Integrated Hydrilla Management Plan Utilizing Herbicides and Triploid Grass Carp in Lake Istokpoga

by
David Eggeman[1]

Introduction

Hydrilla (*Hydrilla verticillata*) was first observed in Lake Istokpoga in 1979. By 1988, it had expanded to an estimated 8,092 ha. Herbicide (Fluridone) treatments began in 1987 and continued each spring through 1991 (Table 1). Although herbicide treatments successfully reduced hydrilla coverage on Lake Istokpoga, their effectiveness was short-lived. Annual vegetation surveys conducted by the Department of Environmental Protection (DEP) in October showed that hydrilla regrew each year (Table 1). This rapid expansion of hydrilla in Lake Istokpoga after spending approximately $2.3 million for hydrilla control caused the DEP, Florida Game and Fresh Water Fish Commission (GFC), U.S. Army Corps of Engineers, and Highlands County to re-evaluate hydrilla management options on this lake. A jointly coordinated interagency project to integrate herbicides and triploid grass carp (*Ctenopharyngodon idella*) was developed in 1991 and implemented in 1992. The project goal is to prolong the effectiveness of a large-scale herbicide treatment by maintaining hydrilla surface coverage below 2,832 ha (7,000 acres). The initial stocking level of 125,000 triploid grass carp was determined based on hydrilla coverage after the 1992 large-scale herbicide treatment (Table 2).

Table 1
Cost of Hydrilla Treatments and Hydrilla Coverage by Year in Lake Istokpoga

Year	Cost, $ (Jan-Mar)	Hydrilla, ha (Jan)	Hydrilla, ha (Oct)
1988	153,000	1,450	5,350
1989	1,218,000	5,350	4,300
1990	467,000	4,300	3,500
1991	450,000	3,500	4,300
1992	1,200,000	4,300	800
1993	656,000[a]	800	3,650
1994	0	3,650	?

[a] Triploid grass carp.

Table 2
Triploid Grass Carp Stocking Options for Lake Istokpoga

Number Proposed	Criteria
75,000	0 ha Hydrilla
125,000	<2,023 ha Hydrilla
125,000	2,023-2,832 ha Hydrilla[1]
0	>2,832 ha Hydrilla

[1] Additional herbicide treatment required.

A potential future additional stocking of 25,000 triploid grass carp will be based on percent coverage of hydrilla regrowth (Table 3).

Table 3
Supplemental Triploid Grass Carp Stocking Options for Lake Istokpoga

Option	% Occurrence of Hydrilla[1]	Action
1	0 to 15 %	No Stocking
2	15 to 35%	Supplemental stocking at 2.5 fish/ha (25,000 fish)
3	more than 35%	No stocking[2]

[1] Percent occurrence lakewide.
[2] Additional stocking at low rates would not be effective.

Study Site

Lake Istokpoga is approximately 11,328 ha (28,000 acres) located in Highlands County in south-central Florida. The lake has two inlets (Josephine and Arbuckle creeks) and two outlets (Istokpoga and C-41a canals). Josephine Creek has a fixed structure to prevent fish

[1] Florida Game and Fresh Water Fish Commission, Tallahassee, FL.

movement. Arbuckle Creek is navigable and connects Lakes Istokpoga and Arbuckle. The two outflow canals connect to the Kissimmee River and Lake Okeechobee.

Methods

Hydrilla was treated with 2,177 kg (4,800 lb) active ingredient fluridone in January-March 1992. Triploid grass carp (125,000; 30-cm minimum) were stocked in October 1992 through March 1993. Aquatic vegetation has been and will continue to be mapped each October using a laptop computer and Loran-C to provide locations and acreage. Quarterly transects will be run using a recording depth finder to determine hydrilla regrowth. Largemouth bass (*Micropterus salmoides*) and total fish populations will be monitored by semi-annual electrofishing (12 hr pedal time) and annual block-nets (six 0.4-ha). Water quality will be sampled and analyzed quarterly. Six enclosures to exclude triploid grass carp were placed in submerged vegetation to serve as control sites so that dynamics of vegetation not exposed to triploid grass carp feeding could be observed. Creel surveys will be conducted during peak fishing season (November-March) to determine angler effort and catch rates.

Results

Hydrilla was reduced by herbicides to approximately 800 ha by October 1992, of which most was surfaced out. As a result, 125,000 triploid grass carp were stocked between October 1992 and March 1993. Hydrilla expanded to approximately 3,650 ha by February 1994; however, less than 40 ha were surfaced out.

Discussion

Fish population and water quality data were collected prior to triploid grass carp stocking. Vegetation mapping has been done each October. It is too early to draw any conclusions on effects of triploid grass carp stocking on hydrilla coverage, water quality, fish populations, or angler creel. Data will continue to be collected until an October vegetation survey reveals more than 2,832 ha of surfaced out hydrilla.