

---

# 2025 Lake Gaston Vegetation Survey Report

August - October 2025

Prepared By:

**North Carolina State University**

Aquatic Plant Management Program

Raleigh, NC 27607

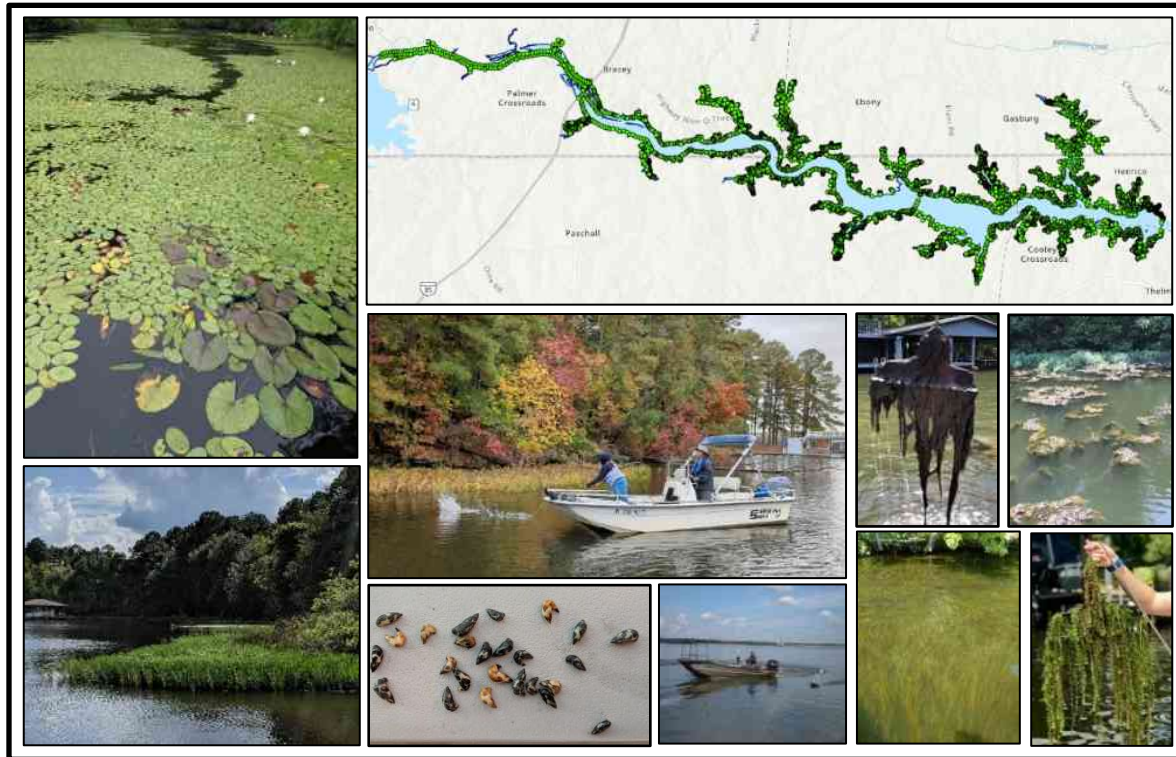
Dr. Rob Richardson, Professor and Extension Specialist

Jessica R. Baumann, Extension Associate

Submitted To:

**Lake Gaston Weed Control Council**

Littleton, NC 27850



**NC STATE UNIVERSITY**

**Aquatic Plant Management Program**

## Introduction

Lake Gaston is a 20,000 acre reservoir located along the Roanoke River, divided by the border of North Carolina and Virginia. The lake is dammed between two other Roanoke River chain reservoirs, which includes Kerr Lake (50,000 acres; US Army Corps of Engineers) upstream and Roanoke Rapids Lake (4,600 acres; Dominion Energy) downstream. Lake Gaston was impounded in 1964 by the Virginia Electric Power Company and maintains a normal pool of 200 feet above sea level. A unique feature of Lake Gaston is that water levels are mandated to remain within one foot of normal pool, except in the case of emergency, thus creating an unusual stability within the aquatic environment. Lake Gaston's primary utility is for generating hydroelectric power by Dominion Energy and provide drinking water to Virginia Beach, VA. However, the lake also provides recreational boating and sporting activities opportunities and is highly developed along its 350 miles of shoreline.

The aquatic vegetation community within Lake Gaston is surveyed annually to evaluate the diversity, abundance, and distribution of aquatic plants and algae species throughout the system. A combination of point intercept and sonar surveys are performed along the lake's shoreline to provide a robust evaluation of the aquatic plant community. These surveys are completed through a collaborative effort between the Lake Gaston Association (volunteers) and researchers from the North Carolina State University Aquatic Plant Management Program (NCSU APMP). Funding for these surveys is provided by the Lake Gaston Weed Control Council.

Currently, there are two problematic aquatic species found in Lake Gaston; the invasive submersed weed, hydrilla (*Hydrilla verticillata*), and the nuisance alga, lyngbya (*Microseira wollei*). Both hydrilla and lyngbya require continued monitoring to help facilitate appropriate management action. Hydrilla, a federally listed noxious weed, has been successfully managed within the system for almost a decade. However, hydrilla produces vegetative reproductive structures (turions and tubers) that can remain dormant for up to 7 years before germination, thus extending the persistence of the population (Nawrocki et al. 2016). Lyngbya was first documented in the mid 1990's, but abundance levels began to steadily increase in the mid 2010's. Lyngbya is a free-suspension filamentous cyanobacterium that can produce robust mat formations along the benthic environment. During warm summer months, these benthic mats have the potential to proliferate upward through the water column and produce thick floating mats along the water's surface. Lyngbya has become increasingly problematic for southeastern reservoirs over the past decade and management often requires a lengthy and costly management program.

Management response to both hydrilla and lyngbya has been extensive at Lake Gaston. In 2012, hydrilla was reported to cover >1,500 acres of Lake Gaston's shoreline. At this point, an integrated management program deploying a combination of chemical (herbicide) and biological (grass carp) control methods was implemented. These initial management efforts

greatly reduced the abundance of the hydrilla infestation. While annual plant acreages naturally fluctuate, the overall estimated hydrilla extent has remained <500 acres annually for the past decade.

In 2012, approximately 230 acres of lyngbya were reported within Lake Gaston, and the infestation has steadily increased with time, occupying >1,000 acres by 2019. In 2021, management activities directed at lyngbya intensified where 300 acres of lyngbya were directly targeted for management utilizing algaecide treatment protocols. This lyngbya treatment program increased the targeted number of acres to 375 for the 2022 and 2023 seasons, and 500 acres for 2024. In 2025, a total of 477 acres were treated within this program. This increase in directed management coincides with reported lyngbya acres that were maintained at approximately 1,300 between 2021 and 2023, and then decreased to 1,037 acres in 2024. Data collected from annual vegetation surveys is directly utilized within both the hydrilla and lyngbya management programs; therefore, continued monitoring of both these aquatic species is critical to ensure the continued success of these programs.

This report details the findings from the 2025 Lake Gaston monitoring efforts.

## **Methods**

### *Vegetation Survey*

An annual shoreline vegetation survey to quantify the diversity and distribution of aquatic plants within Lake Gaston was conducted between August 14<sup>th</sup> and October 25<sup>th</sup>, 2025. This survey, conducted primarily by volunteer effort, recorded all aquatic plant species present at individual points using a combination of visual observations and rake toss sampling approaches. At each point, the presence of emergent and floating-leaved species was recorded using a visual assessment of the shoreline, while submersed and algal species were recorded using a rake toss method. The rake toss method utilized a double-sided metal rake, created by welding two steel garden rake heads together, attached to a rope that is then thrown towards the shoreline and dragged along the bottom to collect any submersed plant material. A total of 2 rake tosses were performed at each survey point. If hydrilla or lyngbya was detected at a sample point, additional data was collected. For hydrilla presence, average plant length was recorded. If lyngbya was present, the density of mat material collected by the survey rake was recorded to estimate the robustness of benthic lyngbya formations. Lyngbya density was ranked on a scale of 1 – 4 (where 1 = lyngbya present at trace density (< 25% rake coverage); 2 = lyngbya present at sparse densities (25-50% coverage); 3 = lyngbya present at moderate densities (50- 75% coverage ); 4 = lyngbya present at extremely high densities (75-100% coverage). Survey points were not pre-determined and were chosen at random by the survey team in the field; however, the targeted distance between points was 200 feet. The GPS location of surveyed points, along with the species present, was recorded on handheld tablets equipped with GIS Cloud™ software.

Subsequent sonar surveys were conducted by NCSU researchers and were used to calculate

the overall biovolume (% vertical occupancy) of submersed vegetation within the lake. The data collected during the sonar survey was post-processed using BioBase™ cloud-based technology and then combined with the point intercept data to calculate the acreage of submersed species using Esri™ ArcGIS Pro software.

### *Tuber Survey*

Due to the life history traits of hydrilla, additional survey methods were required to evaluate the distribution of this species in Lake Gaston. While the point intercept and sonar surveys identify the present status of hydrilla vegetation, a survey of the tuber bank within lake sediments was required to evaluate succession potential. Tuber surveys were conducted by NCSU researchers in February 2026 at 12 creeks located throughout the lake. Within each creek, there were 1 to 4 individual sampling sites, each of which were located in an area that historically contained hydrilla. Tubers were collected utilizing a core sampler that removes a circular plug of sediment from the benthic substrate. The sediment core was then washed over a metal cloth screen to expose any tubers present. To ensure a high probability of detection, if less than 10 tubers are found in the initial 30 samples an additional 20 core samples are collected. Tuber densities (tuber per m<sup>2</sup>) were calculated per site and then averaged over all sites within a creek to determine the overall tuber bank density for each creek.

In 2012, NCSU established a total of 71 tuber survey sites that would serve to capture the extent and density of the hydrilla tuber bank across 18 creeks at Lake Gaston. Beginning with the 2023 season, protocols for site selection were adjusted due to decreased hydrilla abundance and distribution throughout the lake. Individual survey sites are prioritized based on the number of years since hydrilla has last been detected (plant biomass or tuber occurrence). If biomass was detected in areas adjacent to survey sites during the current growing season, or if tubers were detected during the previous year, these sites were considered priority (1) and thus tuber sampling occurred for that given season. Priority (2) sites are those sampled on a bi-annual basis and were identified as sites that had low and inconsistent detection of plant biomass and/or a tuber bank over the past 7 years. Priority (3) sites have no documented plant biomass and/or a tuber bank presence in over 5 years, therefore the hydrilla population is considered below detectable limits. Priority (3) sites are not actively sampled but remain closely monitored with future sampling occurring if hydrilla is detected in areas adjacent to the survey sites.

## **Results**

### *Point Intercept Survey Effort*

The 2025 shoreline vegetation survey was conducted between August 14<sup>th</sup> and October 25<sup>th</sup>. In total, 5,983 sites were surveyed by both volunteers and NCSU researchers totaling 572 hours of effort. During this timeframe, 83 individual teams comprised of 199 volunteers

surveyed 5,674 sites. These teams put in a total effort (including both preparation and active surveying time) of 655 hours and accounted for 556 hours of the active surveying time for 2025. NCSU staff surveyed a total of 309 sites which accounted for 16 hours of active surveying time. This level of sampling effort is comparable to previous survey years (Figure 1).

### *Total Vegetation*

Overall, 86% of the sites surveyed contained aquatic vegetation (Table 1). Relative abundance of the aquatic plant community was comprised of emergent species (86%), followed by submersed species (43%), algal species (30%), and floating-leaved species (17%). (Table 1; Figure 2). Within the aquatic plant community, a mix of both native and non-native species comprised the five most abundant plants within the system (Figure 3). Water willow (*Justicia americana*), a native and beneficial species, was the most prevalent (61% of total sites) and widely distributed species within the system (Figure 4). It has consistently remained the most abundant plant found within the system since 2019 (Table 1; Figure 3). The second most abundant plant, southern naiad (*Najas guadalupensis*) (18% of total sites), displayed the greatest increase in abundance over the past year (+11%) and while it was distributed throughout the system, the greatest abundance is concentrated in the lower end (Figures 3 and 5). Lyngbya was the third most abundant species (17% of total sites) in 2025 and was found throughout the system (Table 1; Figure 3 and 6). Following lyngbya, the native macroalgae, (*Chara spp.*), was found at 12% of total sites and the invasive species hydrilla was found at 10% of sites surveyed (Table 1). Chara was found predominantly in the lower end of the system (Figure 7), while hydrilla was distributed throughout Lake Gaston (Figure 8).

### *Hydrilla*

Hydrilla was distributed throughout Lake Gaston in 2025 (Figure 8) and covered an estimated 468 acres (Figure 9). NCSU has been actively involved in the management of Lake Gaston's aquatic plant community since 2012, when standing acreage of hydrilla was reported to be 1,541 acres and found at 64% of survey sites. The hydrilla population has drastically decreased since that early management period in not only acreage but also abundance, with detections occurring at only 10% of all survey sites in 2025 (Figure 9).

While overall acreage has remained relatively low since 2015, the 2025 survey reported the greatest increase in hydrilla abundance (4%) for the past seven years (Table 1). However, this increase could be, in part, driven by changes in surveying methodology. In 2023, a team of surveyors utilizing kayaks was formed with the goal of addressing shallow areas of the lake that were inaccessible by traditional outboard motor driven boats. In 2025, 120 of the estimated 468 acres of hydrilla were identified by this team (Figure 10), most of which were in areas of shallow water depths that would not be preferred by grass carp for grazing and would make herbicide applications difficult. In addition, the increased growth displayed by southern naiad presented challenges in estimating hydrilla acreage due to the level of mixed

stands of hydrilla, southern naiad, and eelgrass (*Vallisneria americana*) (Figure 11). There was an estimated overlap of 127 acres between hydrilla and southern naiad and an estimated 12 acres between hydrilla and eelgrass. These mixed stands accounted for additional biovolume presence that was not solely hydrilla, however it was all attributed to hydrilla when modeling potential distribution. Therefore, it is important to note that reported acreages are estimates of potential extent of a species and not exact calculations of species distribution.

Results from the tuber bank survey conducted in winter of 2026 also indicate a drastic decrease from initial densities reported in 2012 (Table 2). The tuber bank located within the eastern portion of the lake (east of Eaton Ferry's Bridge) remains near undetectable levels. Jimmies Creek and Big Stone House both displayed increases in tuber bank densities; however, in both sites high tuber densities were exclusive to just one site. The western portion of the lake (west of Eaton Ferry's Bridge) also remains at near undetectable tuber bank levels. Hawtree and Cotton Creek are the only two areas in which tubers have been detected at increased densities for consecutive years.

### *Lyngbya*

In 2025, lyngbya was highly distributed at varying densities throughout the system (Figure 12), affecting an estimated 818 acres of Lake Gaston's shoreline. Although relative abundance remains consistent over time, acreage levels indicate a continued decrease in lyngbya spatial distribution, with 2025 reporting the lowest acreage levels since 2018 (Figure 13). Density levels of the robust, filamentous benthic mats are another parameter monitored to help understand growth potential. For all sites in which lyngbya was present, a large proportion was represented by benthic mats reported at trace densities (37%), which was a slight increase from the 35% reported in 2024. Sites containing sparse-to-moderate density levels also increased slightly from 35% reported in 2024 to 37% in 2025. The percentage of sites containing a high density of benthic mat material has remained constant since 2023 (21%). This continued shift of benthic mats from moderate to trace densities indicates that although benthic mats persist in the system, they are becoming less robust in nature (Figure 14).

### *Natives*

Native, submersed aquatic vegetation provides freshwater systems with a plethora of beneficial ecosystem services. However, rapid growth and expansion within these populations can increase stakeholders' concerns, especially when growth has perceived negative impacts on recreational utility, such as swimming and boating. Eelgrass and southern naiad were two such native species that were perceived and noted as being problematic by homeowners of Lake Gaston during the 2025 growing season.

In 2025, eelgrass was present at 4% of total survey sites and was estimated to cover 137 acres of shoreline (Table 1; Figure 15). Found primarily in the lower, eastern section of the lake, eelgrass has steadily increased in both distribution and abundance (Figure 15 and 16). Although native, concern over eelgrass distribution has been reported due to the rapid

growth and expansion capabilities displayed by invasive and hybridized eelgrass cohorts, which have established throughout the southeast. In 2023 and 2025, genetic analysis of Lake Gaston's eelgrass population was performed by the Thum Lab at Montana State University and confirmed that Lake Gaston's population was a native species of eelgrass, *V. neotropicalis* (R. Thum, personal communication). Southern naiad exhibited rapid growth and distribution within its population in 2025 (Table 1; Figure 5). The relative abundance of southern naiad increased by 11% from that reported in 2024, representing the largest growth within a single population during that timeframe (Table 1). Often found in mixed stands of hydrilla and eelgrass (Figure 11), the extent of southern naiad was estimated to be 1,284 acres in 2025 and was primarily located in the lower, eastern section of the lake and also in Pea Hill Creek. The driving factor for this sudden increase in growth is unknown; therefore, temporal trends in abundance should remain monitored.

### **Conclusion and Management Implications**

- For a reservoir system, the aquatic plant community at Lake Gaston is quite diverse compared to similarly sized reservoirs in NC/VA. The aquatic community is represented by a host of native emergent, submersed, and floating-leaved species, all of which provide beneficial ecosystem services to the lake. Though diverse in species composition, density levels of submersed and floating-leaved species are low. However, this is to be expected due to the high stocking rate of grass carp (*Ctenopharyngodon idella*) (18.5 fish / standing acre) within Lake Gaston as part of an integrated management protocol for hydrilla. Grass carp will indiscriminately feed on other aquatic plant species in addition to hydrilla, although emergent and algal species are not generally a preferred food source.
- Current management strategies targeting hydrilla appear to be effective at managing and maintaining this invasive species. Hydrilla remains at low acreage levels throughout the system and tuber bank estimates are relatively stable. Although overall acreage increased in 2025, this could potentially be more of a reflection of new survey methodology rather than hydrilla population dynamics. Continued management of this species is recommended due to the rapid growth potential within hydrilla populations from overwintering vegetative structures (tubers and turions).

### **Conclusion and Management Implications (con't)**

- The current lyngbya management program within Lake Gaston is producing positive results. Success of this treatment program is reflected by the stability of reported lyngbya acreage from 2021 to 2023 and the decrease in acreage reported from 2023 to 2025. The distribution of lyngbya is still widespread throughout Lake Gaston, with many areas still displaying moderate to dense mat densities. Continued management of this algal species is encouraged.
- The eelgrass population continues to increase in distribution and abundance at Lake Gaston. Although DNA extraction methods have confirmed plant sample locations to be of the native *V. neotropicalis*, continual monitoring and sample collection is recommended to determine if targeted management is required in the future.
- The southern naiad population exhibited rapid growth and expansion in 2025, therefore continued monitoring is recommended to understand annual growth patterns within this population.
- Continued annual surveying of Lake Gaston's aquatic plant community is needed to monitor growth and distribution of native plant communities and those that are considered nuisance, noxious, or potentially harmful species.

### **References**

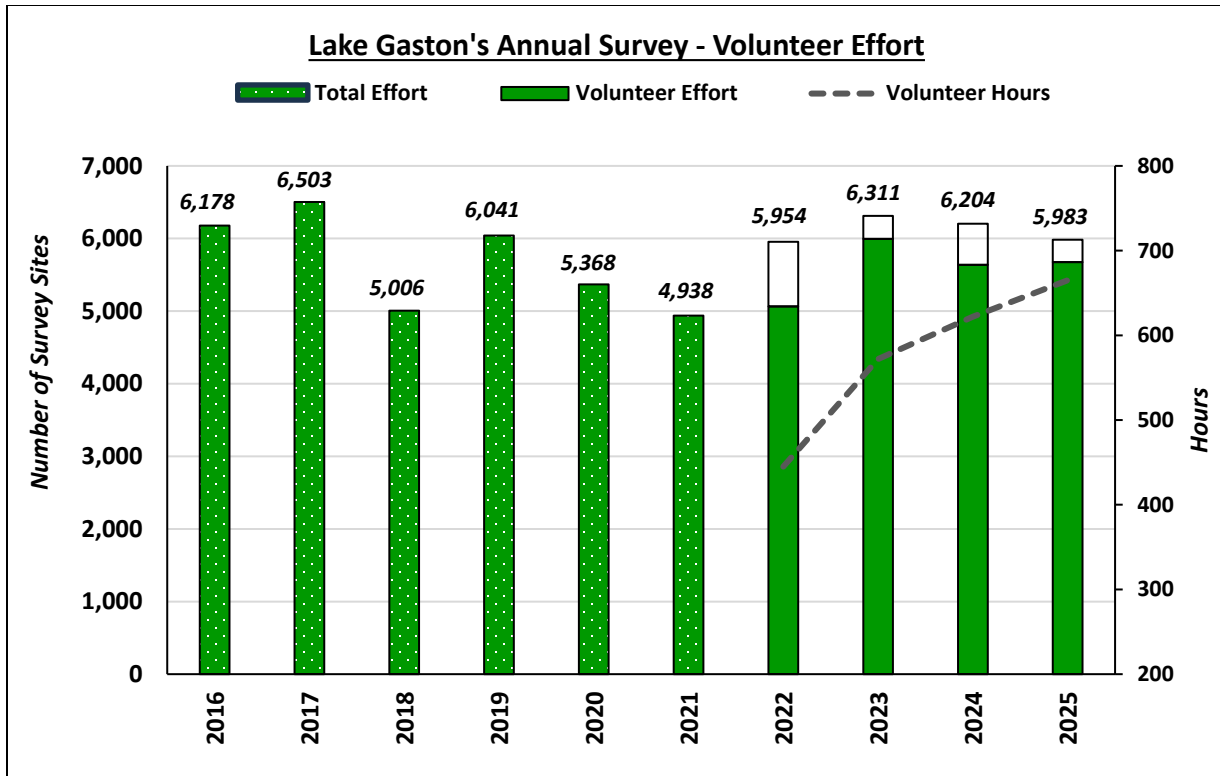
Nawrocki JJ, Richardson RJ, Hoyle ST. 2016. Monoecious hydrilla tuber dynamics following various management regimes on four North Carolina reservoirs. *Journal of Aquatic Plant Management*. 54: 12 – 19.

**Table 1.** Abundance trends for the aquatic plant community at Lake Gaston, NC/VA between 2019 and 2025. Noxious species are indicated in red italics. Values indicate the percent occurrence of each species in relation to the total number of sites surveyed in a given year. Changes in abundance between 2024 and 2025 are reported, an increase in abundance is indicated by green and red indicates a decrease.

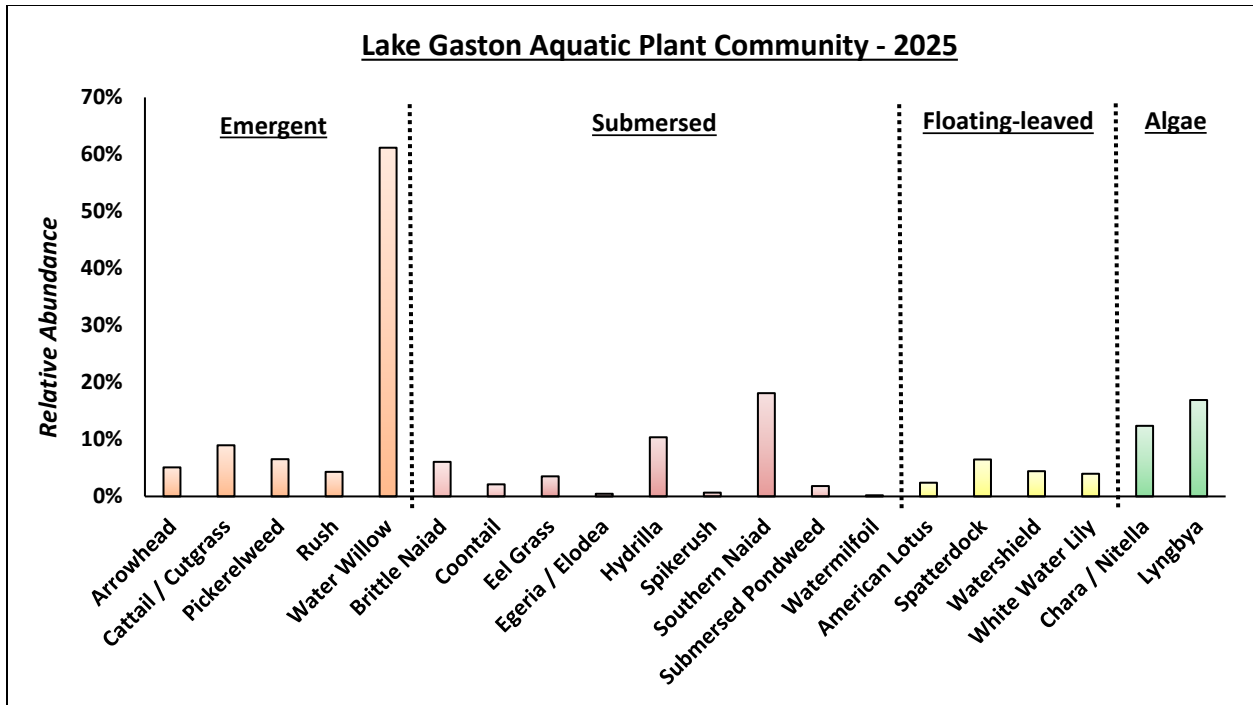
Common Name	2019	2020	2021	2022	2023	2024	2025	Change in Abundance
<b>SUBMERSED</b>								
<i>Brittle Naiad</i>	—	—	—	—	—	—	6%	6%
Coontail	< 1%	< 1%	1%	2%	2%	2%	2%	0%
Eel Grass	1%	1%	2%	1%	3%	3%	4%	1%
<i>Egeria / Elodea</i>	< 1%	< 1%	< 1%	< 1%	< 1%	< 1%	< 1%	0%
<i>Hydrilla</i>	3%	1%	1%	5%	7%	6%	10%	4%
Spikerush	—	—	—	—	—	—	1%	1%
Native Naiads	1%	< 1%	1%	3%	3%	7%	18%	11%
Submersed Pondweed	1%	1%	1%	1%	2%	3%	2%	-1%
<i>Watermilfoil</i>	< 1%	1%	< 1%	1%	< 1%	< 1%	< 1%	0%
<b>ALGAE</b>								
Chara / Nitella	21%	10%	5%	12%	21%	16%	12%	-4%
<i>Lyngbya</i>	17%	22%	21%	20%	21%	16%	17%	1%
<b>FLOATING LEAVED</b>								
American Lotus	1%	1%	1%	1%	2%	2%	2%	1%
Spatterdock	3%	3%	4%	4%	5%	7%	6%	0%
Watershield	2%	2%	2%	3%	3%	4%	4%	1%
White Water Lily	2%	2%	3%	3%	3%	3%	4%	1%
<b>EMERGENT</b>								
Arrowhead	1%	—	6%	1%	6%	5%	5%	0%
Cattail / Cutgrass	8%	8%	7%	8%	8%	10%	9%	-1%
Pickerelweed	5%	5%	5%	5%	4%	6%	7%	1%
Rush	6%	5%	6%	6%	6%	6%	4%	-1%
Water Willow	64%	57%	61%	58%	61%	60%	61%	1%
<b>TOTAL SURVEYED SITES</b>	5941	5368	4938	5954	6186	6204	5983	-221
<b>TOTAL VEGETATED SITES</b>	4650	3803	3639	4454	5086	5049	5148	99
<b>% VEGETATED POINTS</b>	<b>78%</b>	<b>71%</b>	<b>74%</b>	<b>75%</b>	<b>82%</b>	<b>81%</b>	<b>86%</b>	<b>5%</b>

**Table 2.** Hydrilla tuber bank densities (tuber/ m2) for 18 creeks throughout Lake Gaston, NC/VA. Average density estimates for each creek are shown for the initial survey (2012) and for the last five years (2021-2025). Results represented by *n/a* indicate sites in which the hydrilla population are classified as priority levels 2 or 3, and therefore are not sampled yearly.

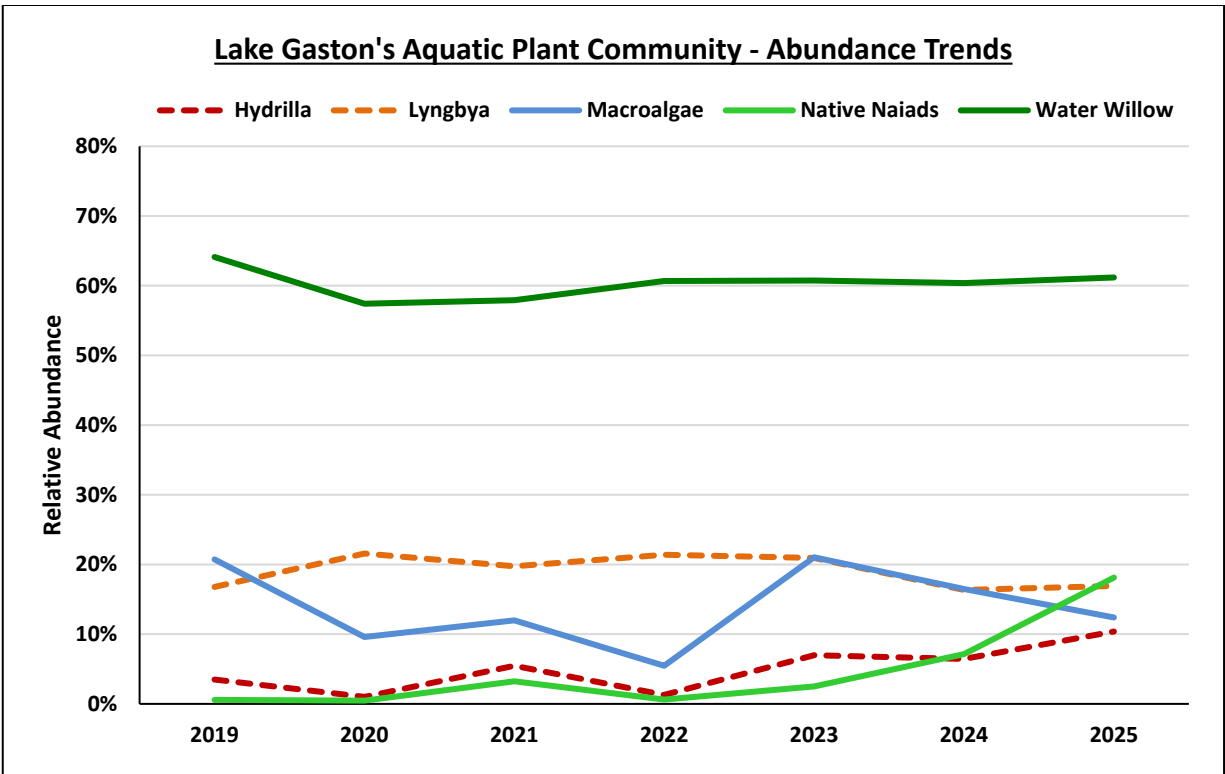
<b>LAKE GASTON HYDRILLA TUBER BANK ESTIMATES</b>							
	<b>Years Since Last Tuber Detection</b>	<b>Starting Bank Density (2012)</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
<b>Jimmies Creek</b>	0	36.41	0	0.82	12.33	8.39	37.14
<b>Timberline Shores</b>	7	3.08	0	0	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<b>Cold Springs Branch</b>	1	34.95	0	0	<i>n/a</i>	1.64	0
<b>Lakeview</b>	11	124.37	0	0	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<b>Lizard Creek</b>	0	N/A	24.39	53.72	15.90	7.40	2.47
<b>Big Stone House</b>	0	31.25	0	0	7.40	0	78.12
<b>Pretty Creek</b>	9	38.72	0	0	<i>n/a</i>	0	<i>n/a</i>
<b>Poe Creek</b>	6	125.4	0	0	<i>n/a</i>	0	<i>n/a</i>
<b>Woodland Hurst</b>	7	135.67	0	0	0	0	<i>n/a</i>
<b>Sledge Creek</b>	3	8.22	0	2.47	<i>n/a</i>	<i>n/a</i>	0
<b>Hamlin</b>	0	446.08	0	0	0	0	1.23
<b>Hubquarter</b>	0	292.73	0	0	0	0	0.82
<b>Lyons Creek</b>	6	293.96	0	0	0	<i>n/a</i>	0
<b>Poplar Creek</b>	0	89.63	0	0	31.52	0	1.23
<b>Hawtree</b>	0	38.03	4.93	22.61	84.28	24.67	31.86
<b>Smith Creek</b>	0	8.22	0	3.70	0.62	0	1.85
<b>Flats</b>	7	119.23	0	0	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<b>Cottons Creek</b>	0	217.9	0	5.76	13.16	13.16	17.27



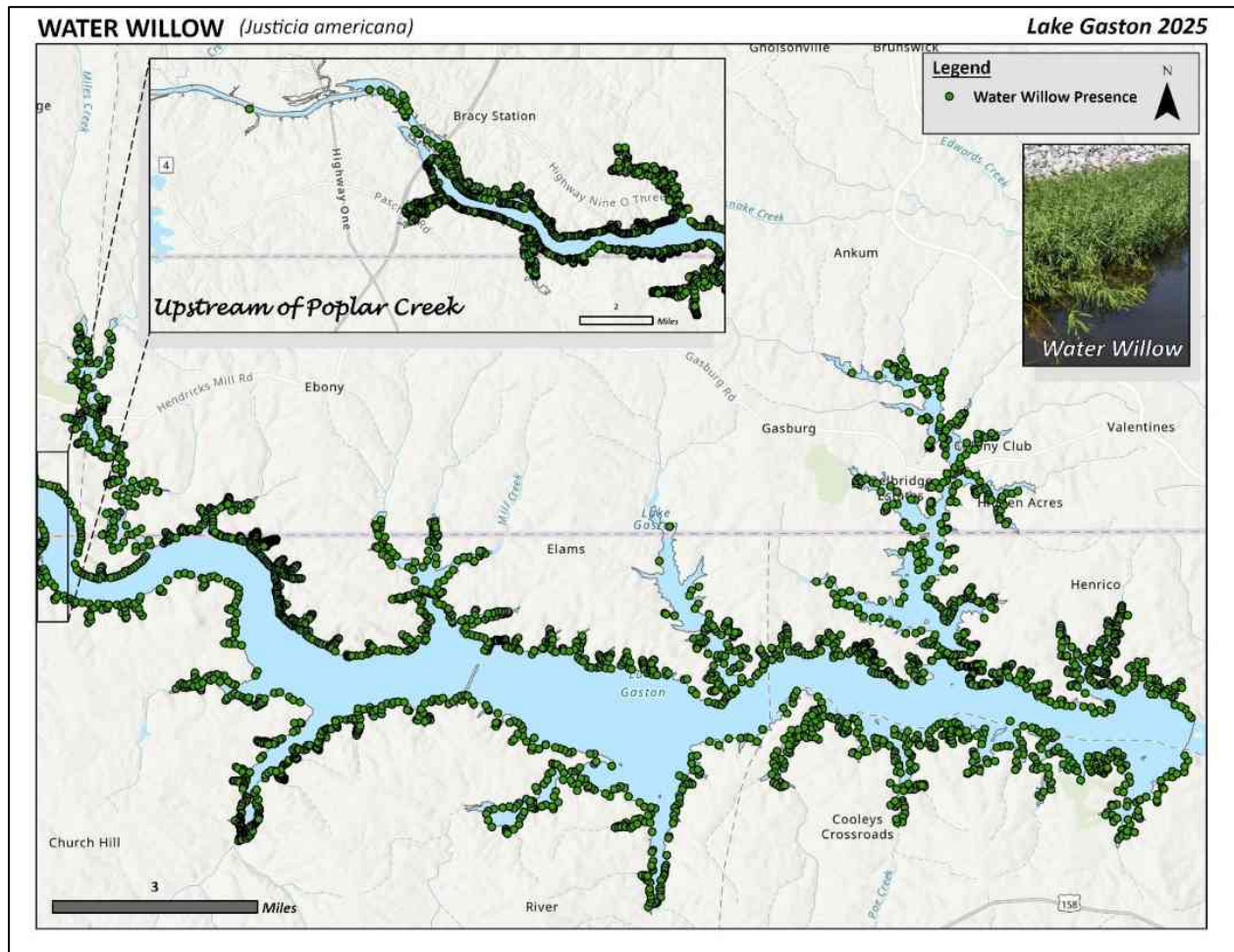
**Figure 1.** Survey efforts of volunteers and NCSU APMP researchers (in total number of sites surveyed and total volunteer hours) directed towards annual vegetation surveys conducted on Lake Gaston, NC/VA between 2016 and 2025. Prior to 2022, effort towards the total sites surveyed were reported with volunteer and NCSU efforts combined, however in 2022 volunteer effort and surveys hours began to be delineated and reported.



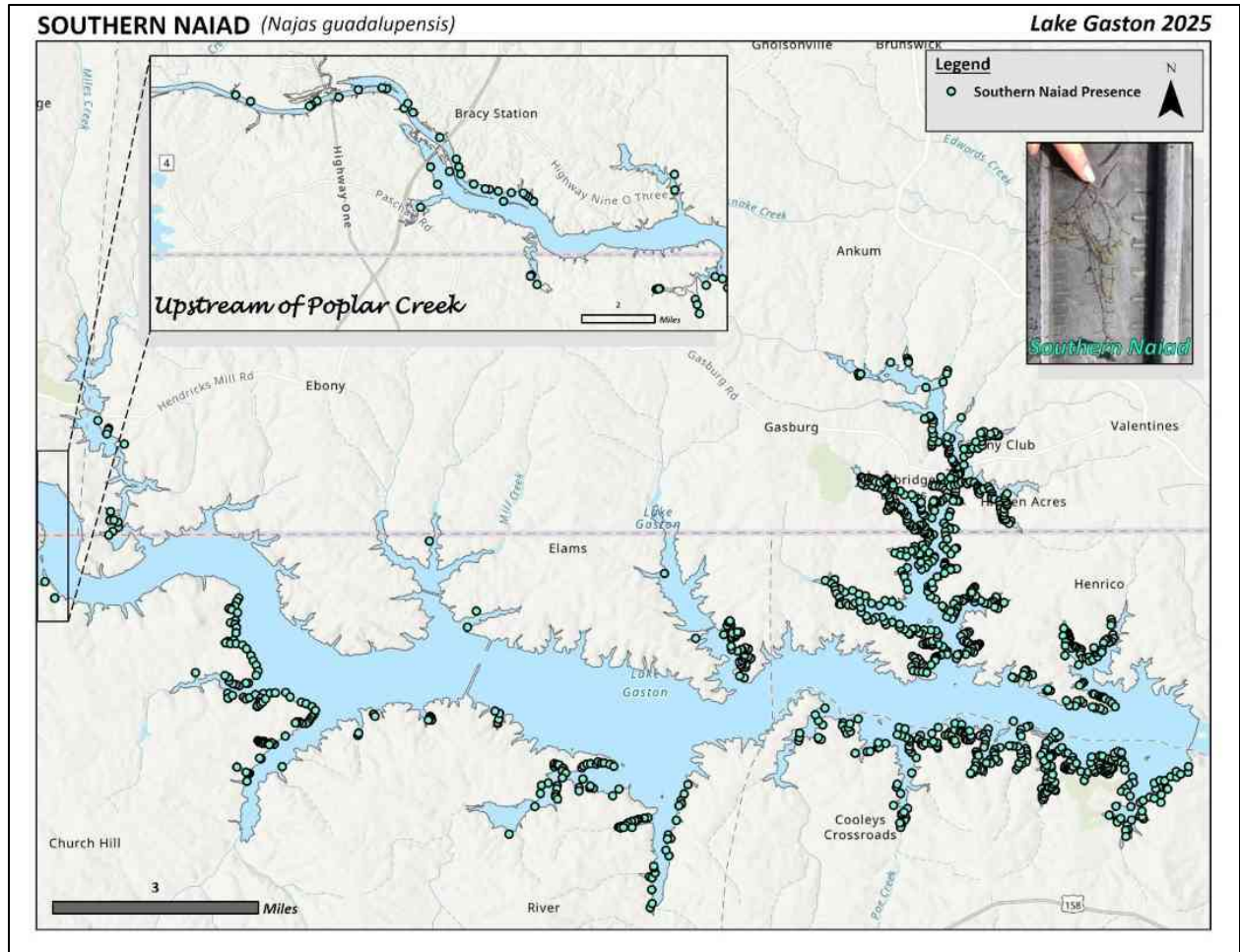
**Figure 2.** Bar graph representing the overall aquatic plant community of Lake Gaston, NC/VA in 2025. Overall, the community is represented by emergent (86%), submersed (43%), floating-leaved (17%), and algae (29%) species.



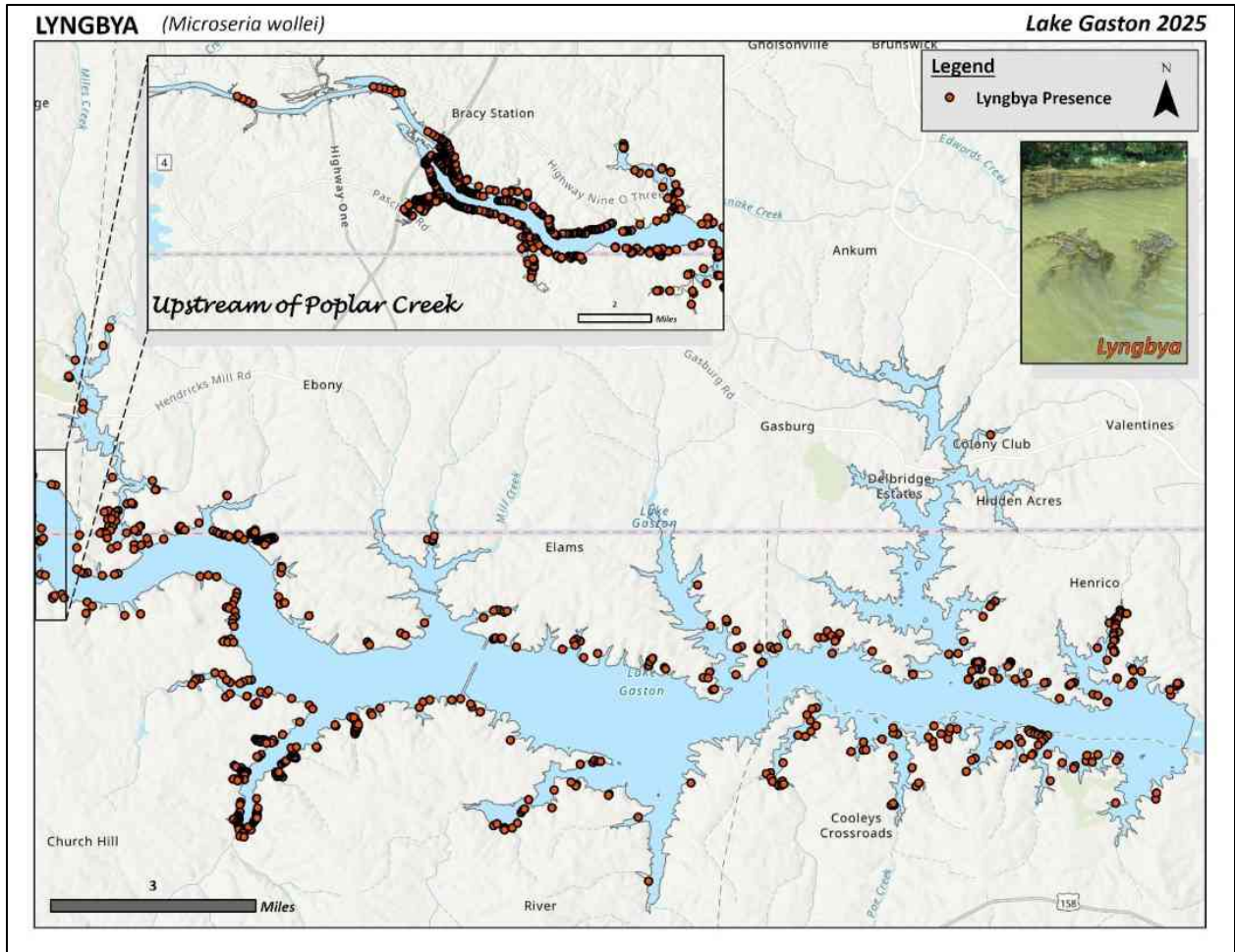
**Figure 3.** Abundance trends for the five most prevalent species found in Lake Gaston, NC/VA during the 2025 survey. The dotted lines represent noxious species (hydrilla and lyngbya) and solid lines represent native species (macroalgae, naiads, and water willow).



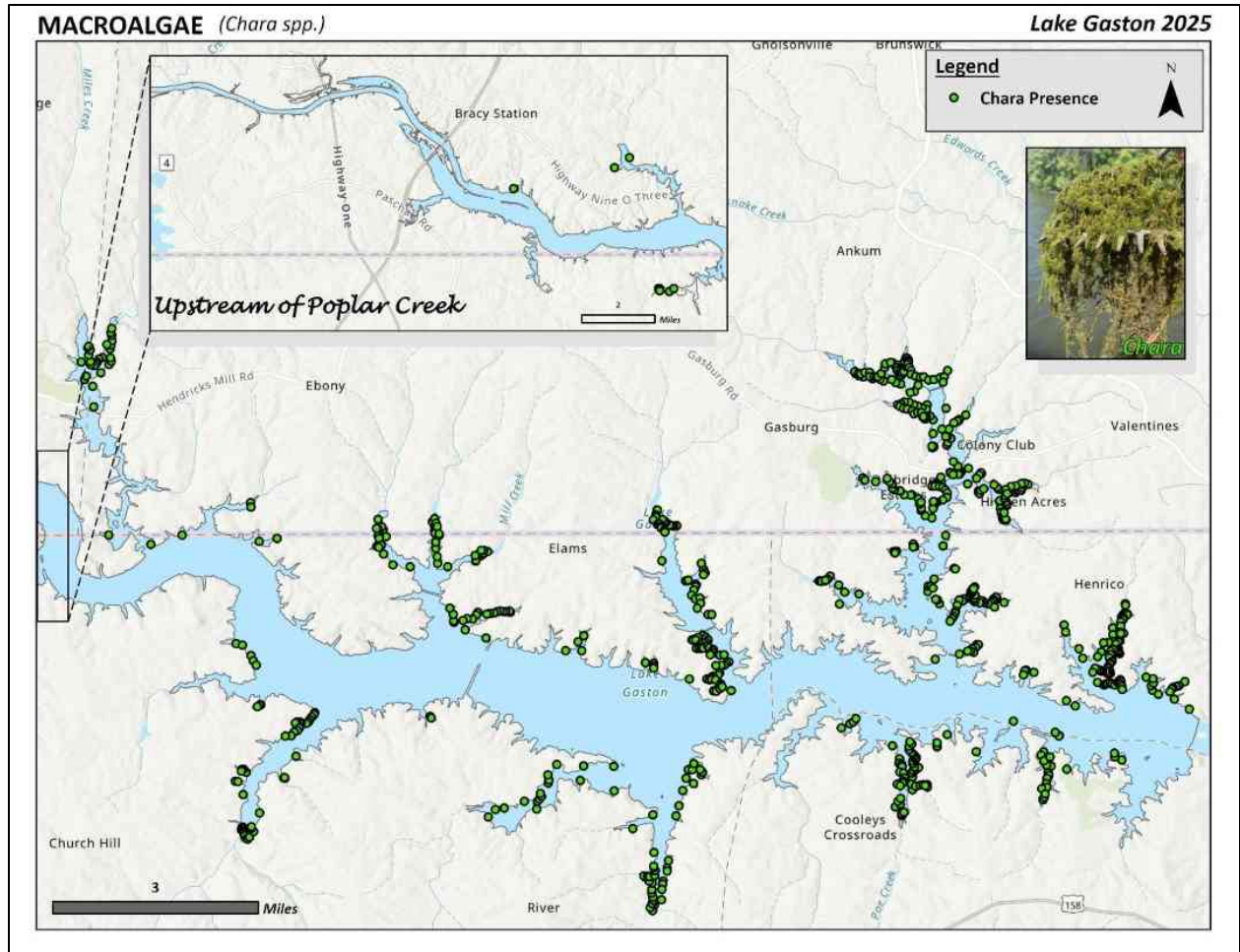
**Figure 4.** Map indicating sites where water willow was present during the shoreline vegetation survey of Lake Gaston, NC/VA in 2025. Water willow was the most prevalent species found in 2025.



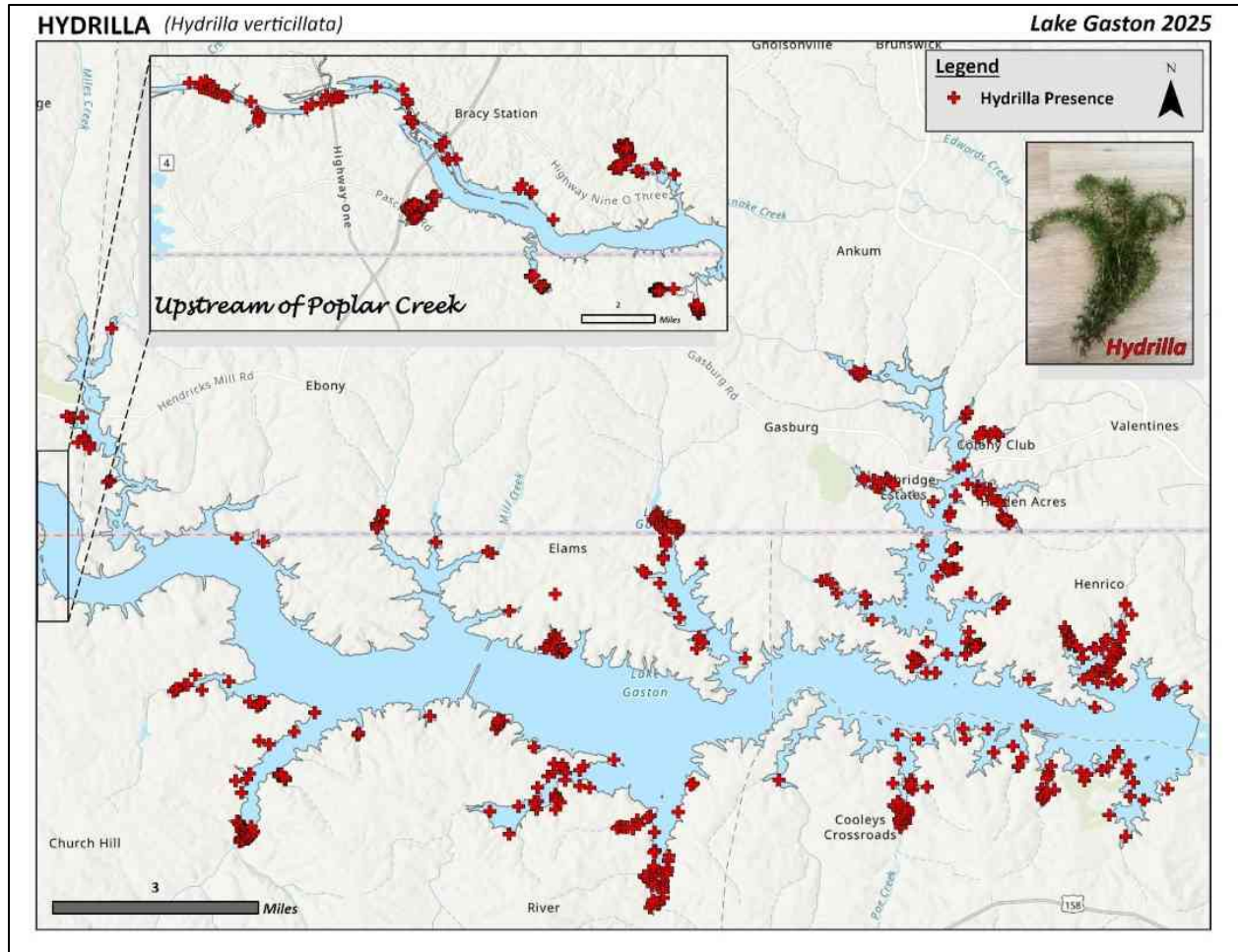
**Figure 5.** Map indicating sites where southern naiad was present during the shoreline vegetation survey of Lake Gaston, NC/VA in 2025. Southern naiad was the second most prevalent species found in 2025.



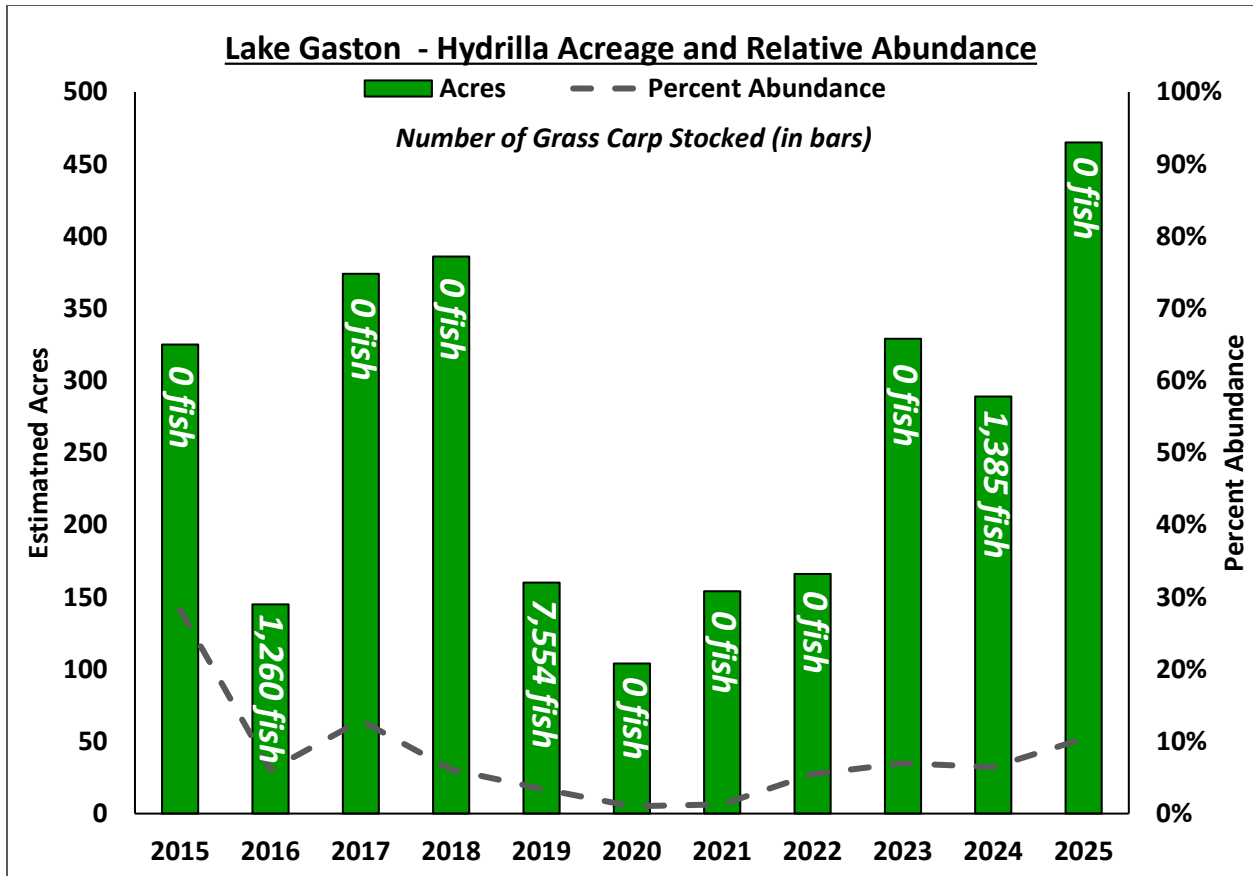
**Figure 6.** Map indicating sites where lyngbya was present during the shoreline vegetation survey of Lake Gaston, NC/VA in 2025. Lyngbya is the third most prevalent species found in 2025.



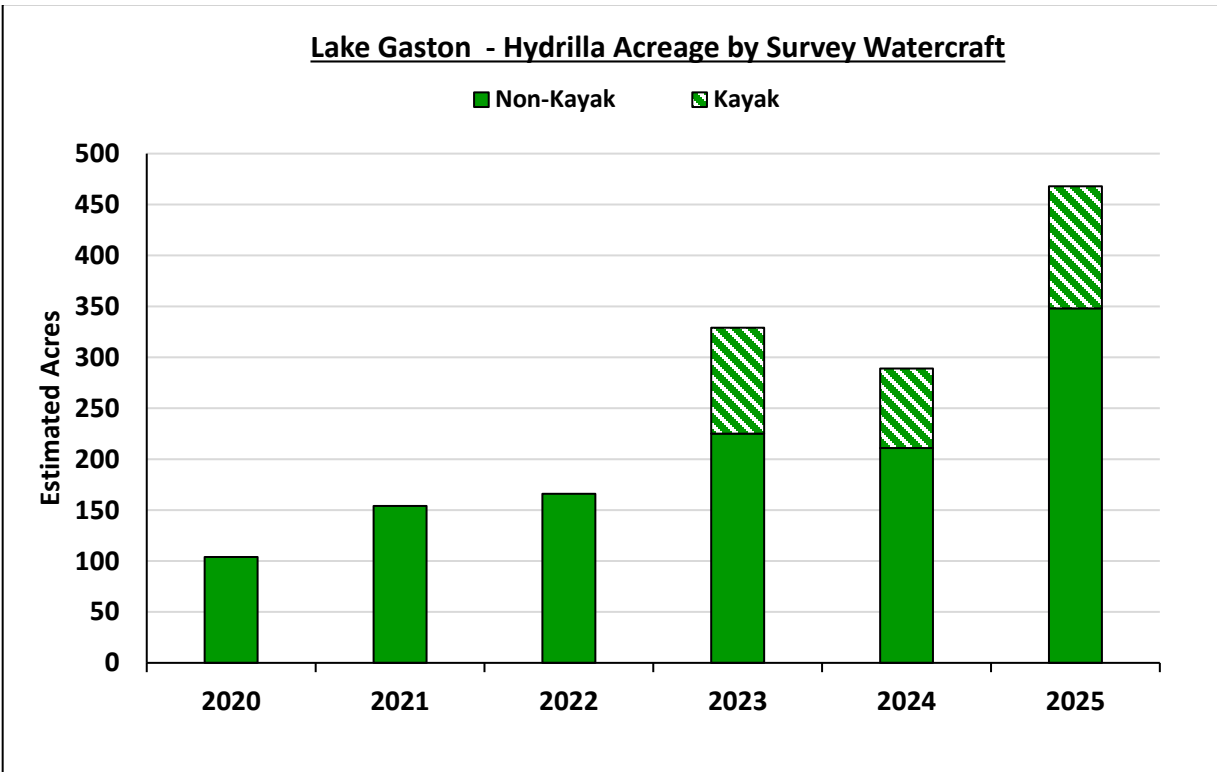
**Figure 7.** Map indicating sites where the macroalgae chara/nitella was present during the shoreline vegetation survey of Lake Gaston, NC/VA in 2025. Chara/nitella is a native species and was the fourth most prevalent species found in 2025.



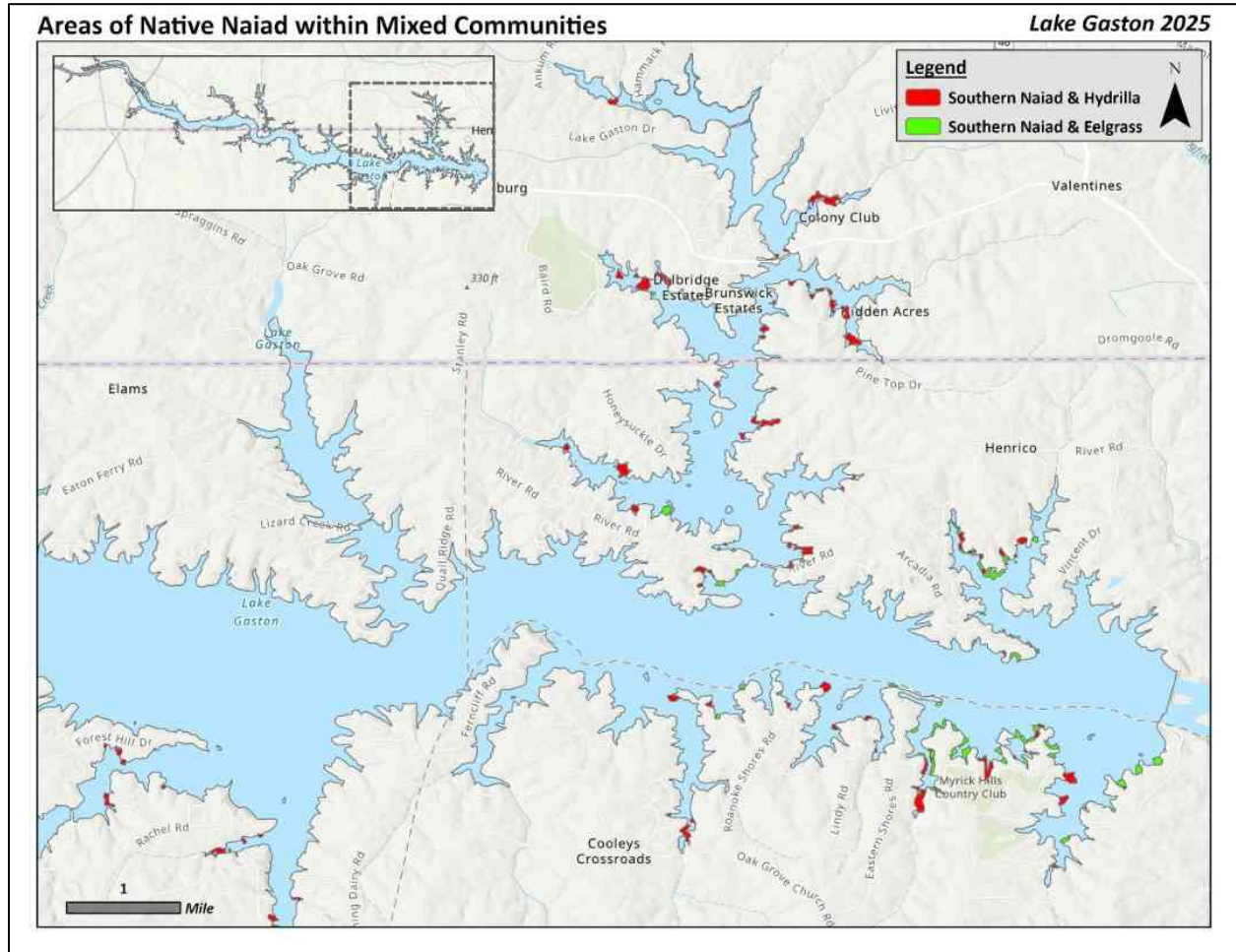
**Figure 8.** Map indicating sites where hydrilla, a federally noxious weed species, was present during the shoreline vegetation survey of Lake Gaston, NC/VA in 2025. Hydrilla was the fifth prevalent species found in 2025.



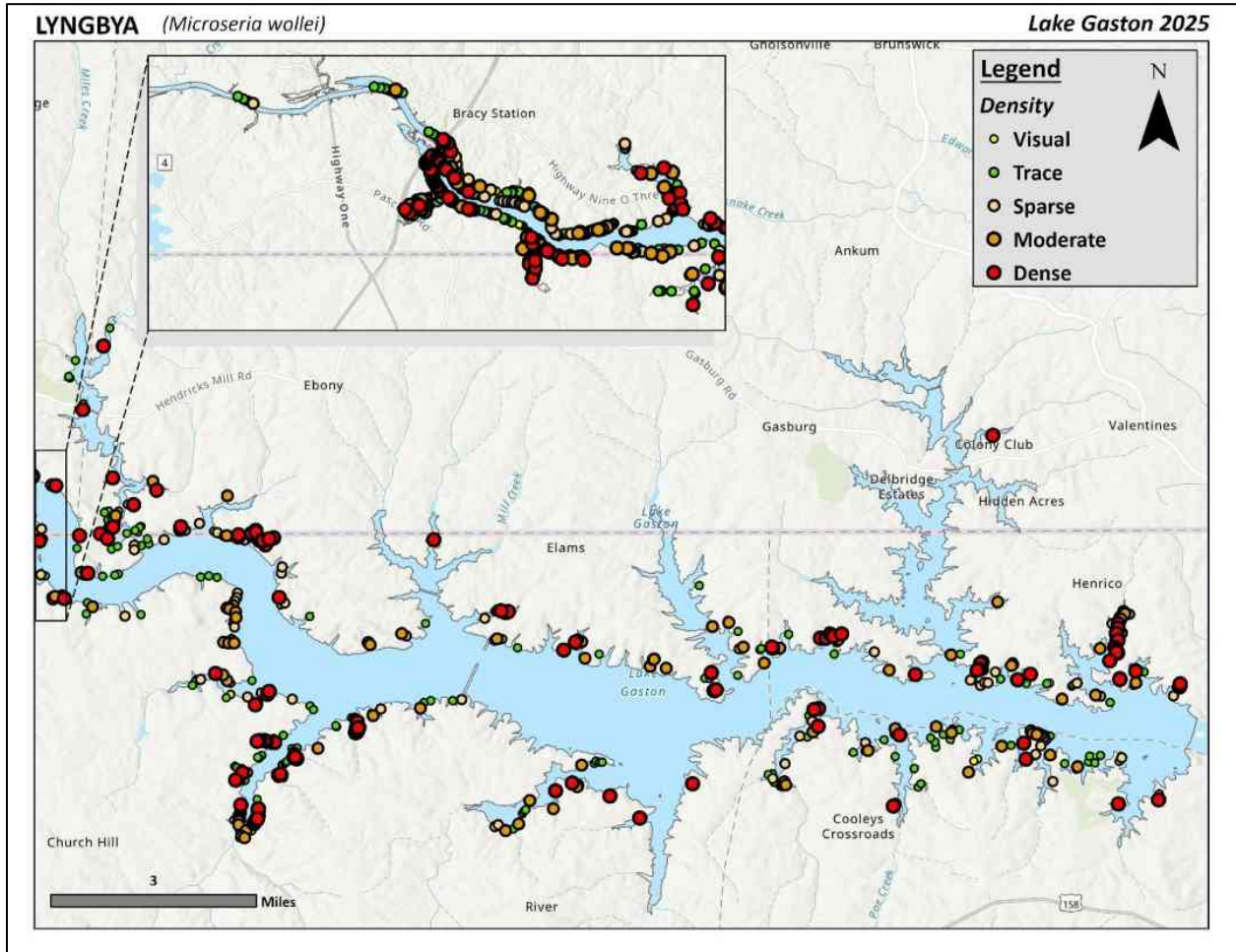
**Figure 9.** Temporal changes in estimated acreage (bars) and percent occurrence (line) of hydrilla in the vegetation survey at Lake Gaston, NC/VA between 2015 and 2025. Yearly grass carp stocking numbers are indicated within each bar.



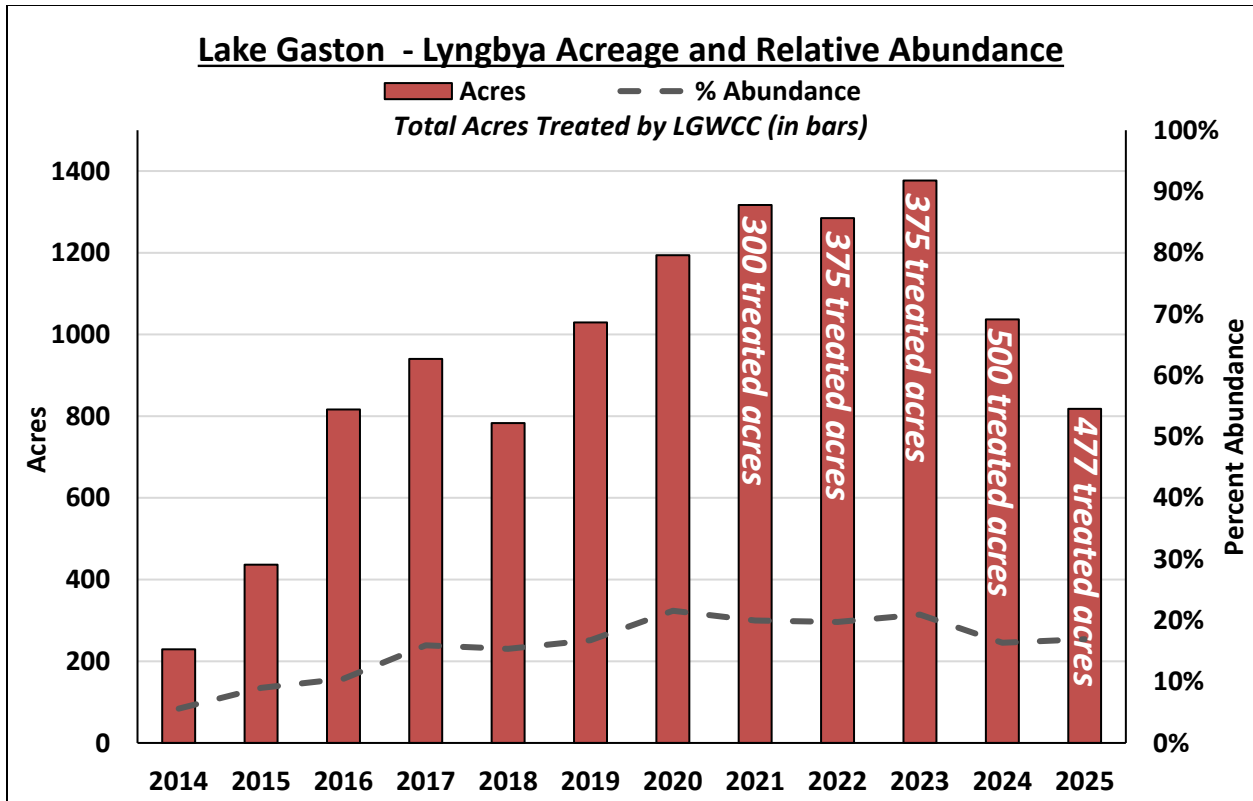
**Figure 10.** Acreage estimates of hydrilla identified by the type of watercraft utilized during the vegetation survey at Lake Gaston, NC/VA. Prior to 2023, efforts were not delineated between watercraft types. In 2023, a team of surveyors utilizing kayaks was formed to address shallow areas of the lake.



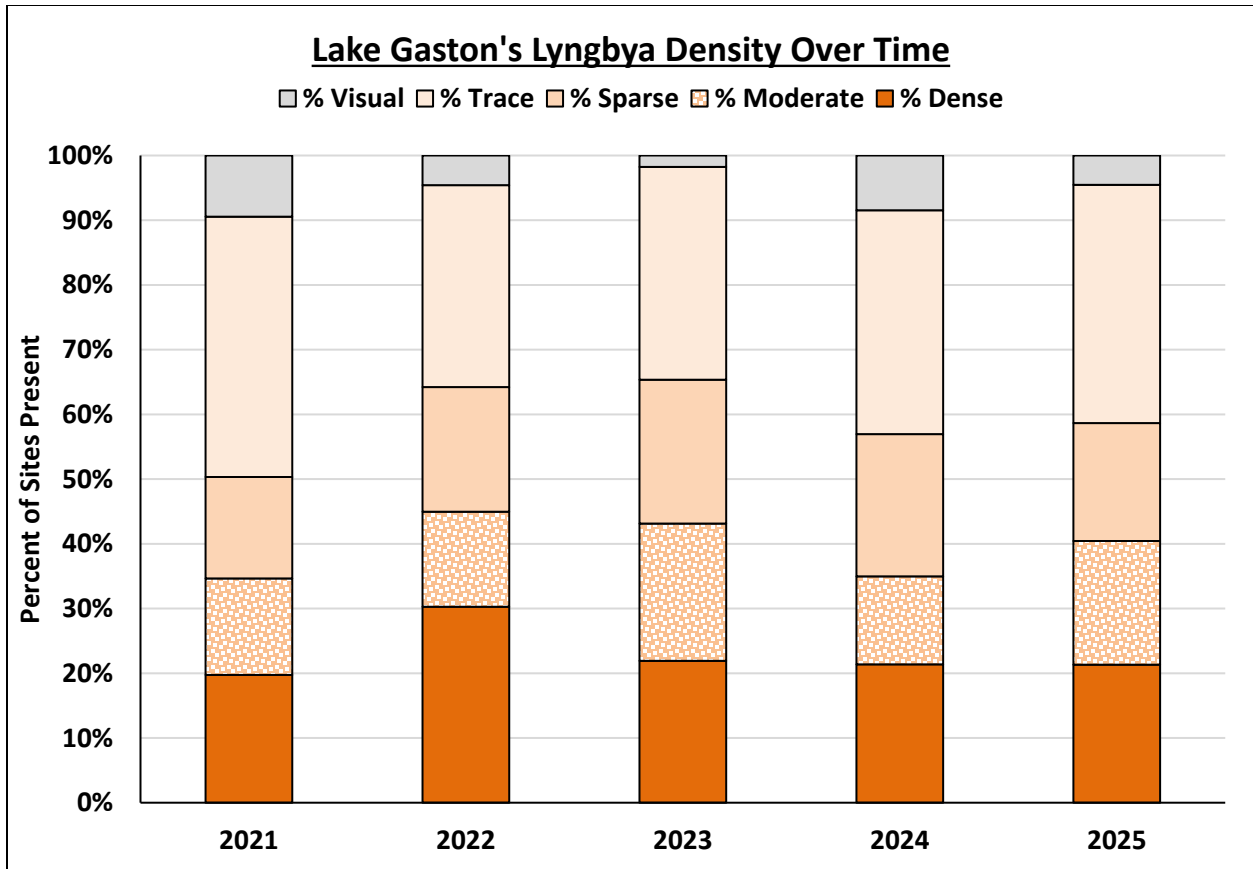
**Figure 11.** Map indicating sites of mixed stands containing hydrilla and southern naiad (127 acres) and southern naiad and eelgrass (62 acres) in Lake Gaston, NC/VA in 2025.



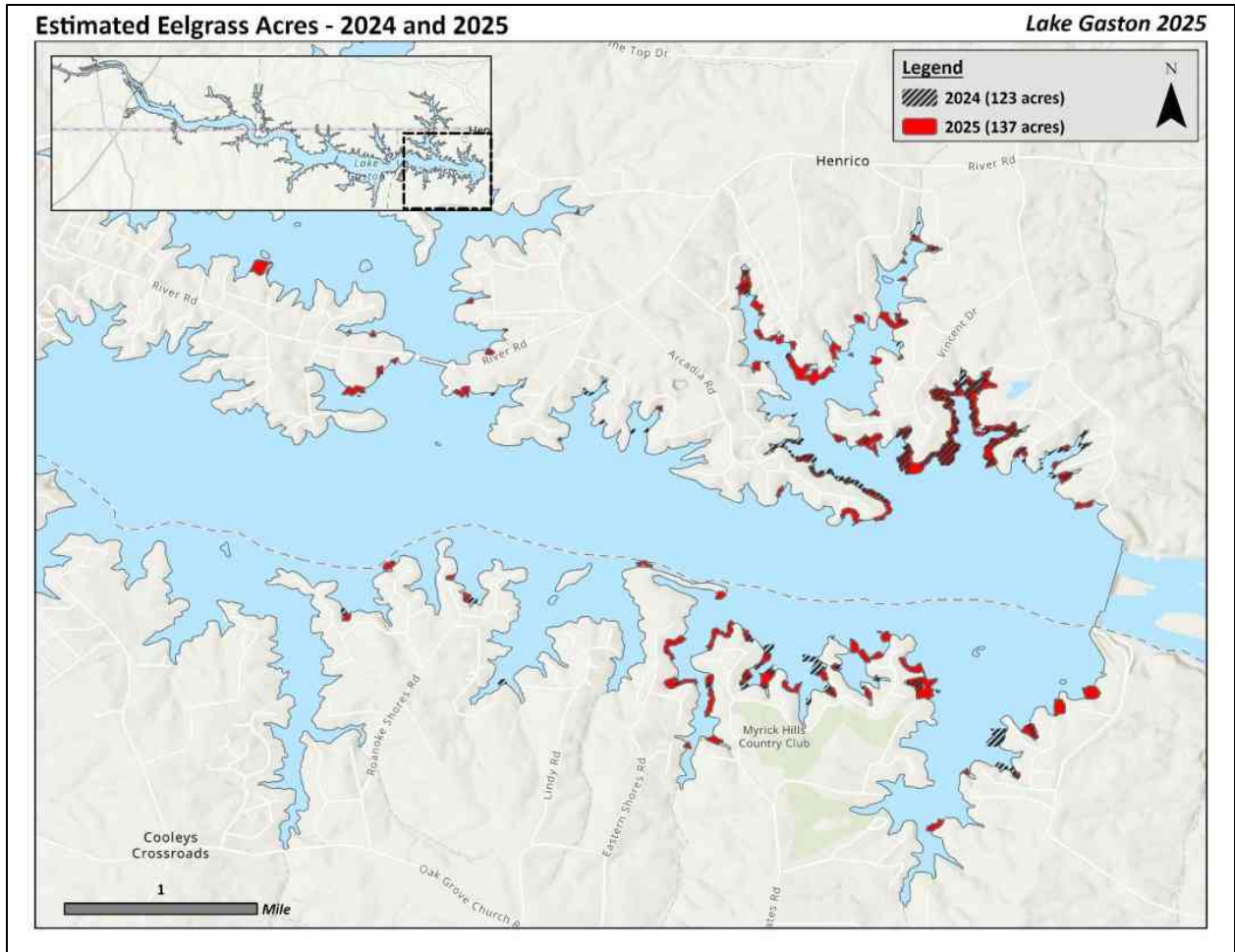
**Figure 12.** Map indicating the site rankings for locations that contained lyngbya during the shoreline vegetation survey of Lake Gaston, NC/VA 2025. Survey sites are incrementally ranked with 1 (green dots) representing trace detection and low mat growth density, 2/3 (orange dots) representing sparse to moderate growth density, and 4 (red dots) representing gear saturation due to high mat growth densities. Yellow dots indicate areas where surface mats were detected, however mat density was not sampled.



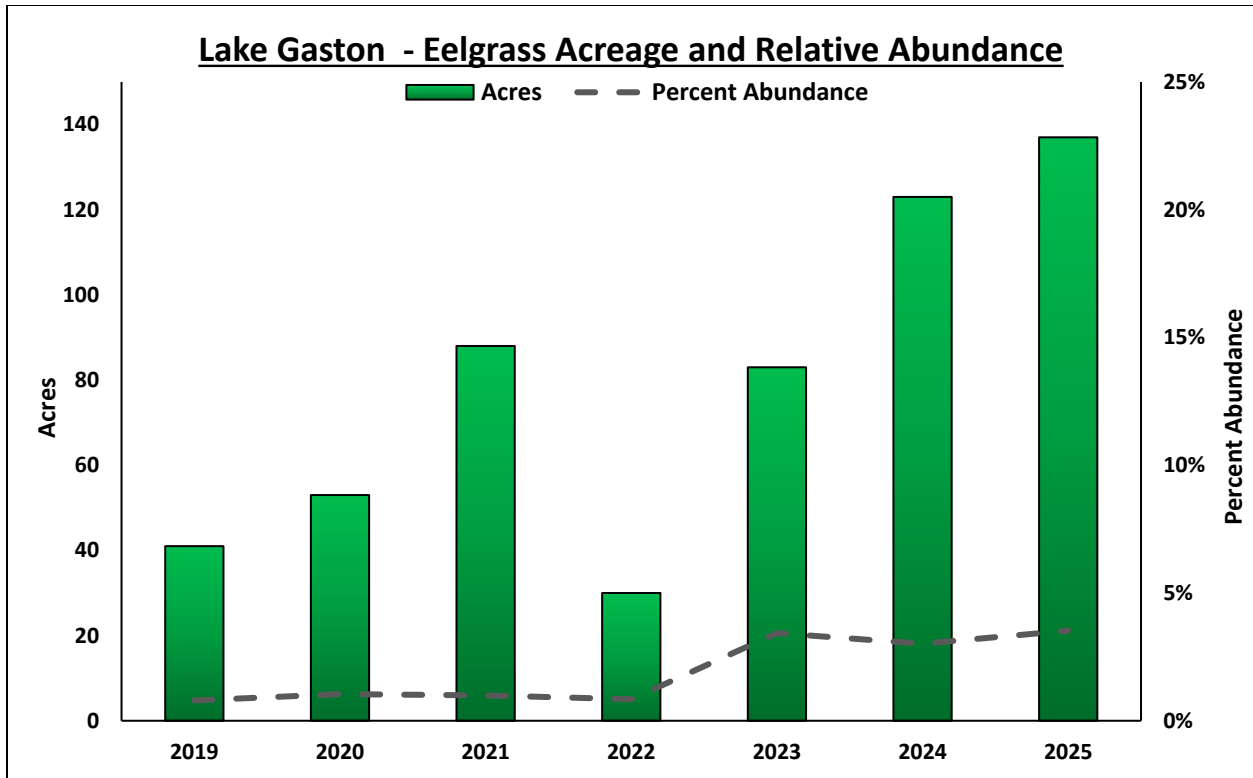
**Figure 13.** Estimated standing acreage (bars) and percent occurrence in the vegetation survey (line) of lyngbya in Lake Gaston, NC/VA between 2014 and 2025. Annual treatment acres provided by the Lake Gaston Weed Control Council’s (LGWCC) lyngbya treatment program are indicated within each bar.



**Figure 14.** Temporal trends in the density rankings of benthic lyngbya mats in Lake Gaston, NC/VA from 2021 to 2025. Trace density represents low mat growth density, moderate mat growth is represented in the sparse and moderate categories, and dense represents high growth levels that result in gear saturation. Visual rankings were sites in which lyngbya was observed, but the benthic mat was not sampled.



**Figure 15.** Estimated coverage of eelgrass in 2024 and 2025 at Lake Gaston, NC/VA.



**Figure 16.** Estimated standing acreage (bars) and percent occurrence in the vegetation survey (line) of eelgrass in Lake Gaston, NC/VA between 2019 and 2025.