

Kerr Lake Vegetation Survey

February 8, 2017

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.

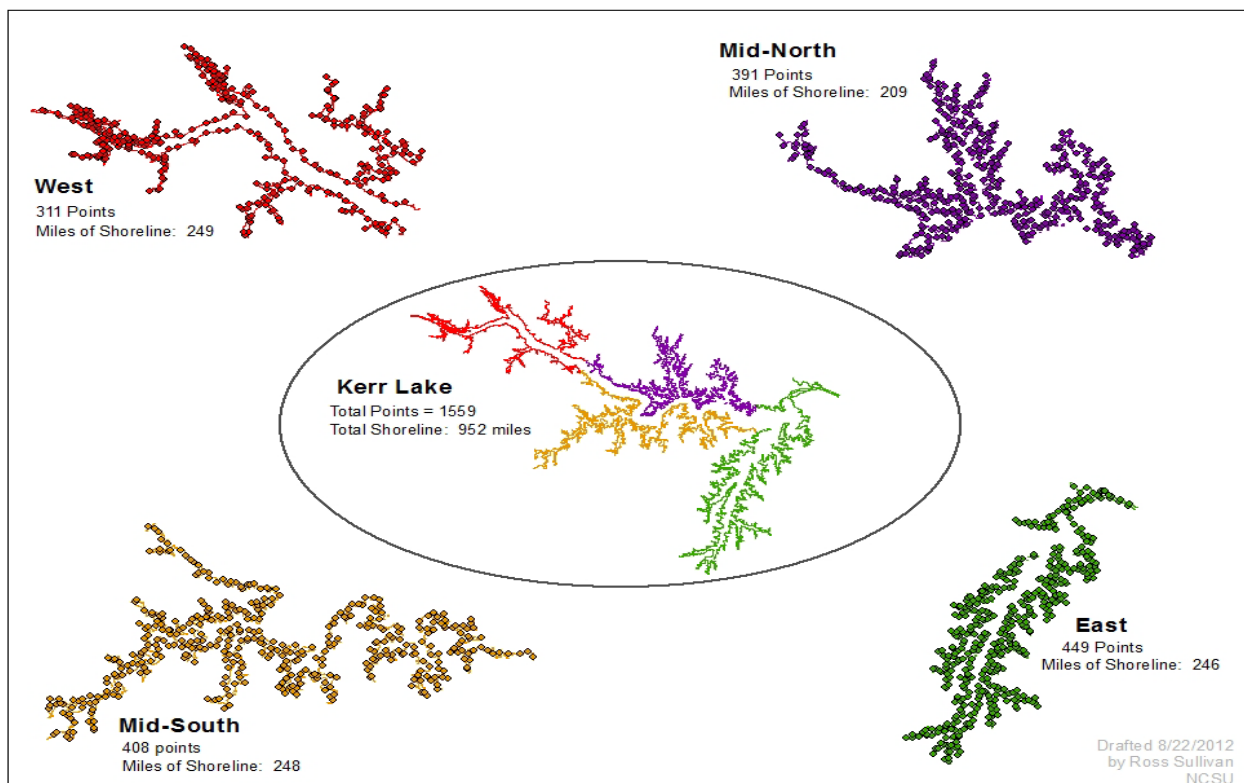
In the fall of 1992, hydrilla was documented in the North Bend Park portions of Kerr Lake. The first reports were of small patches in the back of one cove near a boat ramp. Because of the location (near the dam, and adjacent to Lake Gaston) it was thought that boats traveling between the two lakes had been the primary method of dispersion. Following surveys in this area, additional small patches (approximately 8 A 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 problematic Hydrilla infestations 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 hydrilla may be more widespread and actual locations and acreages were unknown. A full lake survey was conducted in the fall of 2011 indicating 698 A of Hydrilla.

Methods

The survey began September 19, 2016 and was completed on November 4, 2016. During the survey timeframe, the lake elevation ranged between approximately 298 and 307 feet msl. Unusual water levels (following heavy rainfall) occurred during the middle part of October, but did not prevent the survey from being completed. Shoreline use and lake digital map information was provided by USACE to be used in completing this survey.

Beginning in 2012, a point intercept method was incorporated in order to more accurately determine species presence/absence and assist in determining Hydrilla spread. A total of 1559 points were placed at an approximately 0.5 mile interval around the shoreline based on USACE shoreline shape file. Some of these points occurred in areas that were not accessible for various reasons including low water, behind culverts, below dam structure. Of the predetermined points, 1336 were actually sampled for vegetation in 2016 (1245 in 2012, 1316 in 2013, 1336 in 2014, 1307 in 2015). The sample method included visual observation of area and 2 rake tosses at each point (or as close as possible to actual point). In addition, Sonar (same method as 2011) was used in areas where Hydrilla was found, along with hand drawn maps and notes. In addition, rake samples were taken at two points around all boat ramps.



Results

During the survey period, with the exception of October 8 – 23, lake elevations remained between elevation 300 and 298 allowing for accurate sonar and rake toss data collection. Most of the living hydrilla biomass remained well below the surface. In shallow water (2 ft. or less) no rooted plants were observed, however beds of plants were found in water depths of 6 to 8 ft. Based on previous surveys, hydrilla growth was sparse and relatively shorter than in other years. Hydrilla was the most frequent plant observed in areas where plant beds were present. Unlike previous years, the only other submersed plant species found were *Najas guadalupensis* (southern naiad) and *Chara sp./Nitella sp.* (macroalgae).

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.

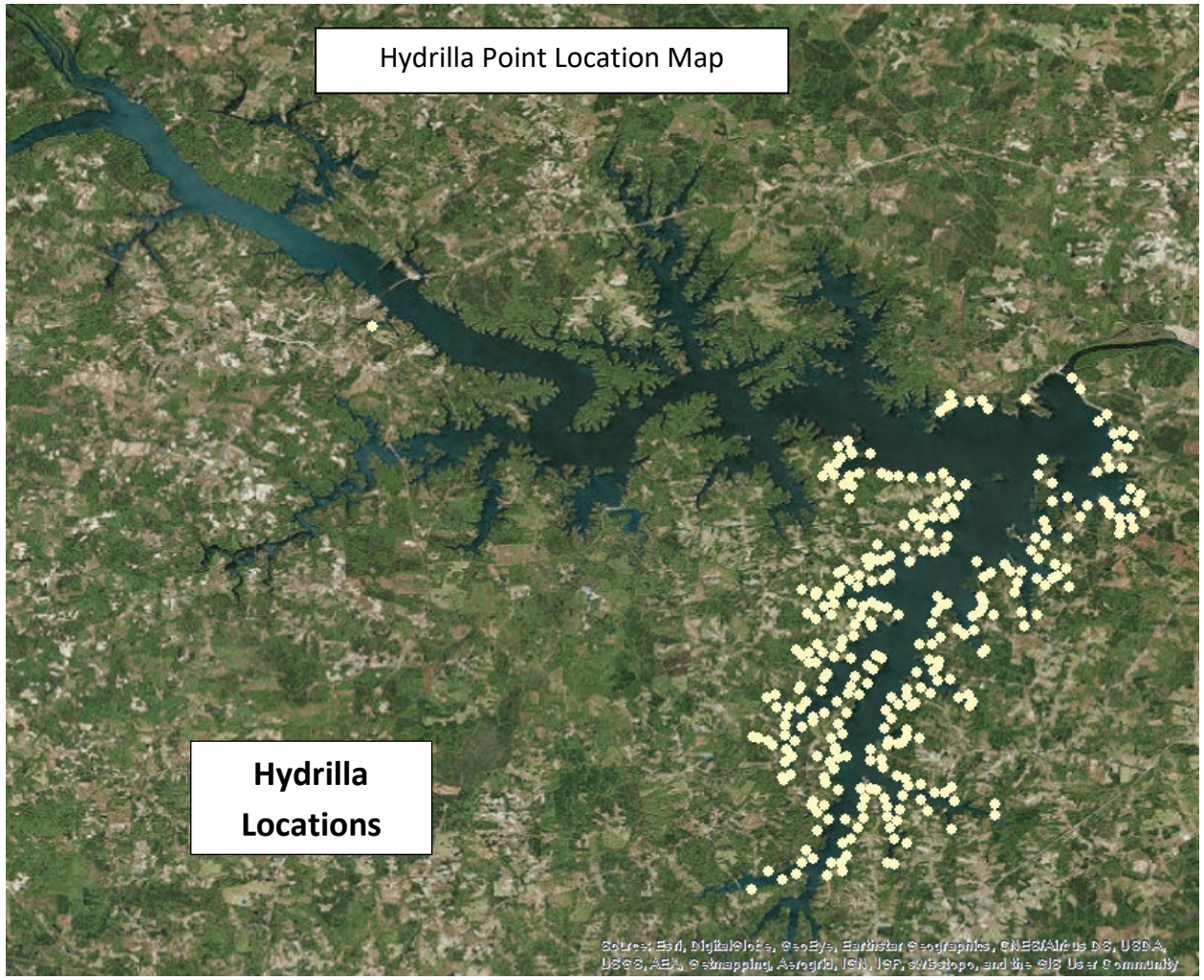
During the survey process it was again noted that most of the hydrilla infestations occurred in areas of high human use including State Parks, boat ramps, commercial marinas, and in areas of higher populations of people based on number of docks. As in previous years large areas of undeveloped shoreline west of Nutbush Creek were found to contain almost no Hydrilla. It was noted in 2013 that Hydrilla has begun to spread west and north outside the Nutbush Creek area. Additional points were found in the same area in 2016, but infestations are generally small in size. No hydrilla was found in 2016 in Eastland Creek in the area that was identified in 2013 as having Hydrilla. Close monitoring of this area will continue in future surveys. Several additional points had rooted hydrilla, on the North shore, west of the Corps boat ramps and swim areas but the total area was very limited (.1 A total).

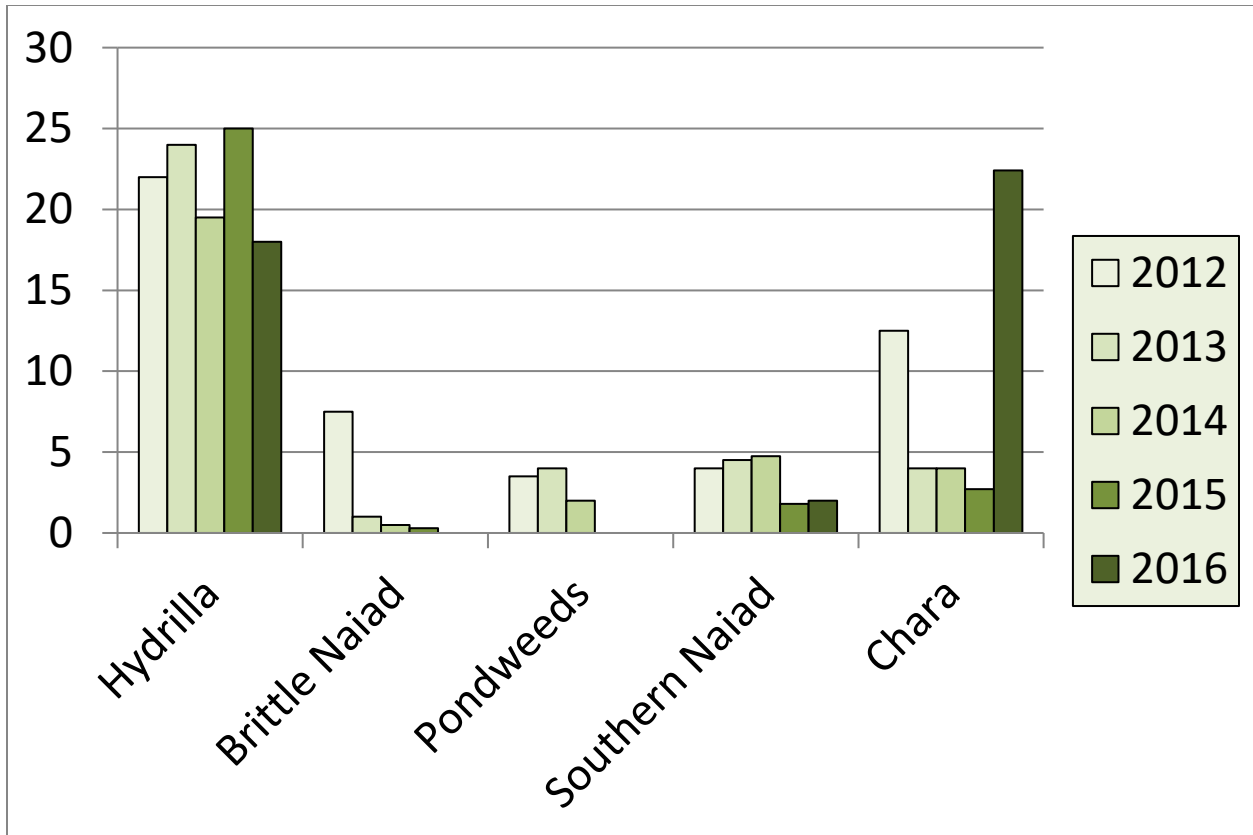
As observed in 2015, the areas around Stanton View and west of the bridges in Clarksville completely clear of hydrilla.

Hydrilla Point Location Map

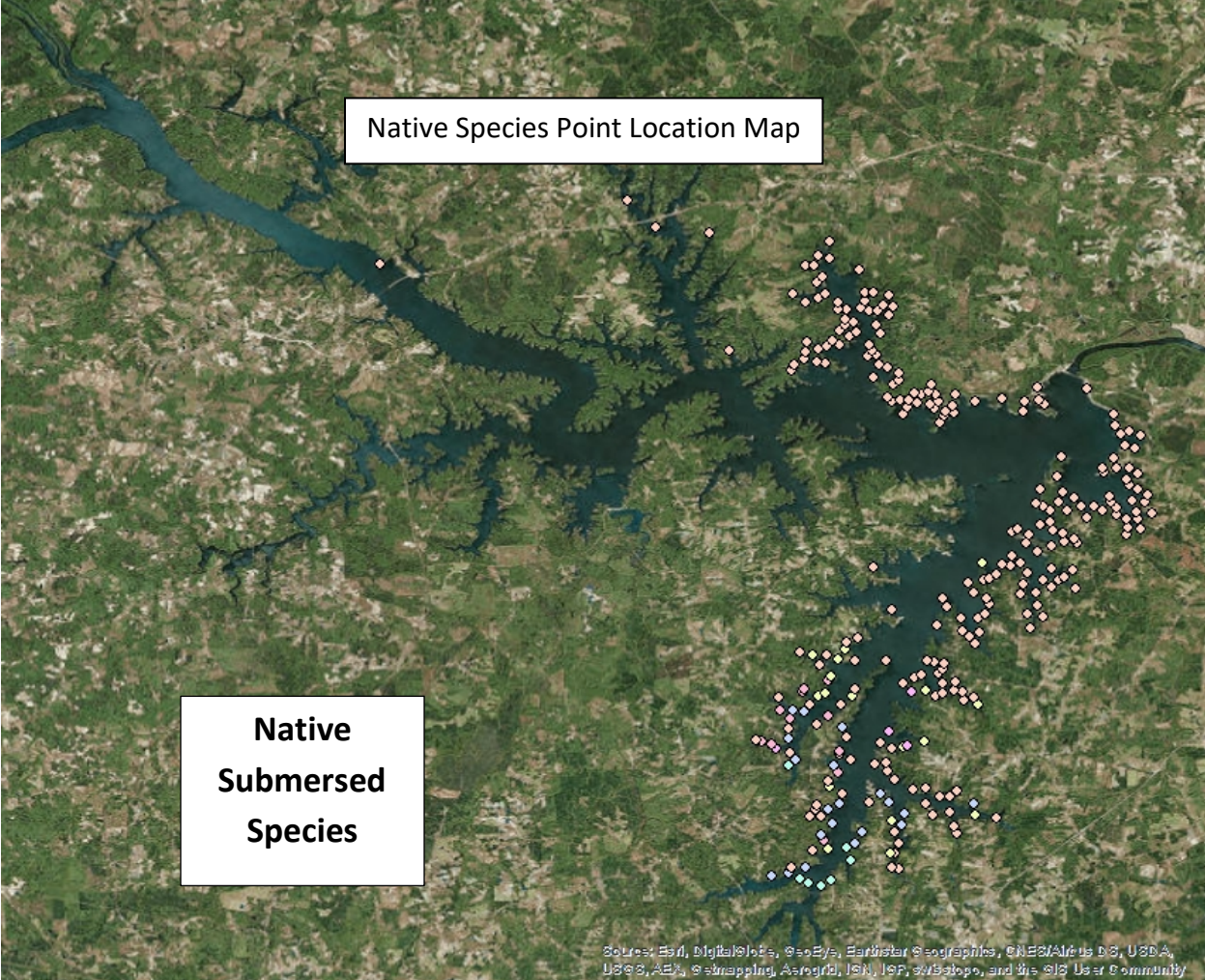
**Hydrilla
Locations**

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Aero, © mapping, AeroGrid, IGN, IGP, swSatop, and the GIS User Community





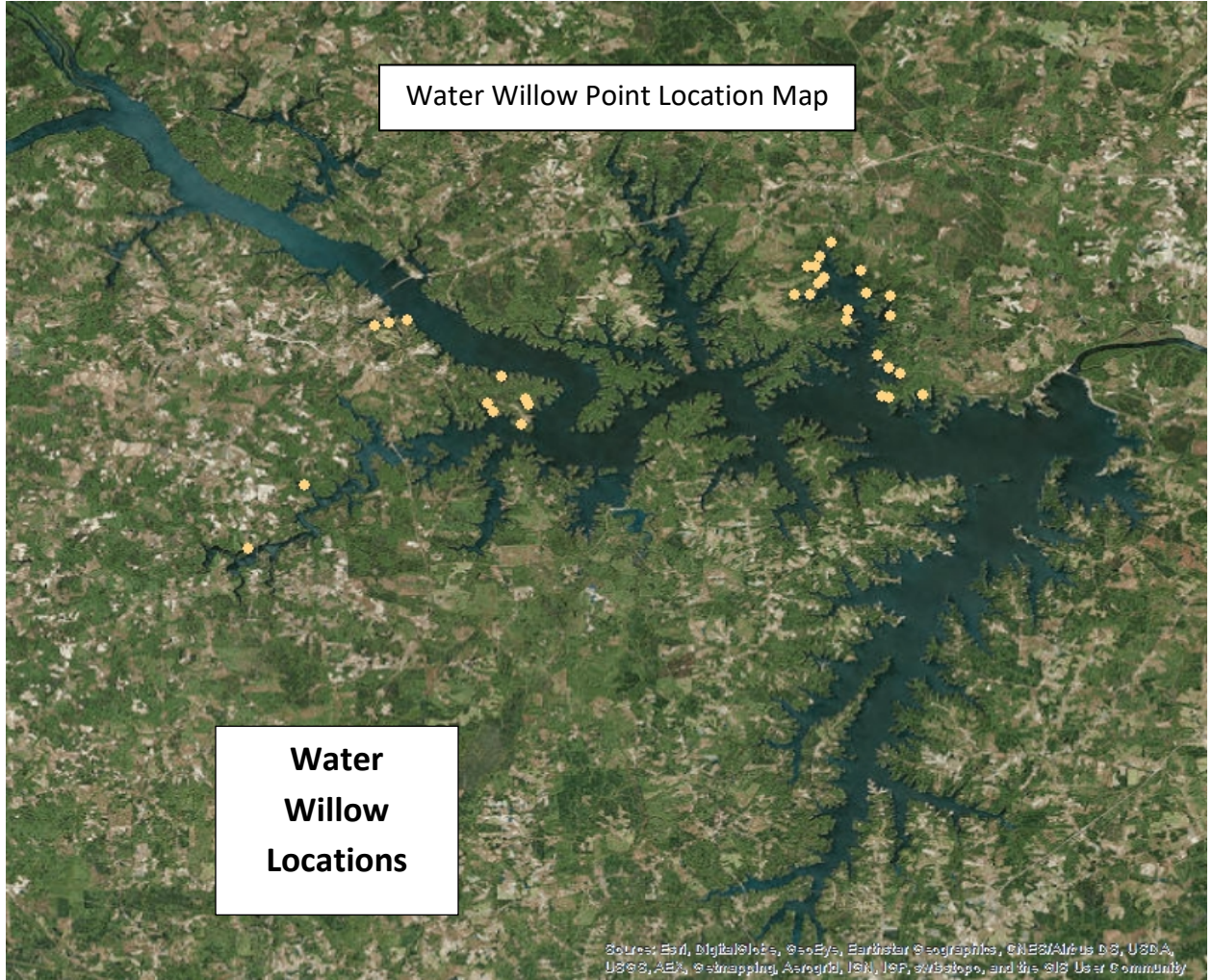
Percent Plant Occurrence by Species



Water Willow Point Location Map

Water Willow Locations

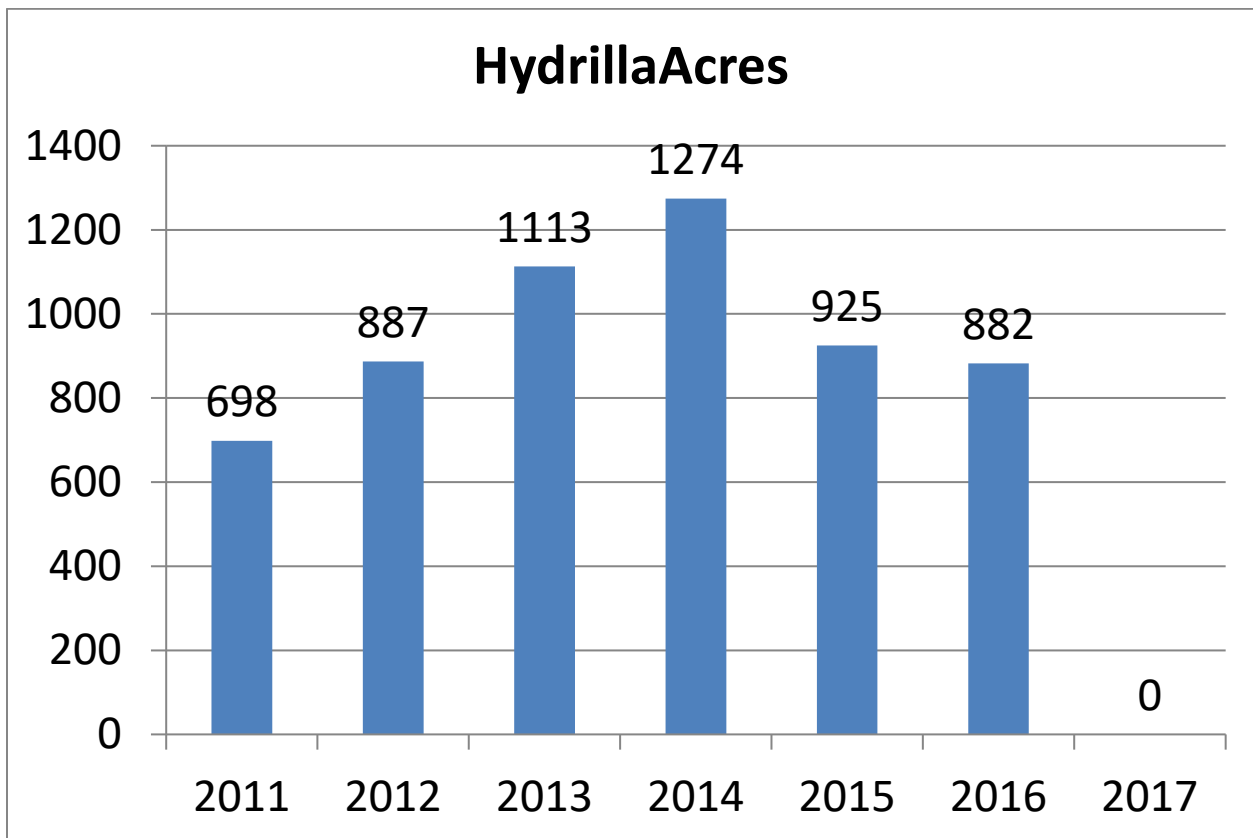
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Aero, S mapping, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community



Notes from the 2016 survey:

1. Little Nutbush and Nutbush Creek proper continue to have the largest continuous areas of shoreline containing Hydrilla; the back of numerous coves had extensive populations as well as many small scattered populations. However in contrast to previous years overall density and plant height was less in all areas.
2. North Bend Park and adjacent areas the site of the original infestations have several small populations.
3. Possible infested areas in Eastland Creek and areas west of Nutbush Creek need to be monitored.
4. Several areas where Hydrilla was documented in 2013 including: Staunton View ramp area, Clarksville Marina, and scattered locations along the south shore west of Clarksville bridges, continue to need monitoring. If stable water levels occur this area will most likely see a rebound of past hydrilla populations.
5. Although not seen in 2016 alligator weed (*Alternanthera philoxeroides*) found in two areas in the western section of the lake, and Curly-leaf pondweed (*Potamogeton crispus*) another non-native species seen in the Dan River area (no rooted plants) are of some concern. Continued monitoring and surveys further up river may be needed.
6. In 2016 we started trying to monitor water willow (*Justicia americana*) populations, continued monitoring of this desirable species will continue in future years.

Based on the information obtained during the survey, our estimated total acreage of Hydrilla in Kerr Lake is 882 acres, located mainly in Nutbush Creek and Little Nutbush Creek. The 43 acre decrease in 2016, continues a trend in reducing hydrilla acreages, currently back to the levels of 2012. The introduction of grass carp has shown a trend in other lakes to reduce the height and density of hydrilla and it appears to be occurring at Kerr.



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.

Maintain grass carp (*Ctenopharyngodon idella*) populations based on stocking rates from Va and NC Wildlife officials.

Contact herbicides applied by USACE approved applicators may be the best option for control in some areas. Certain 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, evaluation of biomass reduction (treatment effectiveness), 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 State Park visitors and others to aid in public awareness of invasive species.

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.

