited to residents only and gasoline powered engines are not permitted in an effort to promote a quality lake and shoreline environment.

Recently, a non-native submersed aquatic plant species, hydrilla (*Hydrilla verticillata*), has become established in Lake Trace. Hydrilla is a federal noxious weed in the United States and has the potential to reduce access, navigation, and recreational opportunity for members of the Carolina Trace community. In 2023, North Carolina State University researchers initiated a survey to assess the distribution and abundance of aquatic vegetation in Lake Trace. The primary objective for the 2024 vegetation survey was to repeat survey methods that were established in 2023 and to continue to monitor regions of the lake where hydrilla has become established. A secondary objective of the 2024 survey was to measure changes in bathymetery (lake depth) between survey years.

Methods:

Point-Intercept Survey

The lakewide aquatic vegetation survey of Lake Trace occurred on October 31st, 2024 following a boat-based point-intercept method coupled with echosounding (sonar) techniques. A total of 146 georeferenced points were sampled based on a 100 meter grid pattern (Figure 1). Upon arriving at each point, a double-sided rake was thrown to collect submersed vegetation. Vegetation collected per rake was quantified using a species-specific relative density estimate

from 0 to 4 based on rake coverage (**0**: not present, **1**: <25% or trace coverage, **2**: 50% or sparse coverage, **3**: 75% or moderate coverage, **4**: 100% or very dense). When applicable, the occurrence of floating and/or emergent shoreline species were documented at each point.

Echosounding (Sonar) Survey

In addition to the point-intercept rake samples, survey boats were equipped with high definition sonar units that have the ability to record plant biovolume (%), or plant height occupancy within the water column, along with lake depths along the surveyed track. Sonar data collected during this survey were uploaded to BioBase C-Map, a cloud-based processing service, to extract bathymetry estimates and submersed plant biovolume and lake bathymetry from the sampled tracks. The processed sonar logs were then exported as tabular data and post-processed in ArcGIS Pro (v. 3.0.3) for mapping and analytics.

Results and Discussion:

Overall Vegetation

Of the 146 points completed during the 2024 survey of Lake Trace, 41 (28%) points contained aquatic vegetation (Table 1). The dominant plant species was macroalgae (*Chara spp.*), which was present at 32 (22%) points (Table 1; Figure 2). Hydrilla (*Hydrilla verticillata*) was present at 3% occurrence (Table 1). Five shoreline species were documented and were all observed at under 10% occurrence (Table 1). These included: creeping water primrose (*Ludwigia* spp.), cattail (*Typha spp.)*, lizard tail (*Saururus cernuus*), pickerelweed (*Pontederia cordata*), and parrotfeather (*Myriophyllum aquaticum*) (Table 1; Figure 2).

Based on survey efforts, hydrilla presence has dramatically decreased throughout the lake. In 2023, 80 (54%) survey points contained hydrilla. In 2024, hydrilla was observed at only 4 survey points (3%) and all 4 locations received an abundance estimation of trace (“1”). This results in a 51% decrease in presence at survey sites between years.

In 2023 there was an estimated 123 acres of hydrilla established within the waterbody with the majority of biomass being present in the Carr’s Creek section and throughout the southern portion of the lake. In 2024, less than 1 acre of hydrilla is estimated with patches being contained against the shoreline in shallow sections of the lake (Figure 3). The mean biovolume of all submersed vegetation within Lake Trace in 2024 was only 2%, a decrease from the mean biovolume of 15% in 2023 (Figure 4).

Other non-native species identified during the 2024 survey included creeping water primrose and parrotfeather. These species occurred at 5% and 2% of surveyed points, respectively

(Table 1). Both species were documented along the shoreline of Lake Trace (Figure 2) in three main areas including south of the Traceway South Bridge, in the Carr's Creek arm, and in the isolated coves south of Bluebird Drive (Figure 2). Both creeping water primrose and parrotfeather were documented in the 2023 survey at 3% and 2% of surveyed points, indicating that the populations have remained relatively stable between years.

The depth (bathymetry) of Lake Trace was interpolated from sonar data during both 2023 and 2024 surveys (Figure 5). In general, minimal major changes in depth were observed after an overlay analysis was conducted (Figure 6). Some selected areas of the lake did experience change in depth, including some of the northern shoreline coves and below the Traceway North Bridge that exhibited an overall decrease in depth (became shallower) (Figure 6).

Conclusions and Management Implications:

- The 2024 survey effort found that hydrilla is no longer be the dominant submersed aquatic plant in Lake Trace. Management efforts during the 2024 growing season seem to have been very successful. Our survey efforts found that hydrilla was near undetectable levels. However, due to Hydrilla's aggressive growth habits that interfere with recreational activities as well as the ecological function of aquatic systems, it is important to continue executing a management plan for the growing seasons to follow. Hydrilla can produce vegetative propagules (tubers) that can lie dormant in lake sediment for up to 7 years. Management of hydrilla can be difficult and take several years to control. It is recommended that the hydrilla population at Lake Trace be managed to avoid continued distribution of the plant to nearby Piedmont systems. Further, hydrilla monitoring should continue over time.
- Further monitoring of other noxious aquatic weed species including creeping water primrose and parrotfeather should also continue at Lake Trace and management could be considered if population dynamics deem necessary.
- In 2024, echosounding (sonar) data measured the deepest portion of Lake Trace at 16 feet (just below the dam in the northern reaches of the lake). This is consistent with 2023 findings. The mean depth throughout the lake measured at 5.8 feet in 2024. Major changes in depth at Lake Trace did not occur between 2023 and 2024, however some areas did experience change including a decrease in depth below the Traceway Bridge and some shoreline regions at the northern section of Trace Lake.

References:

For specific information concerning plant identification and aquatic plant management, please visit https://aquaticweeds.wordpress.ncsu.edu.

Tables and Figures:

Table 1: Overview of fall 2024 aquatic vegetation survey results at Lake Trace. Species that are listed on the NC Noxious Aquatic Weed List are highlighted in red.

Lake Trace			Count (#)	Frequency (%)
Survey Overview	Total Surveyed Points		146	
	Total Vegetated Points		41	28%
Species Present	Macroalgae	*Chara sp.*	32	22%
	Pickerelweed	*Pontederia cordata*	12	8%
	Creeping Water Primrose	*Ludwigia hexapetala*	7	5%
	Cattail	*Typha sp.*	7	5%
	Hydrilla	*Hydrilla verticillata*	4	3%
	Parrotfeather	*Myriophyllum aquaticum*	3	2%
	Lizard's Tail	*Saururus cernuus*	1	1%

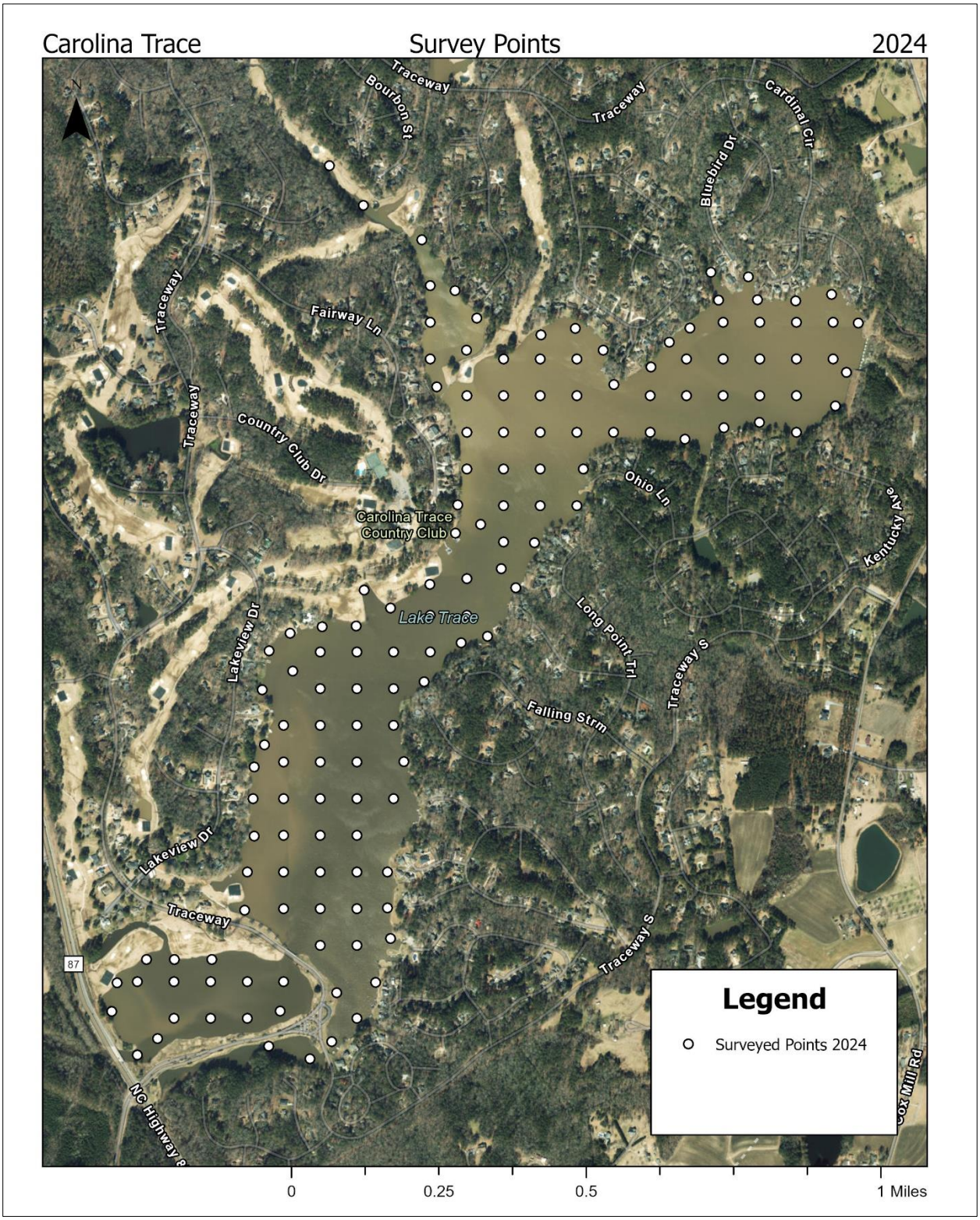

Figure 1: The 146 point-intercept locations visited during the fall 2024 survey of Lake Trace.

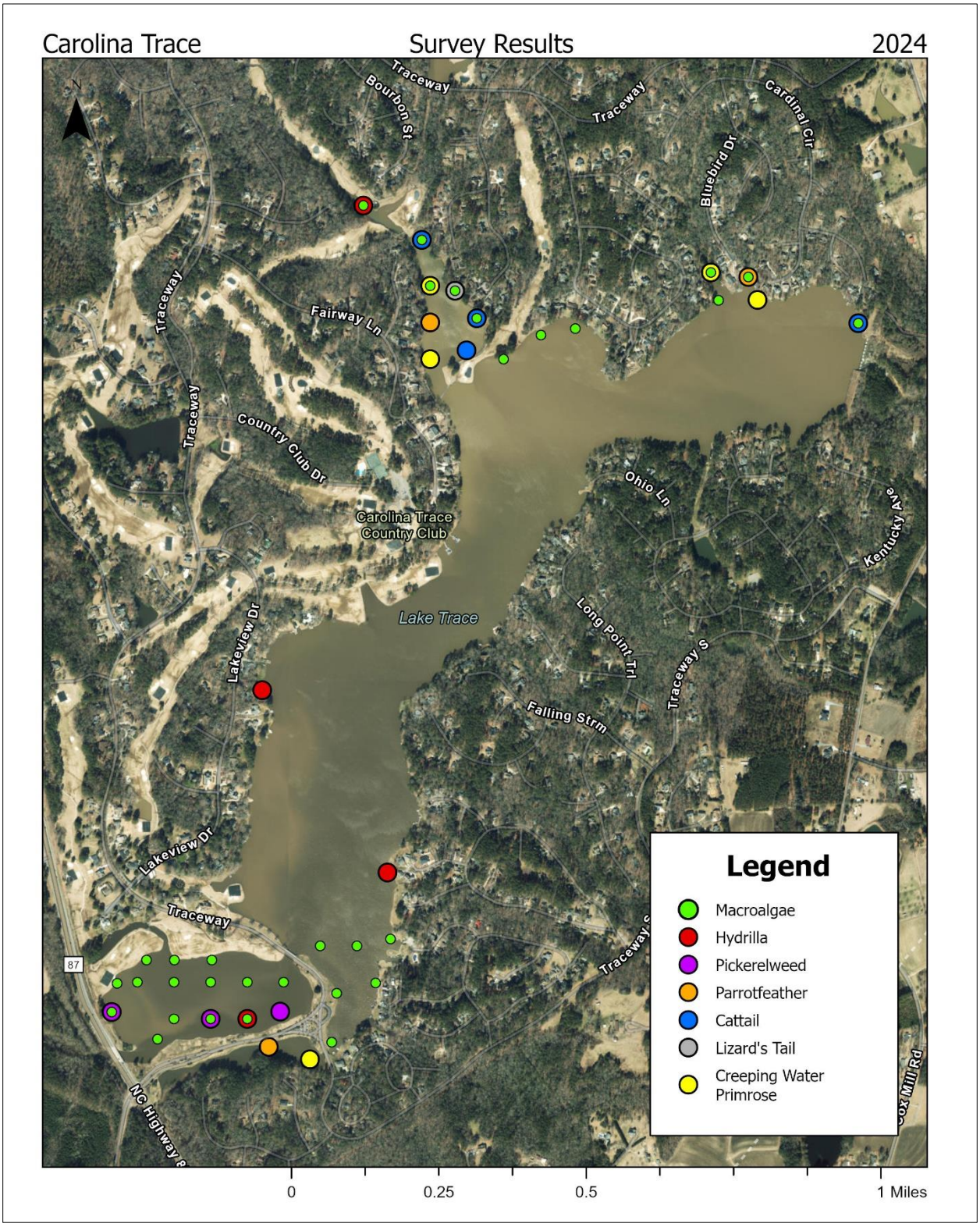

Figure 2: Distribution of aquatic vegetation in Lake Trace during the 2024 survey.

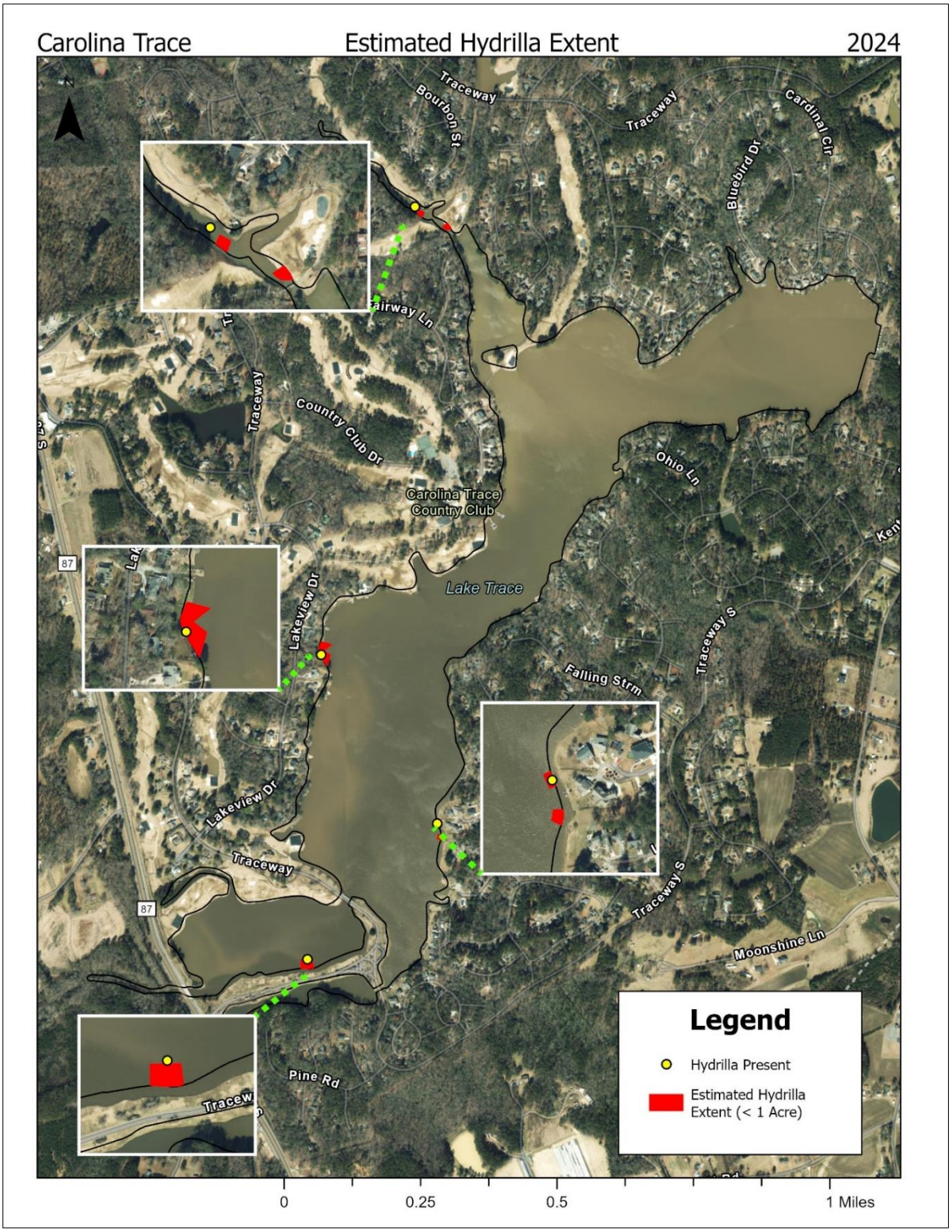

Figure 3: Estimated hydrilla extent (< 1 acre) at Lake Trace during the 2024 survey.

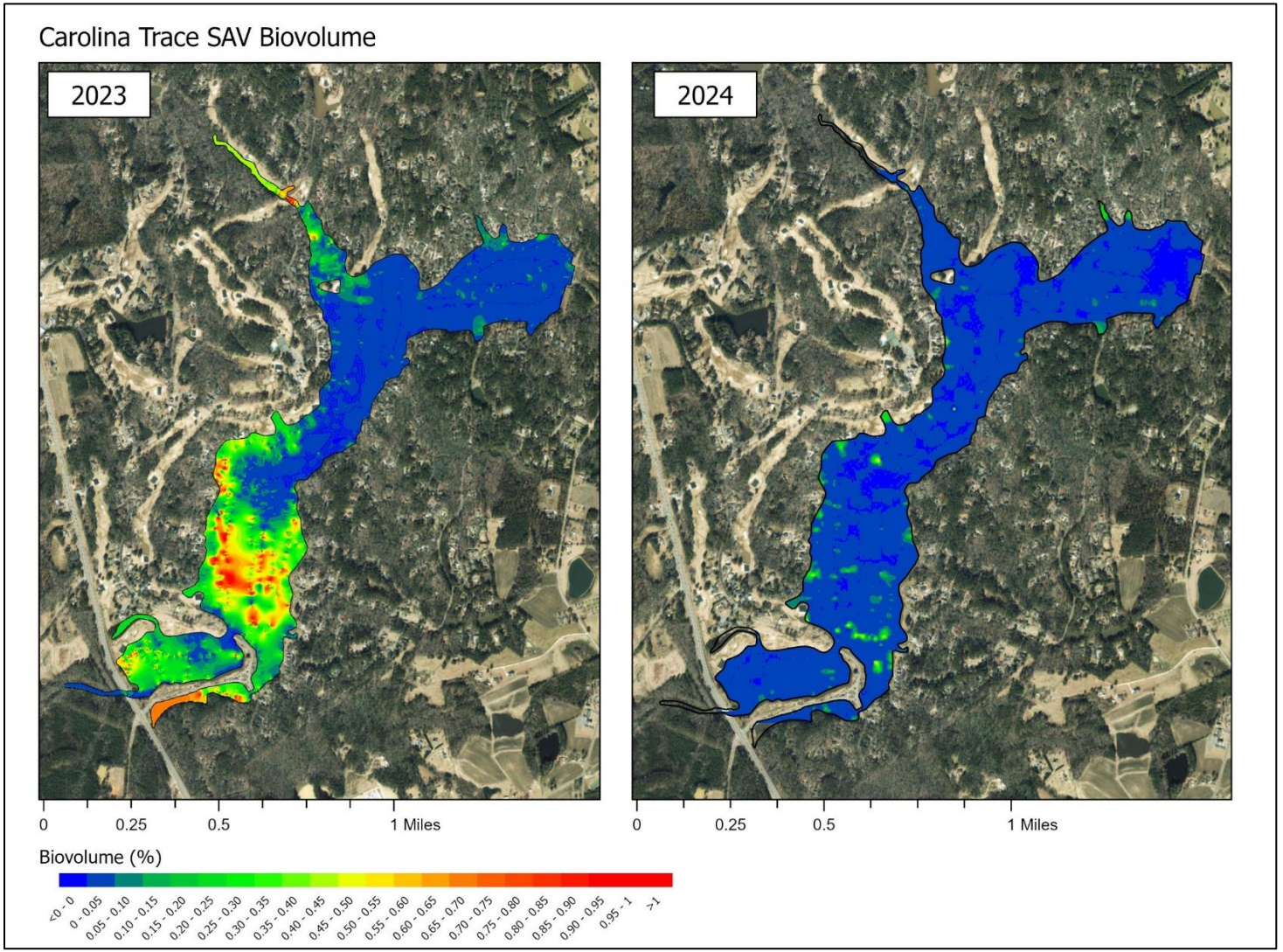

Figure 5: SAV Biovolume recorded at Lake Trace during the 2023 and 2024 surveys. Cool (blue) colors represent low biovolume areas and warm (red) colors represent high biovolume areas

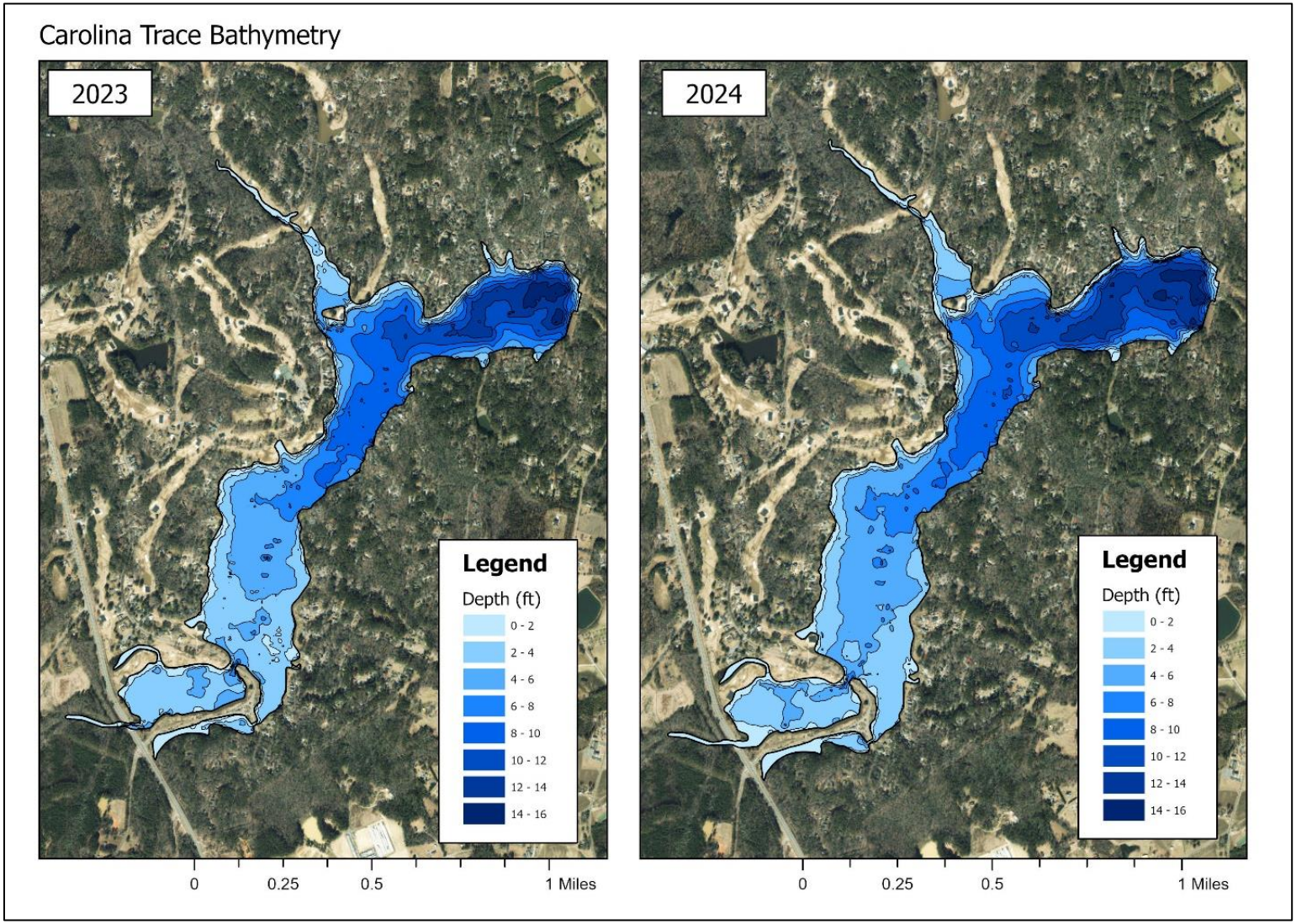

Figure 6: Bathymetry estimates of Lake Trace documented during the 2023 and 2024 surveys. Dark blue colors represent areas deep sections (max: 16 feet) and light blue colors represent shallow sections.

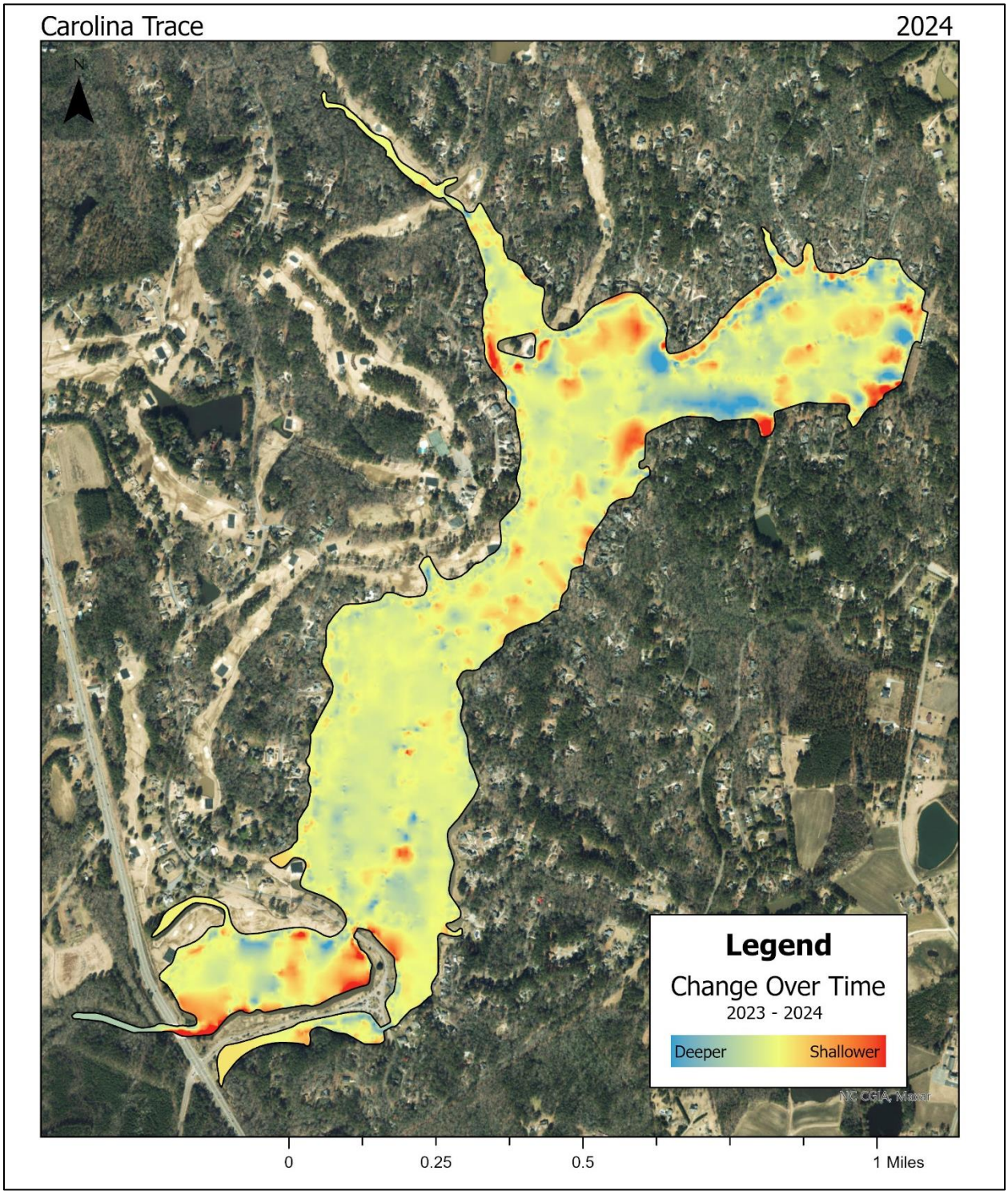

Figure 7: Change in bathymetry of Lake Trace between 2023 and 2024 surveys. Cool (blue) colors represent sections that increased in depth and warm (red) colors represent sections that decreased in depth. The overall mean change between years is minimal (-0.22 feet).