Stocking Update and Vegetation Changes in Lake Marion, South Carolina

by
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Lake Marion, a 110,000-acre impoundment, was originally built and managed by the South Carolina Public Service Authority (a.k.a. Santee Cooper) as a multipurpose reservoir to generate hydroelectric power, improve commercial navigation, provide flood control, and provide recreational opportunities. Together, Lake Marion and Lake Moultrie comprise the Santee Cooper Lakes, one of the largest (170,000 acres) and most economically important lake systems in the southeast.

Historically, Lake Marion has not had a significant submersed aquatic plant population. However, that all began to change in 1982, when hydrilla was discovered growing near a fish camp in the upper portion of the lake. Despite a concerted effort to control this new infestation with aquatic herbicides, hydrilla spread and quickly replaced Brazilian elodea as the dominant submersed species. By 1987, it became obvious that hydrilla was rapidly spreading into areas that never before had submersed aquatic vegetation, was impacting a growing number of water uses, and threatened to infest up to one-half of the lake system.

In 1987, the South Carolina Aquatic Plant Management Council, a multiagency board that coordinates aquatic plant management activities in public waters, studied the problem and developed a management plan that recommended the use of triploid grass carp to provide long-term control of hydrilla. The plan called for the stocking of 300,000 sterile grass carp over a 3-year period with a final stocking rate of 25 fish per vegetated acre. A total of 100,000 grass carp would be stocked each year for 3 consecutive years in the upper lake area where hydrilla was most concentrated. While the stocking project was initially planned to run from 1989 to 1991, an additional 100,000 fish were released in 1992 to compensate for losses in 1989 from Hurricane Hugo and a spring fish kill event. Studies to monitor aquatic plant coverage, native fish populations, grass carp movement, and water quality changes were conducted by the U.S. Army Engineer Waterways Experiment Station.

Aquatic plant coverage was carefully documented prior to the stocking and was monitored annually following the stocking by infrared aerial photography and ground surveys. Following the first 2 years, hydrilla coverage continued to increase in the target area. However, by the third year, 1991, a moderate decline (20 percent) in submersed plant growth was apparent based on photointerpretation. Hydrilla coverage declined significantly (58 percent) in 1992, opening up areas of the lake that had been inaccessible to the public for many years. In 1993, hydrilla coverage was further reduced by about 10 percent. Upper Lake Marion, which used to be a popular fishing area because of its diverse aquatic habitat of open-water flats and flooded cypress/tupelo stands, is once again being heavily utilized by the public.

It is important to note that grass carp have not completely eliminated hydrilla or the other submersed aquatic species from the target area. Hydrilla, while substantially diminished, is still present throughout the upper lake. We have also seen an increase in the diversity of the submersed plant community and an increase in coverage of fanwort (*Cabomba caroliniana*), a native species.

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Although grass carp have effectively controlled hydrilla in upper Lake Marion, hydrilla continues to spread throughout the system. A 1993 survey by Santee Cooper indicated that grass carp were responsible for controlling about 9,000 acres of hydrilla; however, hydrilla continued to impact an additional 17,000 acres in the lower portion of Lake Marion. In Lake Moultrie, where submersed plant coverage was less than 200 acres in 1989, hydrilla now covers almost 17,000 acres. As hydrilla continues to spread, water-use impacts are more frequent and more costly. In 1991, hydrilla was responsible for shutting down the St. Stephen Hydroelectric Project for several weeks by clogging intake screens. The estimated cost of lost power production was $90,000 per day. The shutdown also led to one of the largest fish kill incidents in the State's history with a replacement cost for lost game fish estimated at $526,600. Hydrilla now occurs in over 43,000 acres systemwide where it still impacts recreational uses and threatens two hydroelectric projects and a new water supply system.

Based largely on the success of the stocking project in upper Lake Marion, Santee Cooper and the Aquatic Plant Management Council have recently completed a long-term aquatic plant management plan for the lake system. The plan recommends use of an integrated control strategy using sterile grass carp for long-term control and aquatic herbicides for short-term control in high-use areas when control by grass carp is insufficient. Stocking rates will be 15 fish per vegetated acre with an upper limit of three fish per total surface acre (510,000 fish). The long-term plan was initiated in 1993 with the release of 50,000 grass carp into Lake Moultrie. The 1994 South Carolina Aquatic Plant Management Plan calls for the release of an additional 150,000 grass carp into Lake Moultrie and up to 5,000 grass carp into lower Lake Marion. To help underscore its commitment to this plan, Santee Cooper is completing a sterile grass carp hatchery located between the two lakes to supply fish for future years.

Lake Marion and Lake Moultrie are highly managed lakes that support a variety of important water uses. Sterile grass carp have proven effective in controlling hydrilla infestations in upper Lake Marion for the past 2 years without eliminating all aquatic plants in the system. The State has proceeded cautiously in this effort by stocking the fish incrementally, implementing conservative stocking rates, coordinating all activities with appropriate State and Federal agencies, and monitoring the results. We believe that an integrated management strategy that includes the use of sterile grass carp is the most environmentally and economically sound method of managing hydrilla in large lake systems like the Santee Cooper Lakes, and will ensure the continued viability of this important water resource.