

Kerr Lake Vegetation Survey

October – November 2011

Report submitted by NC State University

Background

Hydrilla (*Hydrilla verticillata*) is a non-native invasive submersed aquatic plant. This plant was first documented in Wake County, North Carolina in 1980. Initial infestations were confined to small ponds and lakes, however, by 1988 it had spread into Lake Gaston. The plant continued to spread across North Carolina and increased acreage in both the North Carolina and Virginia portions of Lake Gaston into the 1990's.

In the fall of 1992, hydrilla was documented in the North Bend Park portions of Kerr Lake. The first reports were of small patches in the back of one cove near a boat ramp location. Because of the location (near the dam, and adjacent to Lake Gaston) it was thought that boats traveling between the two lakes had been the primary method of dispersion. Following surveys in this area, additional small patches (approximately 8 acres total) were discovered in 1993. Other portions of Kerr Lake were not surveyed, however, some boat ramps in the NC portion of the lake were examined and no Hydrilla found. Treatments of the known locations of Hydrilla were started in 1993, using a contact herbicide Aquathol-K (endothall) plus a sinking agent Nalquatic. Based on information from NCDNR Aquatic Weed Control Program records the treatments were successful and only conducted in 1993 and 1994. In July 1996 after reports of weed problems in the Satterwhite Point area, a survey of that area was conducted. Several locations were found to contain Chara and Brittle Naiad (*Najas minor*). No additional information on surveys or treatments was found.

In the summer of 2009, there were reports of Hydrilla problems in the North Carolina portions of Kerr Lake. Additional reports in 2010 gave indication of an increasing problem in these areas. Paul McKenzie, (Vance County, NC Cooperative Extension Agent) sent several samples to NC State University for positive identification and organized a survey of the North Carolina portions of Kerr Lake mainly in the areas of Nutbush and Little Nutbush Creeks. A group of local volunteers and representatives of various Governmental Agencies participated and found Hydrilla in many of the areas surveyed. Reports from others indicated that the Hydrilla may be more widespread and actual locations and acreages were unknown.

After meeting with representatives of the USACE, NC and Va Fish and Wildlife officials and others it was decided that a thorough survey of Kerr Lake was needed and NC State University was contracted to conduct the survey.

Methods

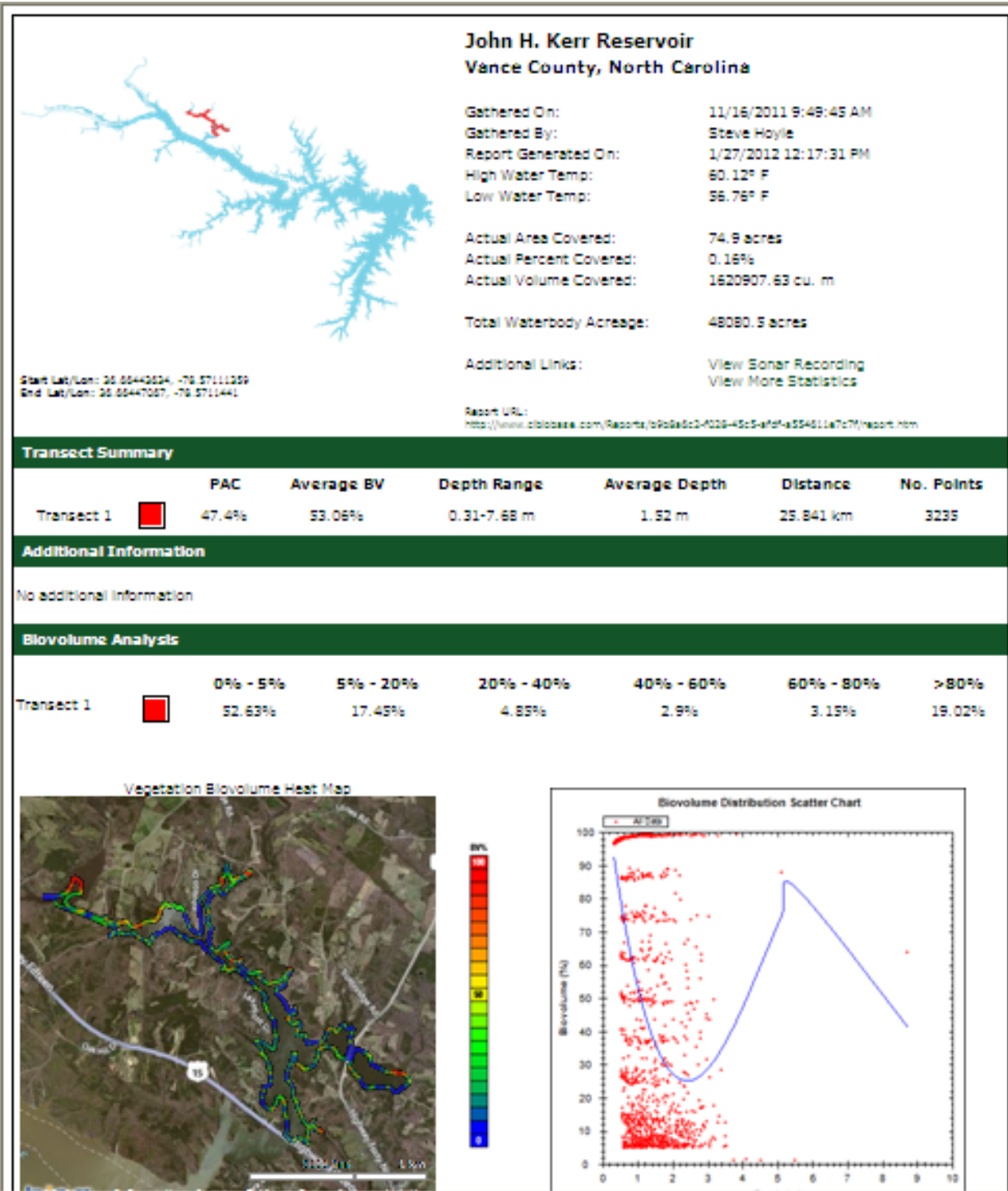
Dr. Michal Netherland USACE, University of Florida, and Dr. Robert Richardson, NC State University discussed survey methods and decided that using a new high resolution SONAR technique would provide the information needed for this survey. The data collected was transmitted to a private company (Contour Innovations) to process the information and provide maps of all surveyed areas. The sonar unit recorded information on water depth, plant presence and plant height as well as location data. However SONAR methods cannot determine exact species, only vegetation presence or absence. In addition to SONAR, staff members from NC State University recorded the locations of Hydrilla and additional plants. Rake collections of plants were done to aid in species identification.

The survey began October 12, 2011 and was completed on November 16, 2011. A total of approximately 650 miles of shoreline were surveyed. During the survey timeframe, the lake elevation ranged between approximately 296 and 298 feet msl.

Shoreline use and lake map digital information was provided by USACE to be used in completing this survey.



Sonar unit used in Kerr Lake Surveys



Example of reports generated by Contour Innovations

Results

Over a 30+ day period, Hydrilla was observed as low growing, small clusters of plants as well as topped out surface mats in various locations throughout the survey. Hydrilla was the most frequent plant observed in areas where dense plant beds were present. Several other plant species were found in significant quantities in many locations throughout the lake. Native submersed plants included *Chara sp./Nitella sp.* (macroalgae), *Potamogeton diversifolius* (variable leaf pondweed), *Potamogeton pectinatus* (sago pondweed), *Najas guadalupensis* (southern naiad). Several locations also had *Najas minor* (brittle naiad) a non-native invasive species. Little Nutbush Creek contained large mats of the filamentous algae, *Spirogyra*. Although not a direct part of the project, several small populations of floating leaf plants were observed including *Nuphar sp.* and *Brasenia sp.* Also, large sections of the shoreline contained a variety of *Polygonum sp.* (smartweeds) and to a lesser extent *Justicia americana* (water willow), and other emergent plants.

Because the SONAR unit defined areas of submersed plants without species identification, hand drawn maps were used to determine areas of Hydrilla infestations. The information was transferred from the maps into ArcGIS software and this information was converted to shapefiles and used to determine acreage. The information was then compared to the processed data from Contour Innovations and slight corrections made based on both sources. *A CD of the shapefile information is included.*

During the survey process it was noted that most of the Hydrilla infestations occurred in areas of high human use including State Parks, boat ramps, commercial marinas, and in areas of higher populations of people based on number of docks. As the survey work continued large areas of undeveloped shoreline were found to contain almost no Hydrilla.

There seem to be four main areas of high occurrences of Hydrilla:

1. Little Nutbush Creek had the largest continuous areas of shoreline containing Hydrilla; the back of numerous coves had extensive populations.
2. Nutbush Creek has several large populations of Hydrilla, but also large areas with Chara/Nitella and Naiads (esp. *Najas minor*).
3. North Bend Park the site of the original infestations has several small populations in the same general areas as 1993.
4. Clarksville Va. areas include Staunton View ramp area, Occoneechee State Park ramp area, Clarksville Marina, dock at convenience store, and scattered locations mainly along the south shore, west of Clarksville bridges

Based on the information obtained during the survey, our estimated total acreage of Hydrilla in Kerr Lake is 698 acres, located mainly in the areas listed above.

The sections of the main lake and between Clarksville and Nutbush Creek (Longgrass Point) including Mill Creek, Butcher Creek, Beaver and Grassy Creeks contain numerous areas with native vegetation, but little to no hydrilla (small patch noted in back of Beaver Creek).

No Hydrilla was observed at any of the boat ramps in these areas.



Recommendations

Additional whole lake surveys should be conducted to determine spread and document impacts on public use areas and native plant populations. Frequency of these whole lake surveys could be based on random point surveys conducted annually. Point survey efforts should focus on high use areas and boat ramps/marinas.

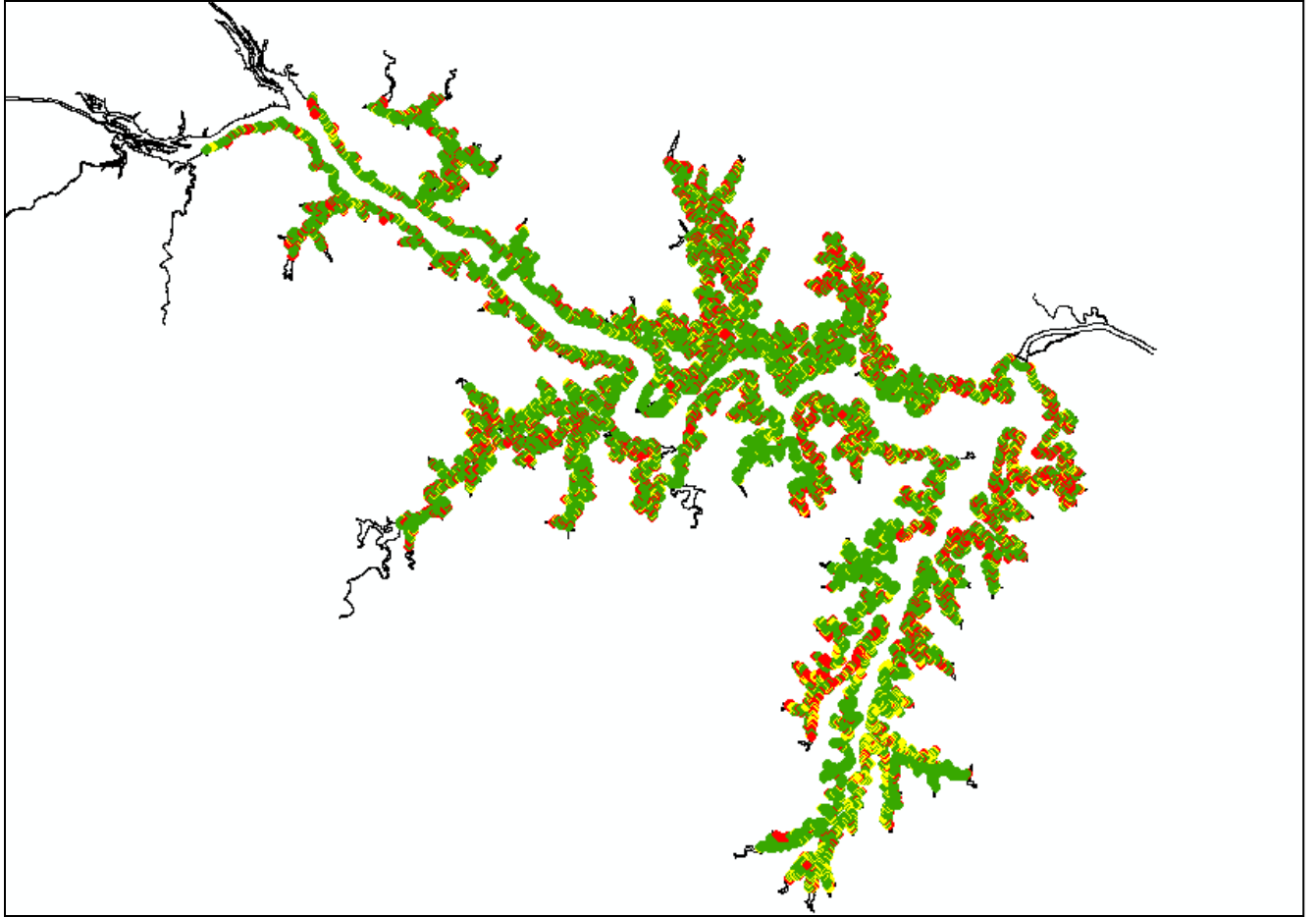
Grass carp (*Ctenopharyngodon idella*) would be the cheapest management option for full lake hydrilla control. Normal stocking rates would be 15 fish / vegetated acre. However, submersed native plants may also be controlled.

Contact herbicides applied by USACE approved applicators may be the best option for control in many areas. Some sections of the currently infested North Carolina portion of the lake may be suitable for systemic herbicides, but water flow will limit their use. Any herbicide applications should be made by these approved applicators and reports containing acres treated, herbicides used and rates, some evaluation of biomass reduction, and other information should be made to the USACE for future determinations of treatments.

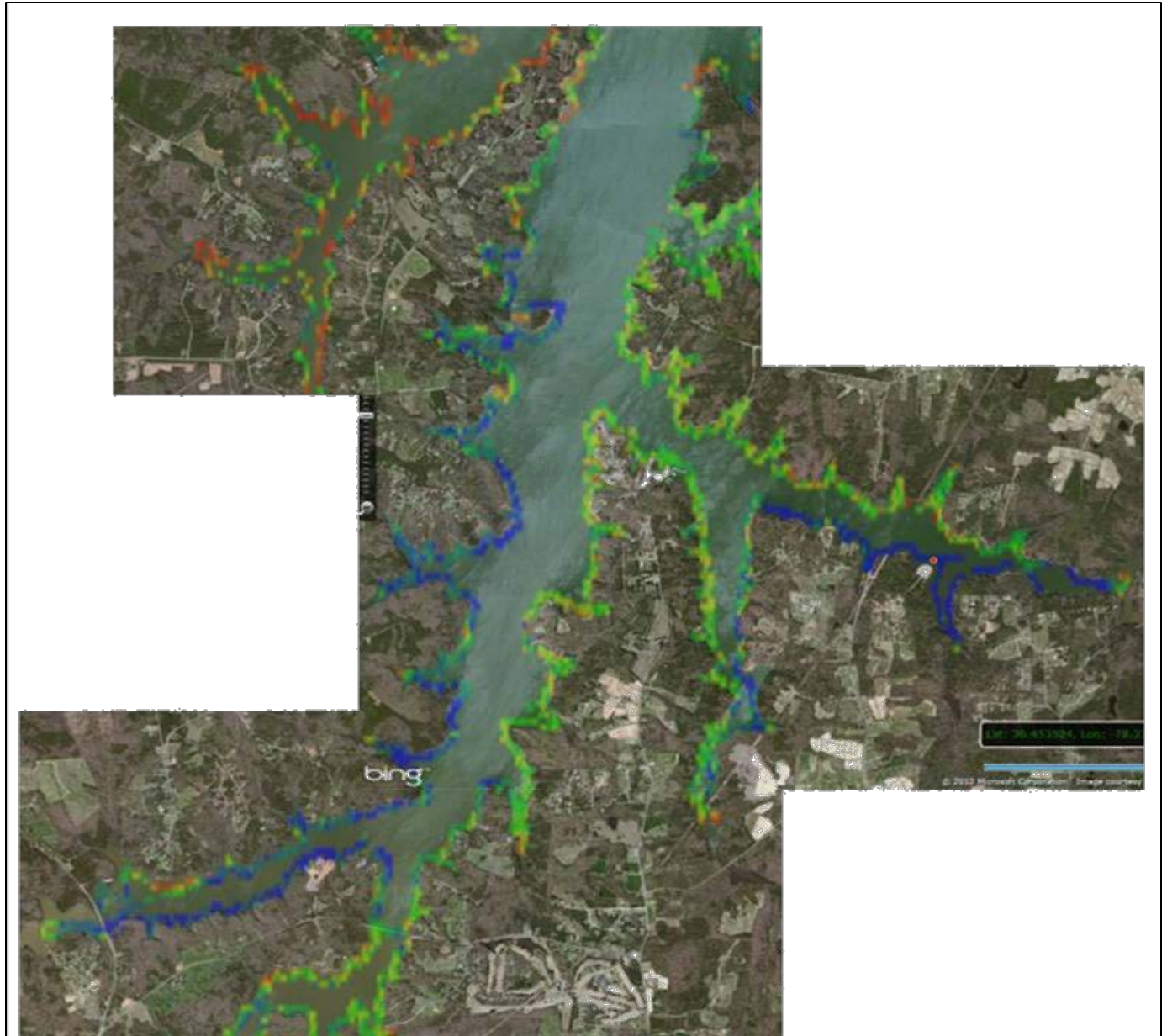
Signs should be placed at all boat ramp/marina locations to help limit unintentional spread in Kerr and to other water bodies.

Information should also be provided to private individuals with "lake front" property, and/or docks. This information could provide instructions for chemical treatments and proper identification of native and non-native plant species. In addition, a reporting system to track new infestations should be implemented. These individuals should be encouraged to rake out or otherwise remove floating mats in the fall to slow spread

Public funds (unknown sources) should be used to treat in areas around public facilities including swimming areas and boat ramps. Repeat applications may be needed and applicators should be required to follow-up in order to reduce tuber formation.



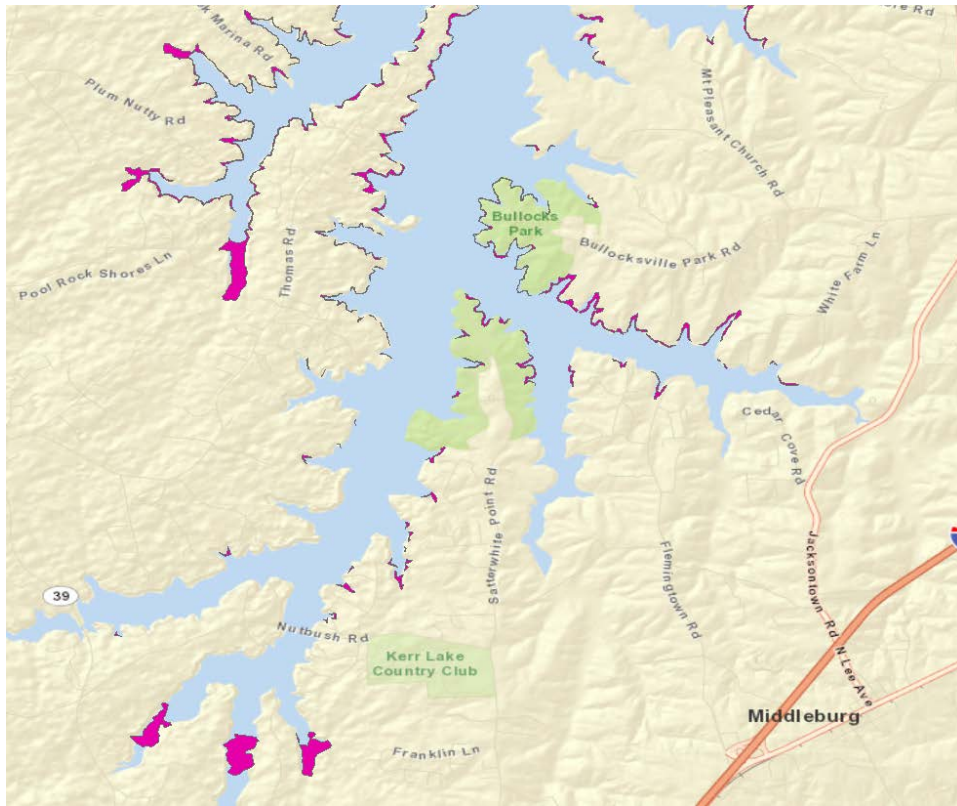
Total Area Surveyed With Relative Plant Density Mapped



Contour Innovations map of plant density

Nutbush and Little Nutbush Creeks

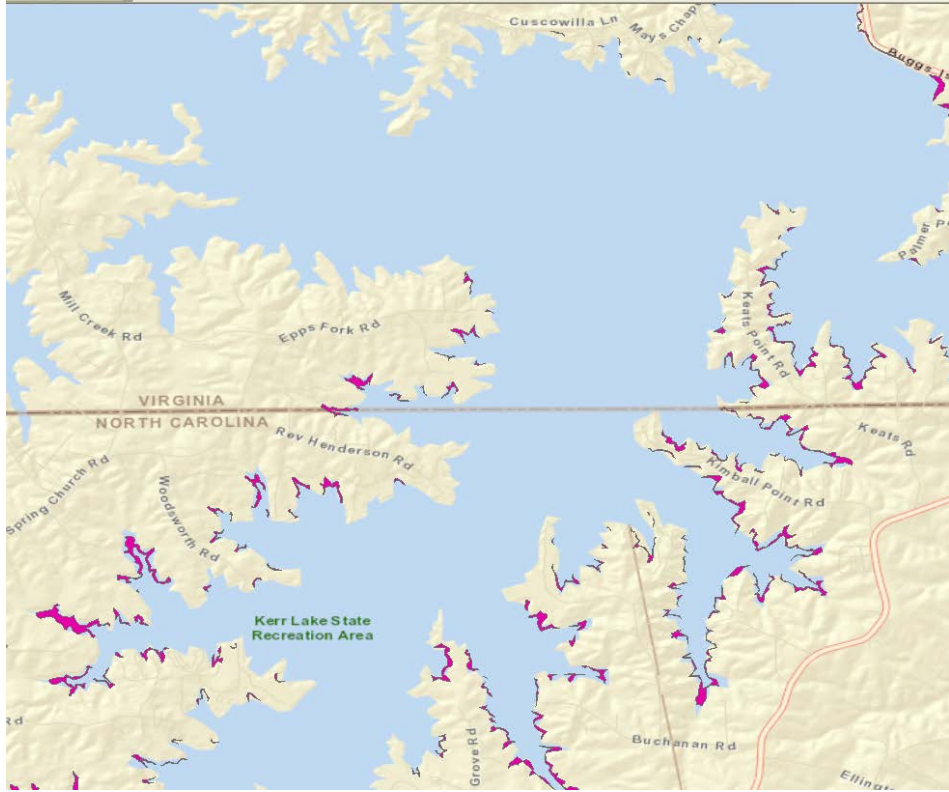
Red high density, Blue low density



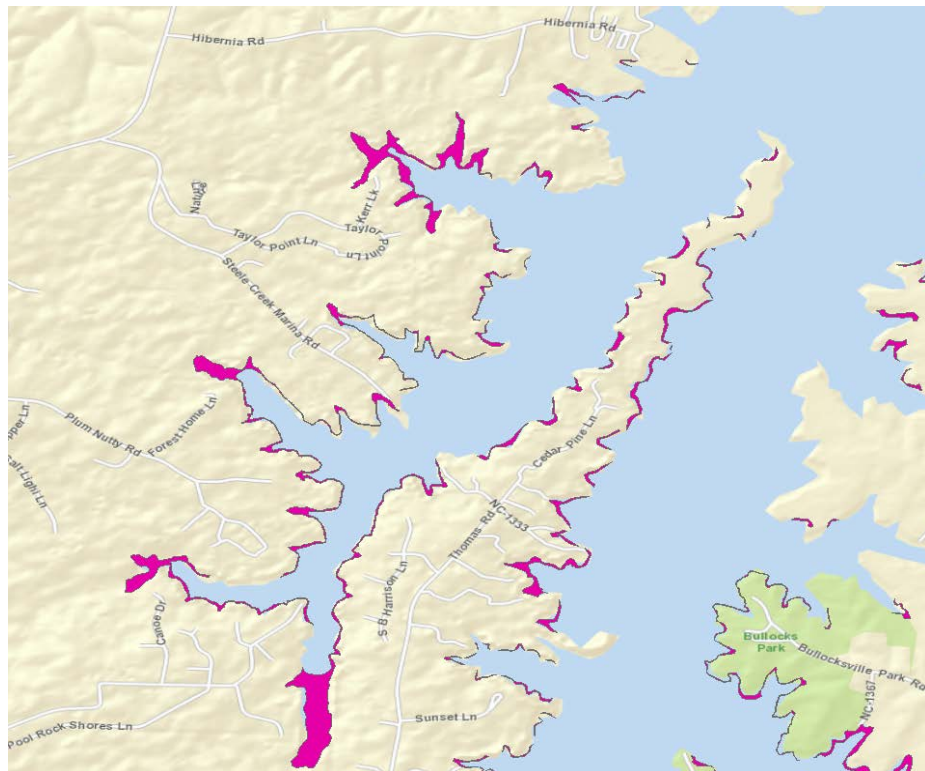
Nutbush Creek Mapped Hydrilla Locations



Hydrilla



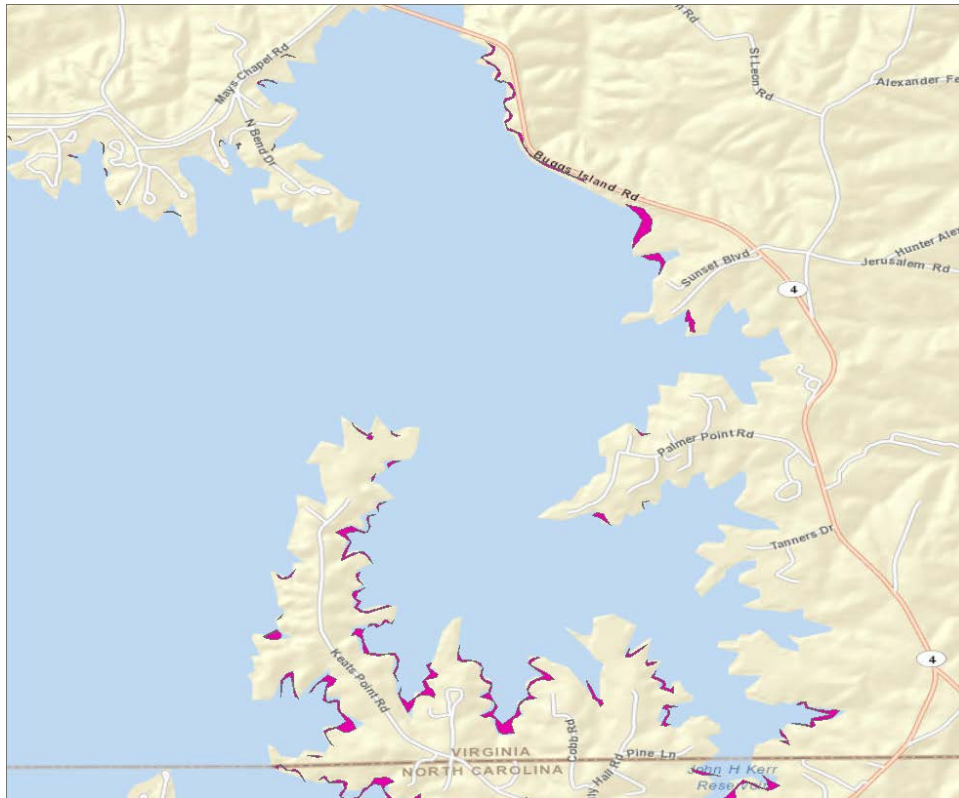
North Section of Nutbush Creek Mapped Hydrilla Locations



Little Nutbush Creek Mapped Hydrilla Locations



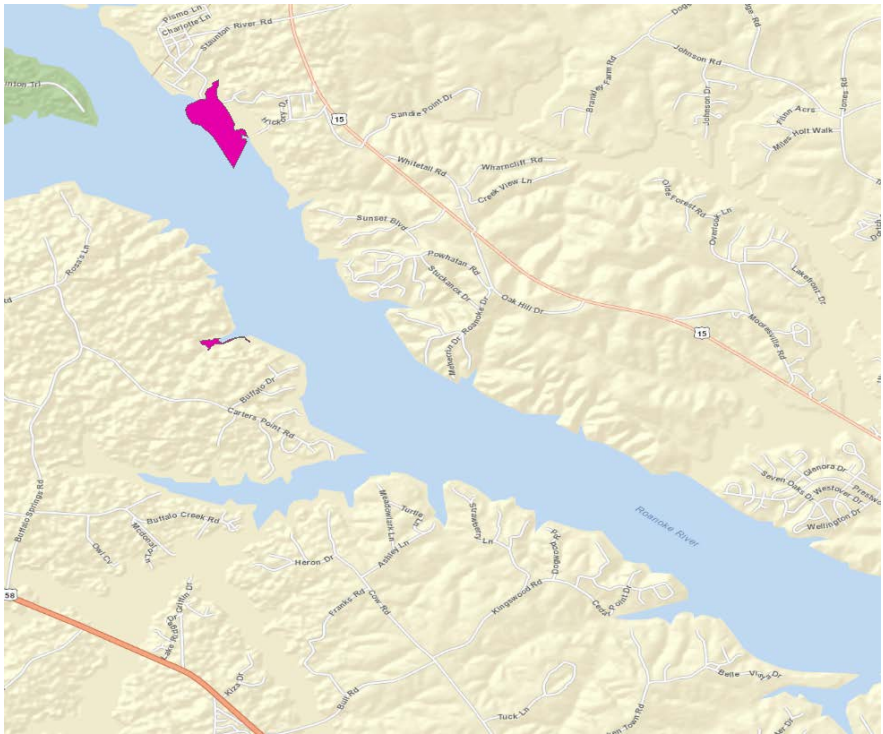
Large Hydrilla site, from boat location to back of Little Nutbush Creek



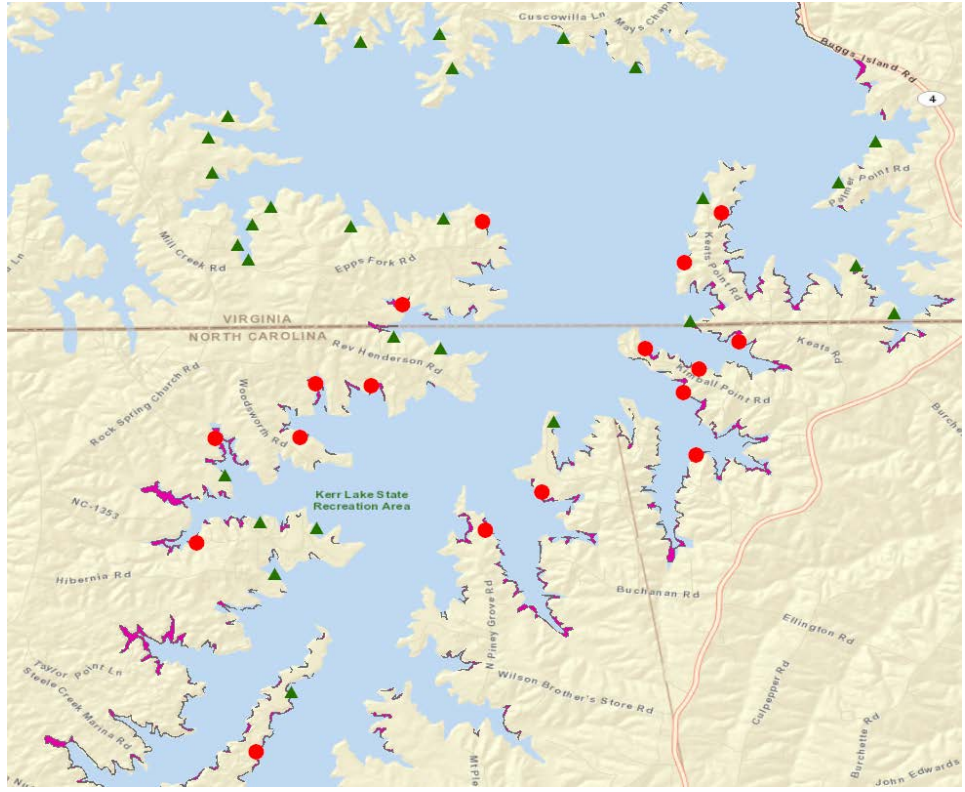
North Bend Park Mapped Hydrilla Locations



Clarksville Marina and State Park Mapped Hydrilla Locations



Areas West of Clarksville Mapped Hydrilla Locations



Point Survey Locations
Green – No Hydrilla
Red - Hydrilla