

# Draft

## Hydrilla Management Plan Lake Conroe 2005

### Introduction

Lake Conroe is a 21,000-acre main channel reservoir on the San Jacinto River. The lake was constructed in 1973 principally as a water supply reservoir for the City of Houston (approximately 40 miles south of the lake). The San Jacinto River Authority (SJRA) is responsible for operation and maintenance of the reservoir. The area surrounding the lake is highly developed, including several small public parks. Lake Conroe is heavily utilized by a variety of outdoor recreation enthusiasts including anglers, skiers, personal water craft enthusiasts, and swimmers.

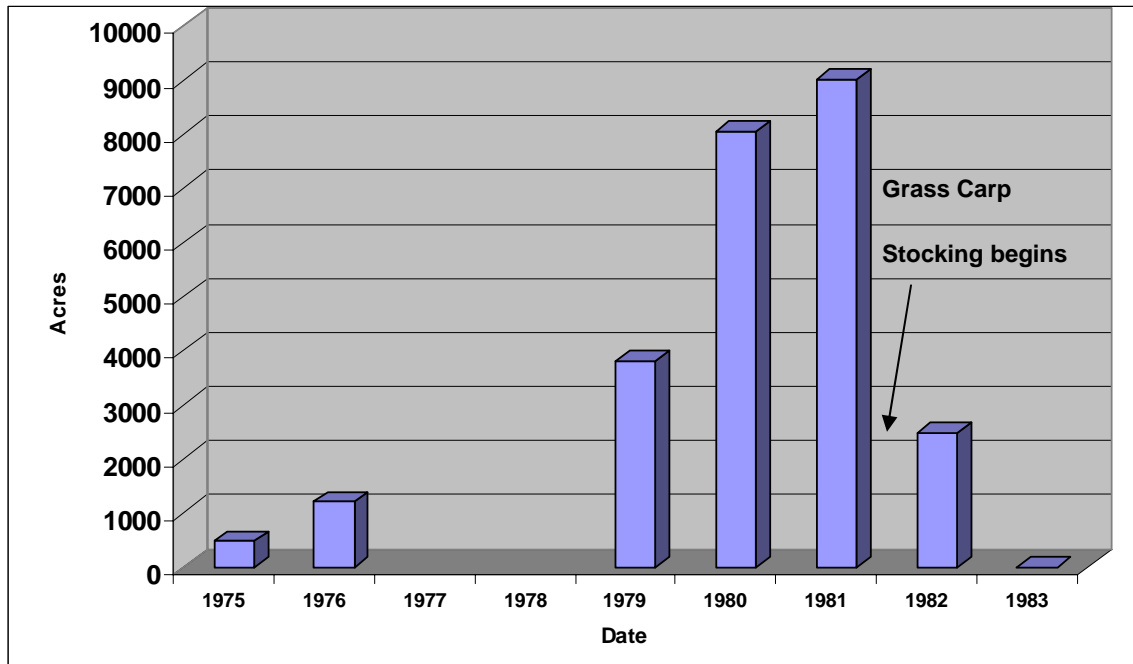
### Vegetation and Vegetation Management

For over 30 years, aquatic vegetation management on Lake Conroe has been a concern for TPWD and SJRA, as well as lakeside property owners. A wide variety of exotic plants has been found in the lake including water hyacinth *Eichhornia crassipes* (identified in the lake shortly after impoundment), giant salvinia *Salvinia molesta* (found in 2000), and waterlettuce *Pistia stratioides* (discovered in 2004). However, probably the most problematic species found in the lake to date has been hydrilla *Hydrilla verticillata*.

Hydrilla was first identified in Lake Conroe in 1975 (Klussmann et al. 1988), only two years after impoundment. By the time it was identified in Lake Conroe hydrilla already occupied 470 acres in the lake (Figure 1). Subsequent surveys indicated hydrilla was spreading rapidly in the lake. By 1979, hydrilla had increased to over 4500 acres and was causing significant problems for boaters, skiers, and swimmers. As a result of efforts by the Lake Conroe Association and its supporters and despite objections by TPWD staff, the Texas Legislature directed the Texas Agricultural Experiment Station (Now Texas Cooperative Extension, TCE) and TPWD to conduct a study to determine the efficacy, and other effects of grass carp use in Lake Conroe. TCE then obtained a permit to use grass carp from TPWD (Klussmann et al. 1988). However, as a result of efforts by the angling community, a court-ordered temporary injunction delayed the stocking of grass carp.

In 1981, a revised legislative directive (House Bill 556) directed TAES (and not TPWD) to conduct the grass carp study. This action put an end to court proceedings, a new permit

is issued to TAES, and grass carp stocking was cleared to proceed (Klussmann et al. 1988).



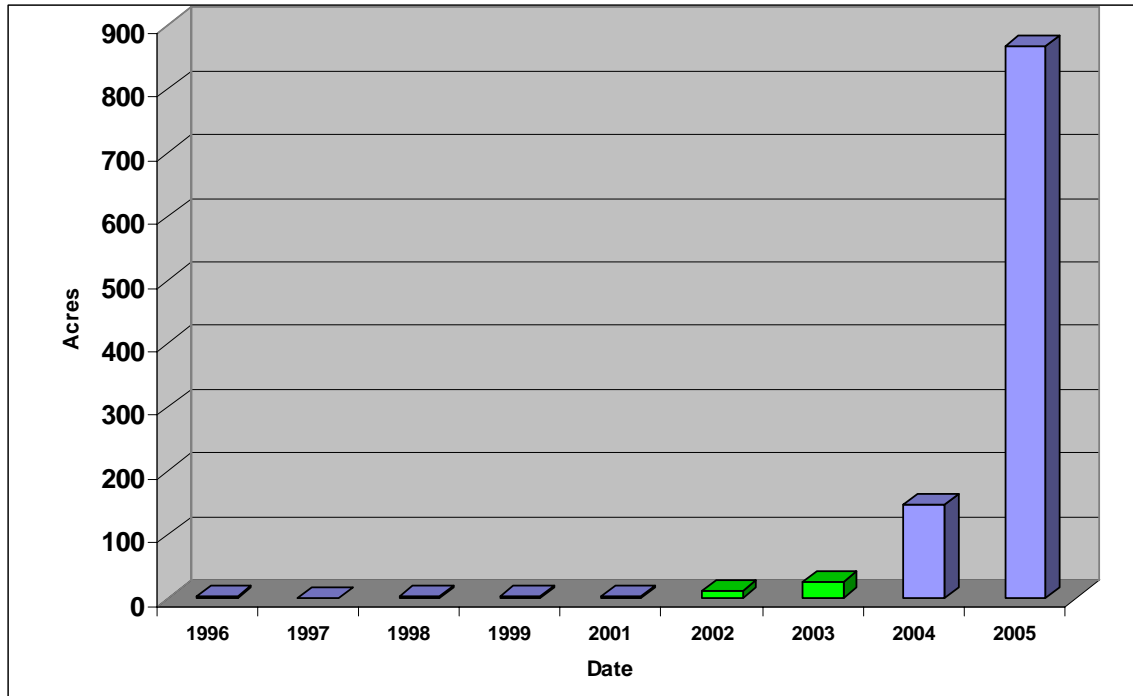
**Figure 1. Hydrilla coverage in Lake Conroe 1975-1983. Data from TPWD vegetation Surveys.**

Between September 1981 and September 1982, 270,000 non-sterile diploid grass carp were introduced into Lake Conroe to control aquatic vegetation. By October 1983 all vegetation had been removed from the lake. Hydrilla did not re-emerge in Lake Conroe for 13 years. In 1996, 3.2 acres of hydrilla was discovered. For nine more years, herbicide treatments funded primarily by SJRA and conducted by SJRA and TPWD were able to successfully inhibit the expansion of hydrilla (Figure 2.). However, by 2005 hydrilla expanded despite intensive herbicide treatments in late 2004 and early 2005.

As a result, TPWD and SJRA met and determined the need to develop a comprehensive hydrilla management plan for Lake Conroe, based on the principles of Integrated Pest Management (IPM). The plan would fall within the scope of the TPWD State Aquatic Vegetation Management Plan. Information is found in *Aquatic Vegetation Management In Texas: A Guidance Document* at:

[http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd\\_pl\\_t3200\\_1066.pdf](http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_pl_t3200_1066.pdf)

The purpose of this document is to provide a plan for hydrilla control activities in Lake Conroe during 2005-2006.



**Figure 1. Hydrilla coverage in Lake Conroe 1996-2004. Data from TPWD vegetation Surveys are in blue, and data from SJRA are in green.**

## Objectives of this plan

- To reduce as much as practical hydrilla infestations in Lake Conroe while minimizing damage to stands of native vegetation.
- To maintain a healthy lake ecosystem and fishery in Lake Conroe while providing access for recreational activities on the Lake.

## Hydrilla Management Options

A discussion of management options for hydrilla control including both proven and experimental techniques may be found in *Aquatic Vegetation Management In Texas: A Guidance Document*.

## Proposed Actions/Timeline

**August-September 2005** 1) **Conduct a comprehensive vegetation survey.**

**Rationale** - The results of this survey will be used as a point of reference to compare with vegetation levels at the same time the following year, as well as vegetation levels during any subsequent

2005-2006 vegetation surveys in order to determine if hydrilla coverage is increasing or decreasing.

**Responsible party(s) – TPWD, SJRA**

**September-  
November 2005**

**1) Continue herbicide treatments to control hydrilla**

**Rationale** – Herbicide use has proven an effective means of hydrilla control in Lake Conroe over the past nine years. Continued herbicide use will help augment the effects of biological controls by reducing the biomass control organisms have to eliminate.

**Responsible Party(s) – SJRA, TPWD,**

**2) Apply for a permit to conduct a limited stocking of triploid grass carp.**

**Rationale** – It is apparent from recent survey results that herbicide treatments alone may not be able to suppress the hydrilla in Lake Conroe. Since grass carp prefer hydrilla, a limited introduction of grass carp now should give native plants an ecological advantage. Stocking grass carp soon based on the area of hydrilla currently in the lake should help avoid the necessity of stocking large numbers of the fish later that would threaten the viability of native vegetation stands.

**Responsible Party(s) –SJRA, TPWD**

**3) Gather public input with respect to the introduction of triploid grass carp for hydrilla control in Lake Conroe.**

**Rationale** – Lake Conroe is heavily utilized by anglers, boaters, and other visitors as well as lakeside property owners. Vegetation management activities, or a lack thereof, have the potential to significantly affect 1) access to outdoor activities such as swimming, boating, skiing, and angling, 2) property values in and around the lake, 3) local businesses, 4) the county tax base, 5) water quality, 6) the environmental health of the system, and 7) tourism.

**Responsible Party(s) – TPWD, SJRA**

**4) Prepare to conduct a radio-tracking study to determine if grass carp that are temporarily caged after**

**introduction will remain in target locations where they are stocked at a higher rate than un-caged fish.**

**Rationale** – Typically grass carp undergo a period of increased movement for at least a few weeks after introduction. After this initial period of movement they often tend to settle down and remain relatively stationary for long periods of time. There is some evidence that the acclimation period of other fish species may be reduced by caging them for a short time after introduction. If the initial period of movement in grass carp could be eliminated they could be stocked more strategically in target areas, and fewer fish could be stocked to perform the same task. By reducing the number of grass carp that need to be stocked, the risk to native vegetation is also reduced.

**Responsible Party(s)** – TPWD, SJRA

**December 2005-  
May 2006**

**1) If necessary, continue to gather public input with respect to the introduction of triploid grass carp for hydrilla control in Lake Conroe.**

**Rationale** – Lake Conroe is heavily utilized by anglers, boaters, and other visitors as well as lakeside property owners. Vegetation management activities, or a lack thereof, have the potential to significantly affect 1) access to outdoor activities such as swimming, boating, skiing, and angling, 2) property values in and around the lake, 3) local businesses, 4) the county tax base, 5) water quality, 6) the environmental health of the system, and 7) tourism.

**Responsible Party(s)** – TPWD, SJRA

**2) If feasible, stock triploid grass carp in selected areas of Lake Conroe at a rate of 5 per infested acre of hydrilla in the lake.**

**Rationale** - Since grass carp prefer hydrilla, a limited introduction should give native plants an ecological advantage by stressing hydrilla. Stocking grass carp soon based on the amount of hydrilla currently in the lake should help avoid the necessity of stocking large numbers of the fish later that would threaten the viability of native vegetation stands.

**Responsible Party(s)** – SJRA, TPWD,

**3) If funds are available, implement an evaluation of radio-tagged triploid grass carp in Lake Conroe.**

**Rationale** – Same as rationale for September through November preparation.

**Responsible Party(s)** –SJRA, TPWD

**4) Monitor radio-tagged grass carp movement into and out of target areas.**

**Rationale** – See Number 4 under September through November activities.

**Responsible Party(s)** – SJRA, TPWD

**5) Where feasible hydrilla growing in less than 10 feet of water, and hydrilla growing within one foot of the surface, will be treated as quickly as possible, to a depth of at least five feet, using mechanical harvest and/or herbicide treatment.**

**Rationale** – Same as above

**Responsible Party(s)** –SJRA, TPWD

**6) Conduct a lake-wide vegetation survey in May.**

**Rationale** - The results of this survey will be compared to previous surveys in order to determine if hydrilla coverage is increasing or decreasing, and to assess grass carp efficacy.

**Responsible party(s)** – TPWD, SJRA

**7) Cooperators meet to evaluate vegetation survey results and determine if more triploid grass carp should be stocked.**

**Rationale** – Survey results will be compared with results from the previous survey.

- a. If hydrilla coverage declines or remains the same additional grass carp will not be stocked at that time.
- b. If hydrilla coverage has expanded over previous survey results additional triploid grass carp will be stocked. Cooperators will evaluate the extent of the expansion, including density and aerial coverage in light of published

literature and TPWD experience in Texas to determine the number of additional grass carp that will be stocked.

**Responsible Party(s)** –TPWD, SRA

**June-July  
2006**

**1) Conduct a lake-wide vegetation survey in July.**

**Rationale** - The results of this survey will be compared to previous surveys in order to determine if hydrilla coverage is increasing or decreasing, and to assess grass carp efficacy.

**Responsible party(s)** – TPWD, SJRA

**2) Cooperators meet to evaluate vegetation survey results and determine if more triploid grass carp should be stocked.**

**Rationale** – See Rationale under “December 2005 – May 2006”, #7.

**Responsible Party(s)** –TPWD, SRA

**August 2006**

**1) Cooperators meet to evaluate vegetation survey results and determine if more triploid grass carp should be stocked.**

**Rationale** – See Rationale under “December 2005 – May 2006”, #7.

**Responsible Party(s)** –TPWD, SRA

**September 2006**

**1) Conduct a lake-wide vegetation survey in September.**

**Rationale** - The results of this survey will be compared to previous surveys in order to determine if hydrilla coverage is increasing or decreasing, and to assess grass carp efficacy.

**Responsible party(s)** – TPWD, SJRA

**2) Cooperators meet to develop a 2006-2007 management plan.**

**Rationale** – Depending on the results of vegetation survey data, management activities may have to be modified to increase efficacy.

**Responsible Party(s)** – TPWD, SJRA

**Optional Activities (Timeline to be determined if options are implemented)**

**1) Stock hydrilla flies in selected areas of Lake Conroe and monitor hydrilla growth to evaluate the effectiveness of the flies.**

**Rationale** – Hydrilla flies may provide an additional way to put pressure on the hydrilla population in Lake Conroe, and give native vegetation a competitive advantage.

**Responsible Party(s)** – TPWD, SJRA

**Literature Cited**

Klussmann, W.G., Noble, R.L., Martyn, R.D., Clark, W.J., Betsill, R.K., Bettoli, P.W., Cichra, M.F., and Campbell, J.M. (1988) Control of aquatic macrophytes by grass carp in Lake Conroe, Texas, and the effects on the reservoir ecosystem. Texas Agricultural Experiment Station, Texas A&M University MP-1664. College Station, Texas. 61 pp.