

# Using Grass Carp to Control Pond Vegetation

Grass carp can provide many years of long-term cost-effective management for prolific vegetation in retention ponds.

By Deodat Budhu and Guy Rocca

**A**quatic weeds can cause maintenance problems in ponds. In many cases, invasive non-indigenous and native aquatic plants become overgrown and create maintenance intensive work and sometimes health hazards in these water bodies. Furthermore, the mild Central Florida climate promotes year round plant growth and retention ponds can quickly become filled with weeds. Excessive vegetation in water retention ponds can cause a loss of storage volume capacity and water conveyance, which can result in flooding.

The Orange County Public Works Roads and Drainage Division is responsible for maintaining over 1,300 retention ponds. Of the 1,300 retention ponds, 70 percent are wet ponds and 30 percent are dry. Retention ponds get a high influx of nutrients in the form of phosphorous and nitrogen from stormwater runoff they receive. These nutrients stimulate vascular and non-vascular aquatic plants, thereby requiring periodic and sometimes intensive herbicide treatments to retain their design function. The control of vegetation with grass carp can significantly enhance water quality, fish and wildlife habitat in wet ponds, and reduce environmental impact of a herbicide-only maintenance program.

Aquatic vegetation can be managed in various ways as a simple method approach or an integrated program. The first approach involves the use of personnel and equipment to mechanically clean ponds, which is a labor intensive and costly method. A second method

involves the use of chemical applications or the spraying of herbicides, an effective technique with moderate costs. A third method involves the use of sterilized triploid grass carp that feed on many of the nuisance plants that can overtake local bodies of water subsequently decreasing biodiversity.

Grass carp are native to eastern Asia. However, only triploid grass carp, which are approved by the State of Florida and Wildlife Conservation Commission for use in Florida, are produced in hatcheries. In its native habitat grass carp occur in lakes, pools, and backwaters of



*Triploid grass carp are raised in hatcheries and cannot reproduce.*

large cold rivers. They are tolerant of temperatures from freezing to over 100 degrees Fahrenheit, salinities as high as 10 ppt (brackish), and oxygen levels down to 0.5 ppm.

The use of grass carp started in the state of Florida in the mid 1970's, and has been used by the Orange County Roads and Drainage Division since 1991. Triploid grass carp are used instead of diploid carp to prevent natural reproduction in state waters. Triploid grass carp have three sets of chromosomes, instead of the normal two, which

render them sterile and unable to reproduce.

The Carp Program incorporated into the Roads and Drainage Division Aquatic Vegetation Management begins with an assessment of the subject water body by the Chemical Spray Foreman. The foreman is responsible for evaluating what areas will benefit through the use of grass carp. Criteria used in performing this evaluation are pond size and retention characteristics, vegetation to be controlled, history and frequency of herbicide treatments, citizen inquiry history of subject areas, and outfall and inlet structure types for containment of fish

To use the fish in Orange County ponds, a permit must be obtained from the Florida Game and Fresh Water Fish Commission. Information on location, size, and severity of vegetation to be managed is provided in the permit application. If the applicant's water body is five acres or less in size, a biologist will call for further information to make a recommendation. If the water body is over five acres, the biologist will conduct an on-site visit and make a recommendation. The permitting process generally takes two to three months for review and approval. There is no cost to Orange County for acquiring the permit.

Once a permit is received, a Roads and Drainage staff representative stocks the pond. Ideally this is done during the fall through early spring when water temperatures have subsided. Lower water temperatures put less stress on the fish during release and serve to enhance the investment and survival rate.

The grass carp will initially consume



**Control structures must be barricaded to be sure the carp remain in the treatment area.**

submersed soft tissue vegetation throughout the water column followed by some species of emerged shoreline vegetation. The fish generally do not eat several species of deeply rooted large emergent flowering plants that occur on the pond surface giving the ponds a well managed aesthetically pleasing appearance that does not inhibit retention volume or release of water at the control structures. Additionally, they will eat detritus, insects, and other invertebrates as the fish age. In Orange County, the stocking rates are used mainly to control hydrilla and duckweed.

The fish initially released are generally 12 to 14 in. long. With adequate food sources the fish will grow, rapidly attaining three to five lb in two years and can live ten or more years, achieving a weight of 15 lb or more at maturity. In Orange County a stocking rate of 15 to 20 fish per acre in retention ponds has provided excellent results.

### Building Barriers

When stocking triploid grass carp to control aquatic weeds, it is sometimes necessary to ensure that the fish will remain in the treatment area for weed



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control by placing barriers at the control structure. These barriers should be constructed so as to not significantly restrict water flow, and have openings large enough to allow suspended detritus and weed fragments to pass through as well as enable easy maintenance and repair. In most cases the barrier is constructed with PVC. The material is inexpensive,

non-corrosive, and durable.

Apart from the initial stocking fees, grass carp are environmentally effective and slightly lower in overall cost than a

chemical only program. Once the fish are released, ponds require only periodic inspections to check vegetation density, species, and to monitor fish mortality and barrier integrity. Additional fish can be stocked whenever the inspections show a need for it. Over a period of five years the average annual cost to chemically control aquatic vegetation in wet ponds is \$2,100. In comparison, ponds stocked with 15-20 grass carp per acre at \$5 per fish is just \$100; and together with limited chemical treatments the average annual cost per pond is \$1,900.

After several seasons, accounts indicate a ten percent reduction in herbicide application costs. As much as 20 to 30 percent or more is likely over the next several years as the fish reduce the vegetation to a managed level, further reducing the necessity for herbicides. Supplemental chemical and mechanical control may still be necessary in some ponds to provide

more immediate control when required to alleviate potential flooding.

The benefits of grass carp usage over chemical spraying for weed control include reduced annual cost for herbicides, labor, and heavy equipment in clearing the ponds and a reduction in citizen complaints concerning pond overgrowth.

Depending on plant densities and species, it may take several years to achieve the desired level of control using grass carp. The type of plants carp prefer may also be those most important for habitat and for waterfowl food. If a water body is overstocked, all aquatic plants may be eliminated, therefore careful analysis of each site should be



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considered. Removing excess fish is difficult and expensive.

Grass carp can provide many years of long-term cost effective management for prolific vegetation in retention ponds. Carp are a safe, reliable, and environmentally efficient method of plant management. All components of the carp program are managed by staff of the Roads and Drainage Division with over 230 wet retention ponds currently stocked with fish. The program has proved successful in many ponds, allowing us to create aesthetically pleasing retention areas and maintain the storage capacity of the various sites. Therefore, in the future, more consideration should be given to this integrated approach to manage aquatic vegetation since carp usage can save money over chemicals. **GE**

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