A Brief Overview of Hydrilla within Eno River State Park

By Superintendent Keith Nealson, Superintendent, Eno River State Park
Updated August 2012

WHAT IS HYDRILLA?

Hydrilla verticillata is an aquatic weed native to various areas of South Asia. It was first documented in the United States in 1960 in Florida. During the 50 years or so that is has been here it has spread out to various areas of the country. Where it establishes a population it can cause severe economic damage and endanger native aquatic plants and free-flowing waterways.

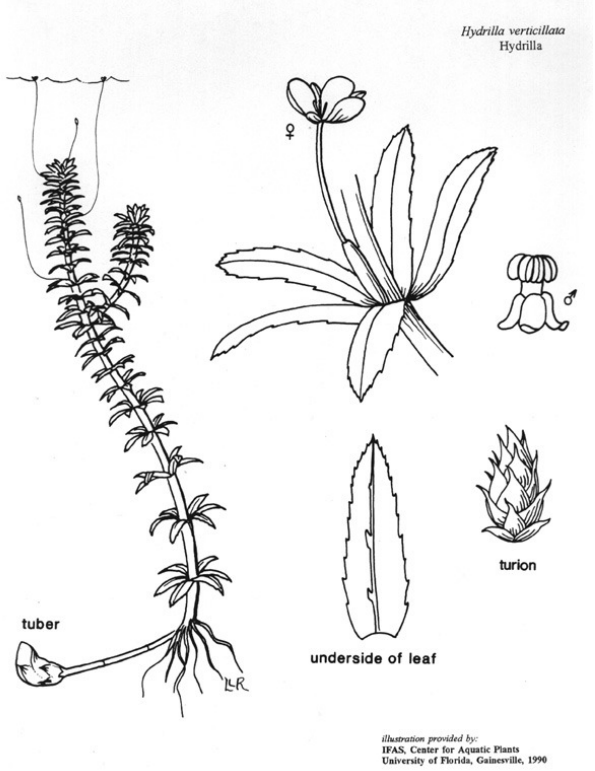
The first documented sighting of it in North Carolina was in the early 1980s in Big Lake at William B. Umstead State Park in Raleigh.

The first documented sighting of it in the Eno River was by state park staff in 2005.

During the months of June through September/October, Hydrilla is the most evident weed in the Eno River and the population of Hydrilla appears to be growing each year. The problem with Hydrilla is compounded by the fact that the water flow in the river is so low for most of the year, allowing Hydrilla to establish populations in the river that continue to spread. Hydrilla is not often a problem in higher flow rivers. Hydrilla has been identified as one of the biggest threats to the natural resources of Eno River State Park.

IDENTIFICATION-

Hydrilla is a submerged aquatic weed. No part of it extends above the water, though a large portion of its mass may be floating on the top of a waterway. It is generally rooted in the soil but parts of the plant can break off and survive in a free floating state (and even take root again) for a considerable period of time. It is easy to mistake some of the native North Carolina aquatic weeds for Hydrilla, and care should be taken in accurately identifying this plant.



Hydrilla is mostly stem, but as it grows it produces more and more stems in a branching pattern. All it takes is a small portion of stem to get in contact with soil to produce a new plant. The plant produces turions (dormant buds) and tubers (underground turions), either of which can sprout into new plants. Tubers can live for 5-8 years dormant in many soils. Hydrilla can grow an inch or more a day and can form very large mats along the top of the waterway. If these mats were to die off suddenly and decompose rapidly it could result in a sudden drop in dissolved oxygen which could result in large scale fish kills in a waterway like the Eno River.

POTENTIAL IMPACT-

The Following Excerpt was taken from the paper 'Hydrilla Verticillata, the Perfect Aquatic Weed' by Kenneth Langeland and was accessed from the website http://plants.ifas.ufl.edu/node/184 on 08/31/2012. It is somewhat dated (1996) and centers mostly around Florida infestations, but the information is still relevant.

> Hydrilla causes major detrimental impacts on water use. In drainage canals it greatly reduces flow, which can result in flooding and damage to canal banks and structures. In irrigation canals it impedes flow and clogs intakes of pumps used for conveying irrigation water. In utility cooling reservoirs it disrupts flow patterns that are necessary for adequate cooling of water. Hydrilla can severely interfere with navigation of both recreational and commercial craft. In addition to interfering with boating by fisherman and waterskiers in recreational waters, hydrilla interferes with swimming, displaces native vegetation communities, and can adversely impact sportfish populations. The economic impacts of these water uses to real estate values, tourism, and user groups can be staggering. For example, an economic study on Orange Lake in North Central Florida indicated that the economic activity attributed to the lake was almost $11.0 million and during years that hydrilla completely covers the lake these benefits can be virtually lost (Milon et al. 1986). Cost of hydrilla management is also extremely high, especially when funding is insufficient for adequate management. An estimated $10.0 million is necessary to manage hydrilla in Florida public waters in 1994-95 and $14.5 million will be necessary in 1995-96, as hydrilla continues to expand (Jeff Schardt, Florida Department of Environmental Protection, personal communication).
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> Some sport fishermen consider hydrilla to benefit largemouth bass habitat (Tucker 1987). While the opinion that hydrilla is beneficial for sportfish production is supported by certain research (Estes et al. 1990; Porak et al. 1990), other research suggests that **largemouth bass are adversely affected when hydrilla coverage exceeds 30%** (Colle and Shireman 1980). Canfield and Hoyer (1992) found no relation between standing crop of harvestable largemouth bass and percent area covered with aquatic macrophytes in 60 Florida lakes (many dominated by hydrilla). When fish biomass was adjusted for lake trophic state (chlorophyll a), maximum biomass tended to occur in lakes when 20% to 40% of the lake volume was occupied by aquatic macrophytes. Hydrilla is eaten by waterfowl, and maintaining hydrilla populations is sometimes advocated by waterfowl scientists because it increases the feeding habitat for ducks (Johnson and Montalbano 1984, Esler 1989).
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> Highly transparent water is often considered desirable by the public and large populations of submersed aquatic macrophytes, such as hydrilla, will tend to increase water clarity (Canfield et al. 1984). The exact reasons for this increase in water clarity are not completely understood but it probably results from a combination of factors which include lowering sediment re-suspension and reduction of phytoplankton populations by compartmentalizing nutrients. Regardless, large amounts of aquatic macrophytes are necessary to cause substantial increases in water clarity (Canfield et al. 1984; Canfield and Hoyer 1992).
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> The endeavor to benefit sportfish or waterfowl habitat or produce clear water has resulted in deliberate dispersal of hydrilla by individuals unwary of the severe detrimental impacts that can be caused by the plant. Detrimental impacts caused by hydrilla far outweigh beneficial impacts and it is usually more difficult to manage than native plant populations, which it displaces.

HISTORY OF HYDRILLA IN THE ENO RIVER STATE PARK

Much of the below information was put together in a memo written by NC DPR Piedmont Biologist Emily Hill in early 2012.-

Hydrilla was first documented in the Eno River by park staff in 2005. By the fall of 2006, its presence was confirmed from the Dumont Road access all the way to Guess Road – the entire length of the park. It was also reported at West Point on the Eno, downstream of the park, that year. At that time

Superintendent Dave Cook requested assistance from the Natural Resources Program to address the Hydrilla problem.

There are few options for controlling this species, especially in a flowing system. In fact, its establishment in a flowing river is very unusual, and at the time DPR staff were unable to find any other resource management agency in the southeast or elsewhere that was dealing with a similar situation. In 2006, we requested assistance from the DWR Aquatic Weed Program. At that time Rob Emens recommended the application of aquatic herbicides, but expressed doubt that this approach would be effective, since it's nearly impossible to maintain adequate herbicide concentration in a river for the period of time required for control (due to flow).

Sterile grass carp have been used extensively to control Hydrilla in reservoirs and ponds, but most resource managers we talked with didn't think they would remain in the river channel, and would instead all end up in Falls Lake. Furthermore, stocking grass carp requires a permit from NC WRC, and they are very strict about allowing grass carp to be introduced outside of reservoirs. So for a few years, we felt that there weren't any feasible options for control of Hydrilla in the Eno.

In the meantime, in cooperation with the Aquatic Weed Program, we thoroughly surveyed the river up-stream of the park to determine the extent of the infestation. We found that both West Fork Reservoir and Corporation Lake (municipal water supply impoundments on the Eno) were severely infested with Hydrilla. Through our participation in annual NC DWR Eno Water Users meetings, and the relationships we developed there with other Eno stakeholders, we convinced the Town of Hillsborough and Orange-Alamance Water Systems to initiate Hydrilla control programs in their respective reservoirs. Those programs are ongoing and are overseen by the NC DWR Aquatic Weed Program as well.

In 2008 we began talking with Dr. Rob Richardson, chair of the NCSU Weed Science program, and he offered to conduct some lab trials examining the effects of various herbicide concentrations on samples of Hydrilla and native plants from the Eno. That research, conducted between 2009 and 2010, showed that a particular concentration of the herbicide endothall would effectively control Hydrilla but would not significantly damage the native Riverweed (the host plant of the Panhandle Pebblesnail). NCSU students also conducted surveys for Hydrilla along the entire length of the Eno and the upper reaches of Falls Lake between 2008 and 2011.

Based on the results of the NCSU lab trials, we decided to conduct some small herbicide test treatments in the Eno in the fall of 2011. These proved ineffective, presumably because the chemical used was not able to have the time on contact with the weed when in a flowing waterway.

During the summer of 2011, Superintendent Keith Nealson spearheaded an experiment in which he had groups of volunteers pull Hydrilla by hand. Almost three hundred volunteer hours plus 20 staff hours were spent pulling Hydrilla along a 100-foot reach between Fews Ford and the suspension bridge. It was estimated that 85-90% of the visible biomass was removed within half of the treatment area, and approximately 40% was removed within the other half of the treatment area. The last volunteer hours toward that effort were logged in early August. By late September, there was no discernible difference between the area treated by volunteers and the untreated areas directly upstream and downstream. In other words, the Hydrilla grew right back to its previous extent and density within less than two months. To state the obvious, manual pulling is not a viable long-term control option for Hydrilla in the Eno.

At that point the Division decided it would be beneficial to convene a stakeholder meeting to discuss the Eno Hydrilla problem in detail. That meeting was held in Raleigh on March 3, 2012, and was attended by representatives from DPR, NC DWR, NC WRC, NC NHP, US Fish and Wildlife Service, NCSU, The Town of Hillsborough Public Utilities, the City of Raleigh Public Utilities, Orange-Alamance Water Systems, USACE-Falls Lake, NCDA&CS Noxious Weed Program, and the Eno River Association. The meeting consisted of a series of presentations describing the infestation and the history of our efforts as described above in this memo, followed by an open discussion. That discussion spilled over into lunch

and continued over email during the following weeks. Some highlights of the discussion included NC WRC biologists expressing alarm that they had to forfeit their Roanoke Bass surveys last summer due to the extent of the Hydrilla, and the consensus that no action will likely result in further ecological degradation of the river. There are still many questions that need to be answered before accurately determining the potential risks of various treatment scenarios, but most participants, including NC WRC, were open to further exploration of the use of triploid grass carp as a biological control. Additional experimental treatments with granular herbicides, and possibly experimenting with a small metered herbicide application, were also discussed.

During the summer of 2012 a park intern at Eno River State Park has been photographing several spots along the Eno River to get a better idea of the problem it presents throughout the summer and the rate of growth it undergoes in various areas of the river.

It remains to be seen how the problem of Hydrilla in the Eno River will be solved. Monitoring efforts will certainly continue and partnerships with all of the Eno River's stakeholders must continue to be developed if we are to ever have a chance at controlling this problem. Consistent and constant efforts to educate the public about the threat hydrilla poses must also be a major priority.

Hydrilla at Pleasant Green, August 2011 (photograph by Erik Nygard).