

PUBLIC WORKS DEPARTMENT

ROADS-STORMWATER DIVISION



MEMORANDUM

DATE: January 12, 2007

TO: Kathy Moore, MSBU Program Manager

FROM: Gloria Eby, Senior Environmental Scientist

RE: Lake Mills Management Plan

On November 21, 2006, Dean G. Barber and Amy Giannotti (Florida Department of Environmental Protection) with Kathy Moore and Gloria Eby (Seminole County) surveyed the aquatic plants in Lake Mills, Seminole County. This assessment was conducted for the initial inspection and status of hydrilla (*Hydrilla verticillata*) for the upcoming aquatic weed control improvements coordinated through the MSBU Program.

Lake Mills' morphology is 243 surface acres in size with a mean depth of 10 feet and a maximum depth of 22 feet. Lake Mills has experienced several infestations of hydrilla and was treated with Avast brand fluridone in March through June, 2004 (25 gallons). Following an integrated approach, Lake Mills was then stocked with 462 triploid grass carp in October of 2005, equating a stocking rate of 2 fish per acre.

Based on the afternoon observations, hydrilla was present to a depth of 12 feet covering approximately 20% of the lake. In competition with hydrilla was eelgrass (*Vallisneria americana*) to 4 feet, and southern naiad (*Najas guadalupensis*) to 7 feet. It was estimated that 10% of the lake vegetation was in competition with Hydrilla. Other submersed aquatic vegetation noted during the survey was baby tears (*Micranthemum umbrosum*). With the exception of hydrilla, these submersed plants are all considered beneficial native aquatic plants.

Hydrilla was observed competing with the native submersed aquatic plants in the shallow water, to a depth of 7 feet, and then the hydrilla becomes a monoculture (a single plant crop) to a depth of 7-12 feet. Considering that hydrilla is competing with the above native plants in shallow water (7 ft or less), is existing at a low density monoculture plant in deeper water (7-12 ft), and is not present in the deepest waters (13-22 ft), Lake Mills has an infestation of hydrilla that encompasses 20% of the lake, or 48.6 acres.

Many undesirable emergent plants species were also observed in Lake Mills (elephant ear, water hyacinth, cattail, torpedo grass, and salvinia); including these plant species in the aquatic weed control plan would be beneficial to Lake Mills.

Portions with the heaviest infestations of the above nuisance species are along Lake Mills Park on the southwest shoreline of the lake and in the canal system on the west shoreline. Large stands of torpedo grass with water hyacinth were noted in various locations throughout the lake. These stands are increasing in biomass and it is suggested for selective management of the torpedo grass and eradication of the water hyacinth to be included in the aquatic weed control contract.

Technical Recommendations:

Our recommendation is for an integrated management plan of the invasive submersed aquatic plant, hydrilla. Integrated management plans use two or more aquatic plant management methods. This could consist of herbicides, algaecides, biological methods (triploid grass carp, insects, fungus or bacteria), water level fluctuation, mechanical control/hand removal and/or aeration.

1. **Herbicides** - Reduce the amount of the invasive plant, hydrilla, with herbicides. The herbicide would be a short term management concept. The key objective with the herbicide treatment would be to reduce the hydrilla to a level where the grass carp could slowly manage the target plant. It is possible that the herbicide would not control all the hydrilla and because this plant has most likely established hydrilla tubers in the lake's substrate, the triploid grass carp could control this regrowth. The hydrilla should be monitored to determine if additional herbicide treatments/grass carp stocking are necessary. A DEP aquatic plant control permit is required to use herbicides to manage aquatic plants and currently must be modified to include these recommendations.
2. **Triploid Grass Carp** - Stock with a low level of triploid grass carp, 2 fish per acre. The grass carp would be a long-term management concept. By using the grass carp to manage hydrilla over a longer time period, you decrease the chance that too much hydrilla is taken out too fast, preventing a possible algae bloom. An algae bloom could reduce the light getting to submersed plants and kill more submersed aquatic vegetation than desired, causing the lake water to turn green (algae), and it could stay green for a long time. Stocking should be done in March to ensure that the fish will feed sufficiently due to warmer conditions and allowing for the fish to gain size, thus avoiding predation will reduce mortality. Monitoring, as suggested below, will help determine the success of the grass carp stocking and at what frequency more fish must be added to maintain/control the target plant. It is not easy to determine the correct stocking rate of grass carp; therefore, it requires a lot of attention, but additional carp will be needed to keep the target plant under control. Stocking frequency is expected to be every 6 months-2 years. Overall tendency is to overstock grass carp, which can have a considerable negative effect. The FWC requires permits to stock grass carp. FWC also requires barriers at water inflows and outflows to prevent the carp from leaving the lake.

3. **Algae management** - If an algae bloom does occur even with your best management plan, some additional management may be necessary. This could include increasing shoreline vegetation, another herbicide/algaeicide treatment and/or aeration.
4. **Lake Mills Canal Management** – The Lake Mills canal system on the west shoreline is heavily dominated with nuisance submersed and emergent aquatic plants (elephant ear, water hyacinth, hydrilla, and salvinia). These plants are thriving in a poor circulation system with nutrient impact from both their watershed and canal submersed substrates. Achieving the desired management objective will require a strong integrated management plan with consistent monitoring, especially related to use of herbicides/algaeicide treatment and/or aeration.
5. **Establish a Lake Association** - Elect a Board of Directors and/or officers, having meetings at the frequency that is necessary - monthly, quarterly or annually. Frequency could be dependent on the type of problem. Consider establishing documents for the association. Contacts could be provided for other lake associations that have had lake management problems. Invite guest speakers to talk the group about the watershed and best management practices that can aid in the reduction of nutrient runoff.
6. **Annual Meeting** - Each year you should have an annual meeting with all the owners around the lake, and the cooperating agencies (FDEP, FWC, County). The agency representatives and elected liaisons should again survey the lake and provide up-to-date recommendations. Part of the recommendations should include whether to add more grass carp, or to modify herbicide management. This will help insure that the grass carp level can be maintained to control the submersed vegetation and insuring the success of the long term management plan.
7. **Monitoring** - No management plan can be successful without close monitoring for changes in target plant communities. This can consist of observations from persons that frequent the lake by documenting observations of plant populations at designated sites, photo plots of designated sites, creating exclusion barriers to observe grass carp activity, etc.
8. **Web pages** -
<http://aquat1.ifas.ufl.edu/>
<http://lakewatch.ifas.ufl.edu/index.htm>
<http://www.dep.state.fl.us/lands/invaspec/index.htm>
<http://www.plantatlas.usf.edu/>

<http://www.seminole.wateratlas.usf.edu/>

<http://myfwc.com/fishing/permits/carp.html>

<http://www.SePRO.com>

<http://www.cerexagri.com>

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