US Army Corps of Engineers ®
Mobile District

Environmental Assessment for the Release of Triploid Grass Carp for Hydrilla Management

Walter F. George Lake, Alabama and Georgia

FINAL

ENVIRONMENTAL ASSESSMENT FOR RELEASE OF TRIPLOID GRASS CARP FOR HYDRILLA MANAGEMENT WALTER F. GEORGE LAKE, ALABAMA AND GEORGIA

US Army Corps of Engineers
Mobile District

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1.0 PROJECT LOCATION

Walter F. George Lake is located on the Chattahoochee River that forms a portion of the southern Alabama-Georgia state line. Although Walter F. George Lake is the official name given to the lake by the U.S. Congress, it is also known as Lake Eufaula in Alabama and is frequently referred to by the latter name in sport fishing circles. Figure 1 contains a map of the lake.

Walter F. George Lake is formed by an earthen dam and lock of the same name. The U.S. Army Corps of Engineers (Corps) completed construction of the project in 1963. At normal summer pool level 190 feet National Geodetic Vertical Datum (NGVD), the lake has a surface area of 45,181 acres. The lake extends 85 miles upstream of the Walter F. George Lock and Dam to Columbus, Georgia and Phenix City, Alabama, where the impounding effects of the lake are no longer observed on the Chattahoochee River. At elevation 190, the lake has a shoreline length of 640 miles.

The Walter F. George Project is a multipurpose project created primarily to aid navigation on the Chattahoochee River and to generate hydroelectric power. Additional benefits include public recreation, regulation of stream flow, and fish and wildlife conservation.

The Walter F. George Project is a component of the Apalachicola-Chattahoochee-Flint navigation system as shown in Figure 2. The system was designed to provide a 9-foot navigation channel on these three rivers from the Gulf Intracoastal Waterway upstream to the head of navigation at Columbus, Georgia, on the Chattahoochee River and to Bainbridge, Georgia, on the Flint River. While sufficient depths are provided for navigation through much of the lower reaches of the lake, dredging is periodically required at selected locations in the lake's narrow upper reaches to provide the authorized 9-foot navigation depth. The elevation of the upper miter sill in the lock chamber is 172 feet NGVD, which means that if the lake levels drop below 181 feet, commercial navigation is no longer possible through the lock upstream into the lake.

Three original 37,500 kW and a newly renovated 43,000 kW turbine units are located in the project's powerhouse. The project generated 310,414,000 net kilowatt hours of electrical energy during fiscal year 2006 with a value of $5,655,000 (**Note:** Two of the four units were out of service and undergoing rehabilitation for most of 2006.). The minimum power pool elevation is 184 feet NGVD. In other words, generation of power ceases when water levels within the lake drop below 184 feet NGVD. At lake levels below 184 feet, unacceptable cavitation damage would occur to the turbines while greatly reducing the output of power generated.

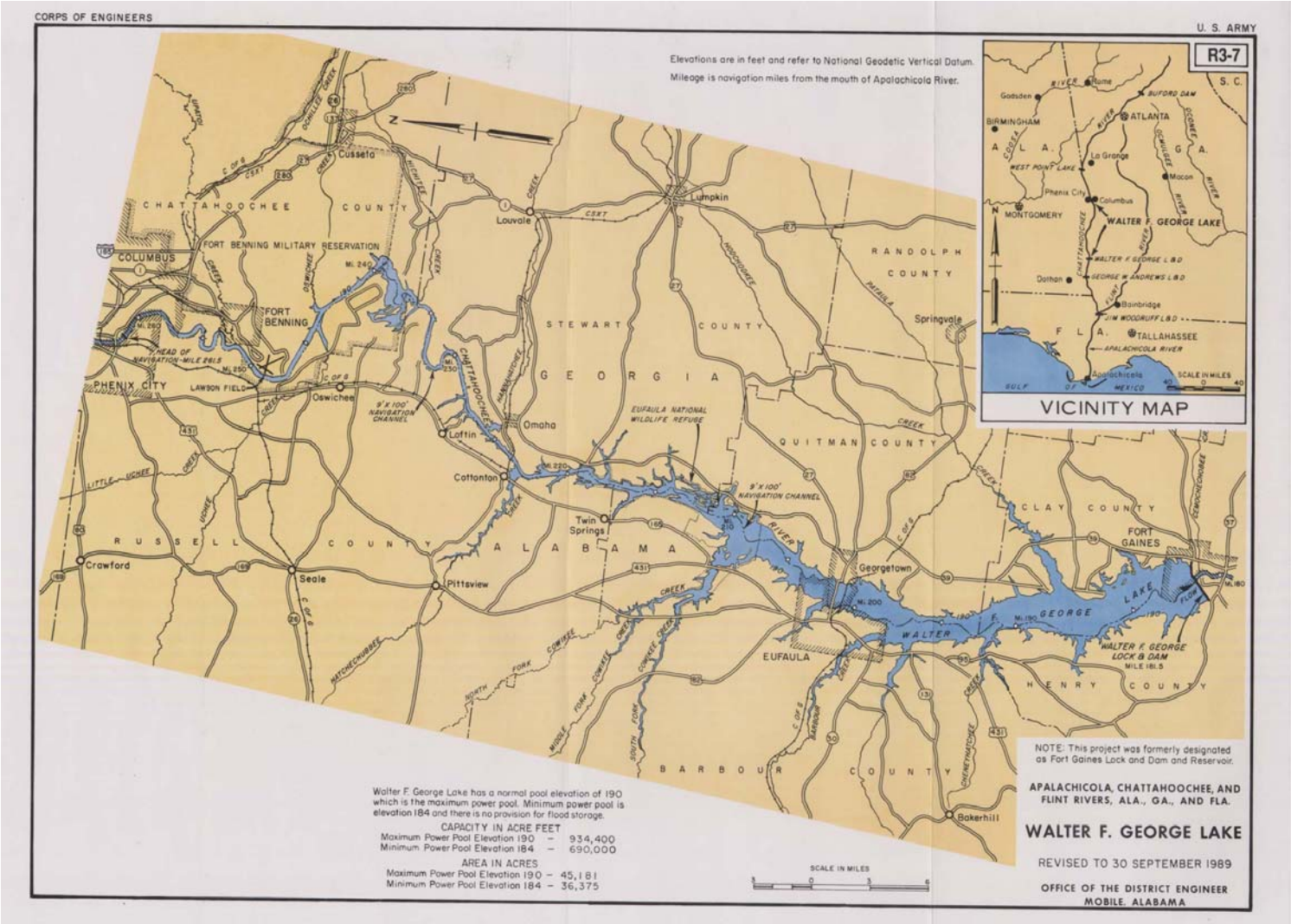

Figure 1. Walter F. George Lake Vicinity Map

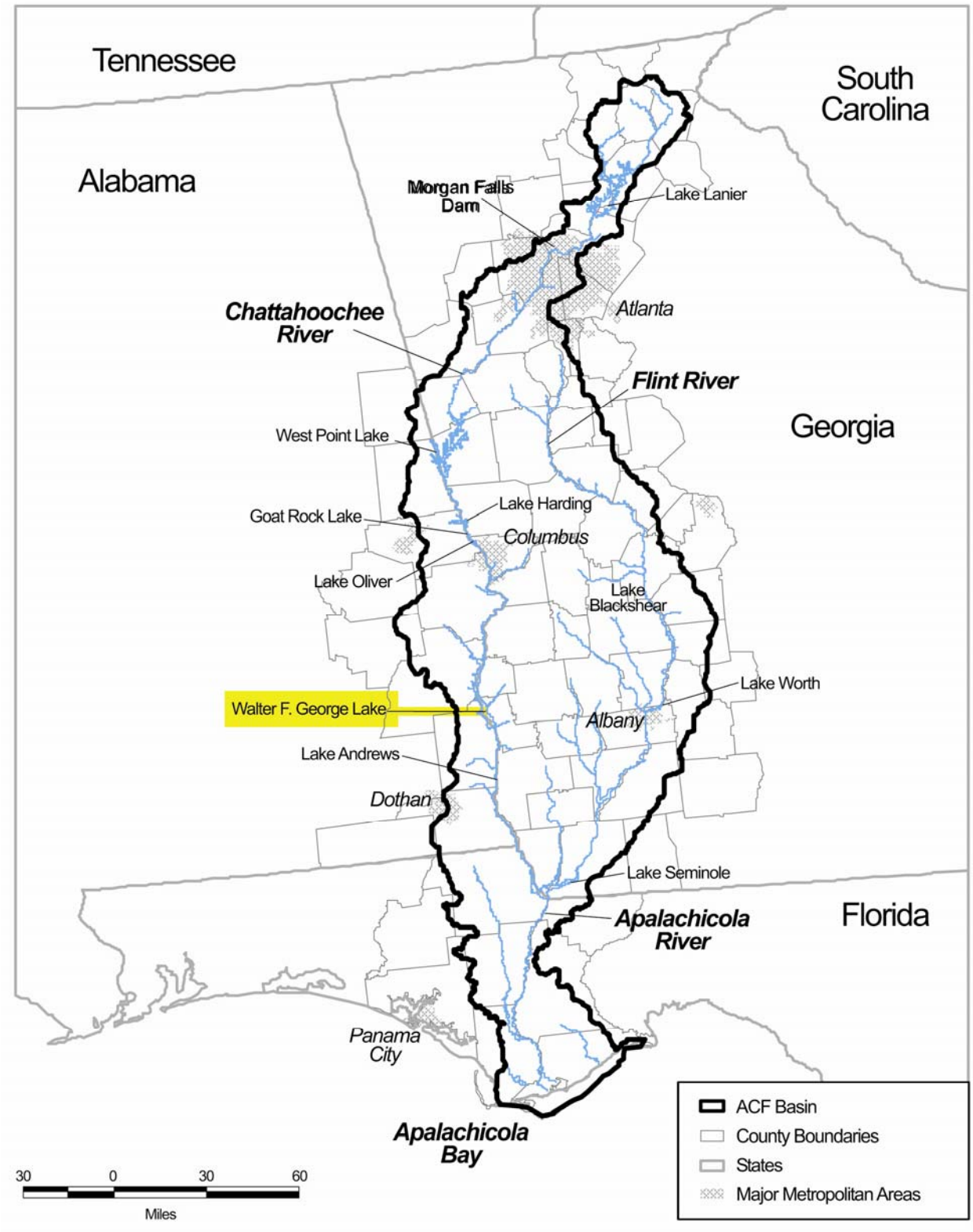

Figure 2. Location of Walter F. George Lake within the Apalachicola, Chattahoochee, and Flint Rivers Basin

The water regulation plan for Walter F. George Lake calls for lake levels to be maintained within a relatively narrow range. Lake levels are targeted to be maintained at elevation 190 feet NGVD during the summer recreation season from June through October each year, and at 188 feet NGVD from November through May. The lower winter pool levels provide approximately 87,300 acre-feet of storage (i.e. the difference in lake volume between 190 feet and 188 feet) that can be used to "smooth" releases downstream of the dam during flood events. During drought periods, it is not possible to consistently meet the target lake levels. The result is that lower lake levels can occur for extended periods of time. The most recent regional drought events that affected Walter F. George Lake occurred in 2000-2001, 2004, and 2006. During the multi-year drought of 2000-2001, lake levels declined to as a low as 184.25 feet and remained below 186 feet for several months in response to insufficient flows entering the lake from the upper Chattahoochee Basin.

The Walter F. George Lake Project is comprised of an additional 37,640 acres of land above elevation 190 feet NGVD. Much of theses lands are used for recreation which has long been an important activity at Walter F. George Lake. A total of 27 public recreation areas surround the lake, including 10 lease areas, three state parks, one private marina, four designated swimming areas, six campgrounds, and 24 boat launching ramps. The Corps operates 18 of the recreation areas. Recreation visitations at these sites during the seven-year period between 2000 and 2006 ranged from a high of 4,658,476 to a low of 2,416,704. In addition, there are at least 1,100 privately owned boat docks around the lake that are permitted by the Corps.

In the years following its initial impoundment in 1963, Walter F. George Lake enjoyed the reputation of being an outstanding largemouth bass fishery. However, typical of all large impoundments, as the lake matured the initial "boom" period of the lake has settled into a more sustained, but still productive fishery.

An important wildlife feature of Walter F. George Lake is the Eufaula National Wildlife Refuge which is operated by the U.S. Fish and Wildlife Service on land outgranted by the Corps. The Refuge consists of 11,184 acres of land, marsh and water and stretches from Cowikee Creek upstream to Rood Creek. The Refuge is operated for waterfowl purposes and consists of a number of impoundments that depend upon water pumped from the lake. Pumping generally begins on November 1 each year and continues over a period of 2 to 3 weeks to gradually flood the planted food crops for waterfowl usage. During this period, lake levels must be maintained above 185 feet for the Refuge pumps to operate efficiently.

2.0 PURPOSE OF ENVIRONMENTAL ASSESSMENT

The purpose of this Environmental Assessment is to evaluate the environmental effects that would result within Walter F. George Lake and contiguous upstream and downstream waterbodies from the release of triploid grass carp (*Ctenopharyngodon idella*) to assist in the management of the exotic invasive submersed aquatic plant hydrilla (*Hydrilla verticillata*).

The Environmental Impact Statement (EIS) prepared in 1979 for the operation and maintenance of the Walter F. George Project addressed the myriad of operational activities required to maintain the project's various features. Among those activities addressed was the performance of the necessary operational measures to maintain boat ramps and docks, small boat channels, and other facilities required to support recreation demands, including the "…implementation of programs pertaining to the conservation, development and utilization of the project resources for the safe and maximum enjoyment of the public." One of the programs addressed was the control of nuisance aquatic plants.

The 1979 EIS addressed the Walter F. George aquatic plant control program in only a conceptual fashion. That is because the lake did not have a significant problem with invasive aquatic plants at that time, and no problems with any submersed aquatic plants. The combination of chemicals and some biological control measures were effective in controlling the floating and emergent plants that did present localized problems around the lake. The use of the chemical herbicide 2,4-D to control water hyacinth (*Eichhornia crassipes*) and biological agents such as alligatorweed flee beetles (*Agasicles hydrophila*) and alligatorweed stem borer moth (*Vogtia malloi*) to control alligatorweed (*Alternanthera philoxeroides*) were the only specific aquatic plant control measures identified in the EIS.

3.0 THE HYDRILLA PROBLEM

3.1 Walter F. George Lake as a Habitat for Aquatic Plants

As Walter F. George Lake has aged over the 44 years since it was initially impounded, the lake has experienced an increase in aquatic plants. This is a typical consequence of ecological succession in aquatic environments.

Aquatic plant communities in moderation provide many benefits to a lake ecosystem by stabilizing sediments; removing excess nutrients from the water; improving water clarity; and providing quality habitat for fish, waterfowl, and other organisms.

While a diverse native aquatic plant community is a desirable feature of an aquatic ecosystem, excessive growths of submersed aquatic plants can cause serious and costly management problems and interfere with the use of the affected waterbody. Problems occur when extensive populations of a single species (monotypic growths) develop very high levels of biomass and have a growth form that produces a dense canopy of vegetation at the water surface. Problems created by such monotypic growths of plants include blocking of navigation channels and boat ramps; hindering swimming and other waterborne recreational activities; interfering with water intakes; promoting sedimentation; restricting photosynthesis to only a shallow zone near the water surface; preventing the growth of other aquatic plant species; impeding gas exchange between the water-air interface; minimizing wind generating mixing of water; obstructing water circulation; depletion of dissolved oxygen concentrations; and contributing to algal blooms as limiting nutrients (i.e. phosphorus) are released to the water during periods of plant die-off.

Plants that are not native to the United States (referred to as “exotics”) pose the most severe problems for large multipurpose impoundments. At Walter F. George Lake, invasive aquatic plants have increasingly affected larger portions of the impoundment as the lake has aged. In addition to hydrilla, other problematic invasive aquatic plants that occur at Walter F. George Lake are water hyacinth (*Eichhornia crassipes)*, egeria (*Egeria densa)*, and giant cutgrass (*Zizaniopsis miliacea)*. Through the years, the Corps has had to devote increasing efforts and funds to control of these species. To date, the method used to control nuisance growths has been the application of chemical herbicides.

Of the exotic aquatic plants occurring in Walter F. George Lake, hydrilla is the species of most concern from an operational, recreational, and environmental standpoint. Hydrilla poses a very serious threat to the project’s continued ability to provide the multipurpose functions for which the lake project is intended.

3.2 Origin, Biology, Reproduction, and Consequences of Hydrilla Infestations

Hydrilla is a submersed aquatic plant that was introduced into the United States through the aquarium plant trade. It was first discovered growing in the wild in Florida in the 1950s. A second introduction is suspected to have occurred in the Carolinas. From the known Floridian introduction, hydrilla has continued its spread throughout the United

States through the aquarium trade and aquaculture as well as being transported between water bodies via sport fishermen's live wells, boat trailers, engines, and intentional introductions.

The origin and native range of hydrilla is widely debated. The more general descriptors give hydrilla a broad native range that includes parts of Asia, Africa, and Australia. Hydrilla can tolerate both high and low nutrient conditions. Salt tolerance capabilities for hydrilla go up to about 9 parts per thousand (ppt). Hydrilla's exceptionally wide tolerance to various habitat conditions has led to invasions in 25 states in the continental United States from the northern states of Washington and Maine to the southern states of Texas and Florida. Hydrilla is climatically suited for growth in any of the States in the continental United States and Hawaii, and possibly even Alaska.

As a submersed aquatic plant, hydrilla grows upward toward the water surface from roots/tubers that are anchored in aquatic sediments. Hydrilla plants produce greatly elongated, narrow stems that support leaves at regularly spaced nodes along the entire length of the stem. The stems can grow up to 30 feet in length, producing multiple branches near the water surface where light penetration is greatest. Separate male and female flowers can be borne on the plants. Figure 3 contains a photograph of hydrilla collected in the field showing the stems and their active growing tips.

Figure 3. Example of Hydrilla Stems Collected in the Field Showing the Growing Tips

Reproductive biology is an important factor contributing to the spread of hydrilla. In Walter F. George Lake, hydrilla expands its coverage by way of the following vegetative modes of reproduction:

- **Fragmentation** occurs when a vegetative portion of the plant containing at least one node breaks away from the main plant body and later forms a new plant. Fragmentation is facilitated by mechanical removal, passing boat propellers, movement of native organisms within the mat, and wave action.

- **Tubers** (see Figure 4) propagation occurs when a root extends some distance from the main plant body and begins to grow leaves, eventually flowering.

- **Turions** (see Figure 5) are formed from compact dormant buds in the leaf axis. They break away when mature, forming a bulb that increases over-wintering success. Each turion has the potential to form a new plant.

The form of hydrilla that occurs in Walter F. George Lake and the surrounding Gulf Coast states is the dioecious variety in which separate male and female plants are produced. Since no male plants are present in the lake, hydrilla is incapable of sexually reproducing to form seeds. This limits its spread to the above non-sexual modes of vegetative reproduction.

Figure 4. Hydrilla Tubers

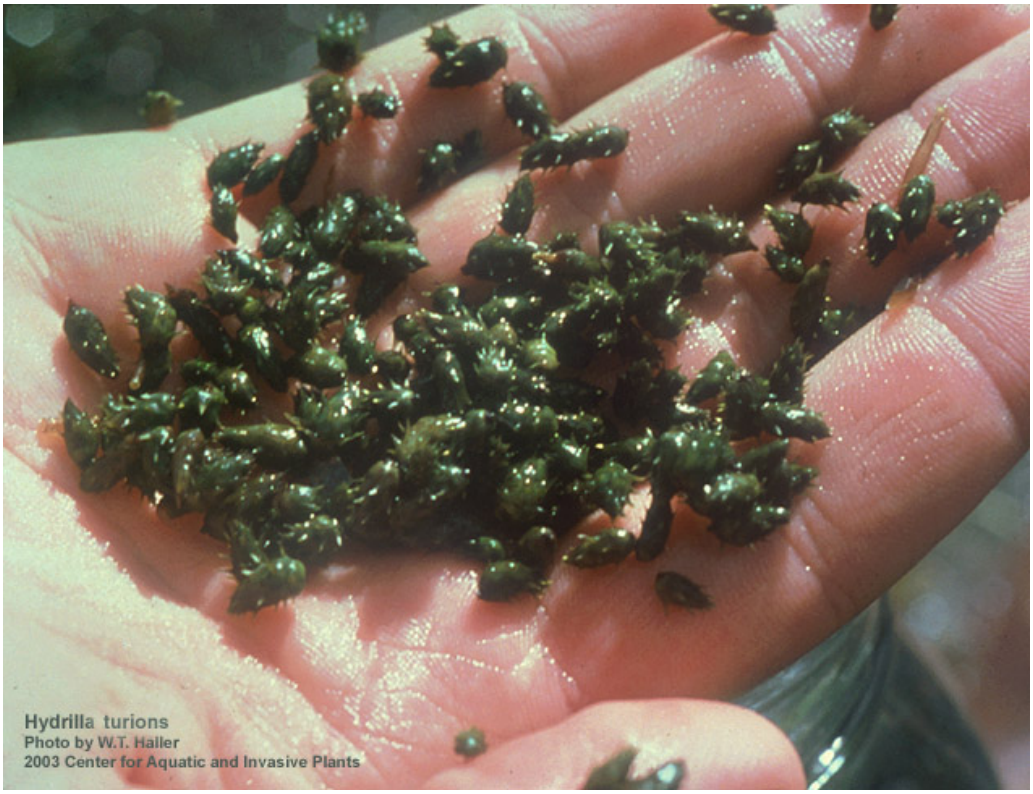

Figure 5. Hydrilla Turions.

In moderation hydrilla provides forage in waterbodies for some waterfowl and cover for fish. However, hydrilla has an extremely aggressive growth rate and will form dense mats that block sunlight from native submersed vegetation (tape grass (*Vallisnaria americana*), coontail (*Certaphyllum demersum*), etc.), impede small craft navigation, and promote sedimentation. Monotypic mats of hydrilla have been documented to encompass hundreds of acres in lakes. Any benefits of moderate hydrilla populations attributed to the sport fishing industry are soon overcome by the pitfalls associated with dense growths of this aquatic plant. Although some research shows that the presence of hydrilla can be beneficial to sportfish, other research has also shown that at levels >30% coverage, hydrilla is detrimental to sportfish. Dense infestations limit sportfish weight and size due to the plant's ability to alter water chemistry and lower oxygen levels (Colle and Shireman, 1980). Hydrilla is also known to disrupt natural water currents, possibly affecting the breeding cycle of some fish (www.plants.ifas.ufl.edu_March_2007).

Figure 6 shows the present level of hydrilla infestation occurring within the Sandy Branch embayment of Walter F. George Lake. Figure 7 provides an example of hydrilla growth in a larger open water portion of the lake near Soapstone Creek. Examples of how severe hydrilla infestations could become at Walter F. George Lake are readily available in Lake Seminole which is also a large multipurpose impoundment on the Chattahoochee River only 50 miles downstream from Walter F. George Lake. Figure 8 shows thick hydrilla mats that developed in open water areas on Lake Seminole, while Figure 9 shows the adverse affects created for private boat docks on the same lake.

Figure 6. Hydrilla Infestation in Sandy Branch at Walter F. George Lake

Figure 7. Hydrilla Infestation in Open Portion of Walter F. George Lake Near Soapstone Creek

Figure 8. Example of Open Water Hydrilla Infestation at Lake Seminole

Figure 9. Example of Hydrilla Infestation Affecting a Private Boat Dock at Lake Seminole

If aggressive actions are not taken to control hydrilla, the present hydrilla infestations within Walter F. George Lake are expected to intensify. Figures 6, 7, 8, and 9 clearly demonstrate how the uncontrolled growth of hydrilla can essentially dominate an aquatic ecosystem. The dense mats of hydrilla can create problems for boaters, canoeists, fishermen, and other water sport enthusiasts.

From an economic standpoint, hydrilla infestations can have costly consequences. Dense growths of hydrilla can clog waterways, interfere with irrigation structures, block water intakes, and limit hydroelectric power production. It can also interrupt commercial operations by impeding navigation. Costs to individual States and the Federal government include not only the expenditures associated with the control of hydrilla, but also the repair of damages and increased maintenance attributed to excessive growths of hydrilla.

3.3 Hydrilla in Walter F. George Lake

Hydrilla was first detected on Walter F. George Lake in 1993 at the East Bank Public Use Area near the dam on the east side of the lake. In 1994 a small infestation of hydrilla was found in the backwater area upstream of Soapstone Creek on the east side of the lake, above the Eufaula-Georgetown causeway. Herbicidal treatments with endothall and fluridone (herbicides approved for aquatic applications), coupled with annual surveys did not reveal an expansion of hydrilla between 1994 and 2001. However, in 2002 several new infestations of hydrilla and egeria were found at Rood Creek, Witches Ditch, Wylaunee Creek, Barbour Creek, White Oak Creek, Thomas Mill Creek, Sandy Branch, Sandy Creek, various areas within the Eufaula National Wildlife Refuge, and along the Chattahoochee River.

The scattered findings of hydrilla in 2002 indicated the infestation had escalated. The varied locations in which hydrilla was found in 2002 may also indicate that the lake may have experienced several secondary introductions. The expansion of hydrilla in Walter F. George Lake resulted in the decision to conduct an impoundment-wide aquatic weed survey in 2002. Follow-up surveys have been repeated in each of the subsequent years. The 2006 survey results showed that hydrilla-dominated submersed aquatic plants had expanded to infest 2,400 acres of Walter F. George Lake's total 45,190-acre surface area. The density of plant coverage within the 2,400 acres of plant coverage was estimated to have been 30% (i.e. 720 acres).

Table 1 demonstrates the rapid spread of hydrilla on the Walter F. George Lake between 2000 and 2006 and the corresponding cost increases that were expended by the Corps in an attempt to control the expansion of hydrilla. The data in Table 1 show that during that five-year period, aquatic plant coverage of the lake expanded from 0.5% to 5% of the lake's total surface area, representing a ten-fold increase in the area of the lake covered by hydrilla. It is noteworthy to point out that the significant expansion of hydrilla during that five-year period occurred even in the face of increasing efforts and the associated expenditure of funds to control hydrilla. What is not known is how widespread the

Table 1
Comparison of Increase in Aquatic Plant Coverage with the Total Walter F. George Project Budget and Herbicide Expenditures [1/]
Between 2000 and 2006

Year	Aquatic Plant Coverage (acres)	Total Project Budget ($)	Actual Herbicide Expenditures ($)
2000	-	7,500,000	6,750
2001	120	6,500,000	1,350
2002	252	6,800,000	74,803
2003	916	6,700,000	105,570
2004	2,048	6,400,000	401,477
2005	2,140	6,500,000	261,954
2006	2,400	7,100,000	545,789 [2/]
2007	2,800[3/]	7,700,000	[4/]

[1/] Herbicide costs reflect the cost of the chemicals alone and not the cost of labor required to apply the herbicides.
[2/] 2006 amount represents costs through August. After that month, only minimal chemical applications occurred since Fall applications are not typically performed.
[3/] Estimated acreage based on drought conditions and early growth of hydrilla.
[4/] It was not possible to determine the amount of funds that would be expended on herbicides in 2007 at the time the Environmental Assessment was prepared.

hydrilla expansion would have been by 2006 in the absence of the increased herbicide treatment efforts that were undertaken.

The area covered by hydrilla dominated submersed aquatic vegetation in 2007 is projected to expand to 2,800 acres due to the drought conditions affecting the drainage basin and the resulting lower turbidities that enhance the growth of hydrilla. The density of submersed aquatic vegetation within this overall area is also projected to increase from the 30% observed in 2006 to 40% in 2007, or an increase from 720 acres to 1,120 acres. This will represent an increase in coverage of from 5% to 6% of Walter F. George Lake's total surface area.

Figure 10 compares the hydrilla coverage in 2002 with 2006. Examination of Figure 10 shows that hydrilla is no longer restricted to a few isolated locations on Walter F. George Lake. While a significant coverage of hydrilla still occurs in the vicinity of the East Bank Public Use Area upstream of the dam where it was first discovered, this exotic plant has now spread throughout the lake. The heaviest infestations are centered around the Cowikee Creek embayment near the Lakepoint Resort State Park. Smaller infestations of hydrilla also occur in the headwater reaches of many of the tributary embayments that are scattered throughout the lake. Each of these locations, singularly and collectively, serves as a source of plant material that contributes to the continued expansion of hydrilla throughout the lake.

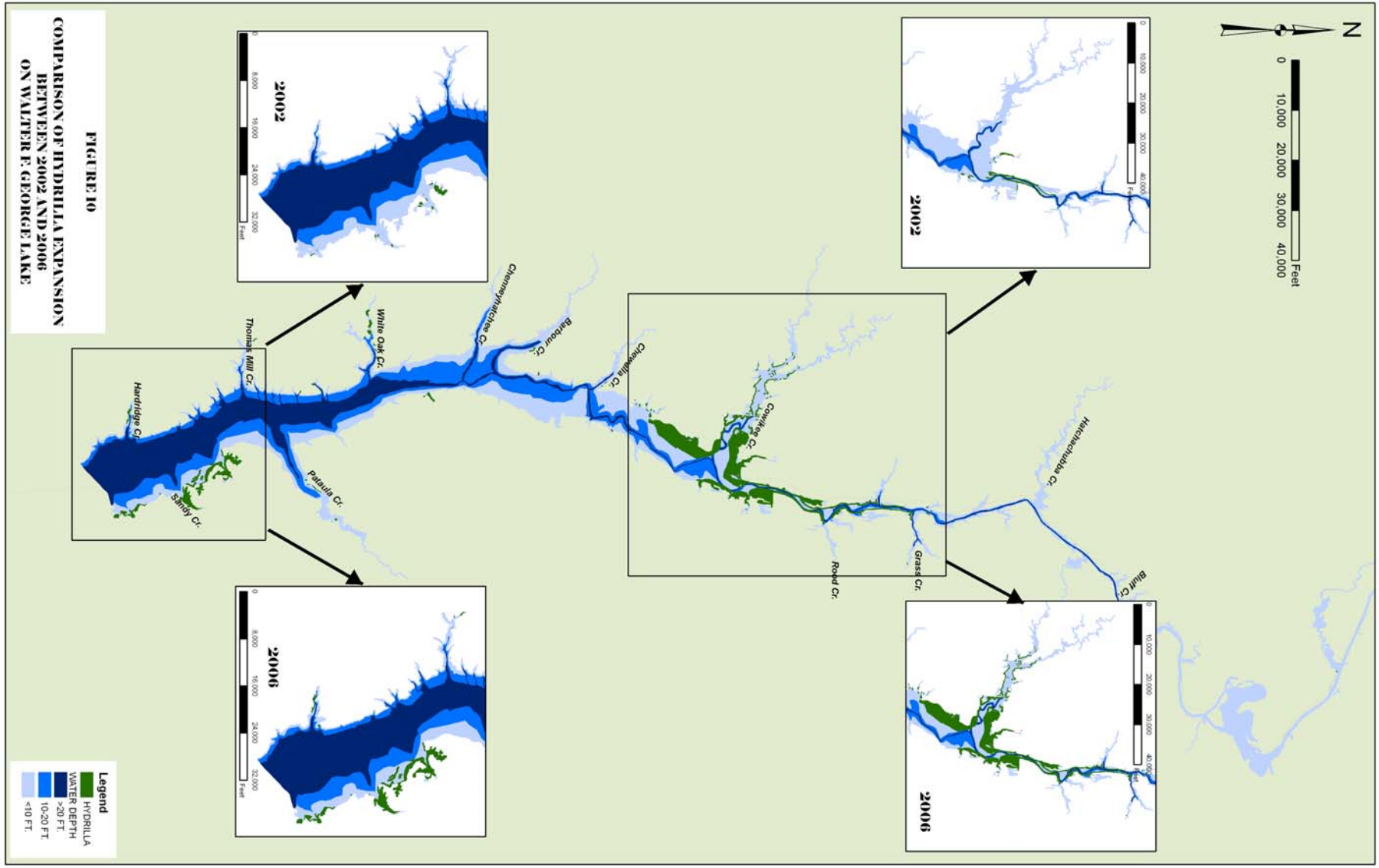

FIGURE 10

COMPARISON OF HYDRILLA EXPANSION BETWEEN 2002 AND 2006 ON WALTER F. GEORGE LAKE

While the aquatic plant coverage projected for 2007 is estimated to be 6% of Walter F. George Lake's total surface area, much of the lake is conducive for the growth of this problem plant. Light penetration (often related to depth) and substrate type are generally crucial limiting factors influencing the occurrence of many submersed aquatic plants. However, hydrilla's flexible ecological tolerances can allow this plant to extend to depths of 20 feet in the lake, particularly in the clearer and quieter embayments of the lake where sunlight penetration is adequate.

Area-capacity (i.e. the relationship between lake surface area and lake volumes which considers depth) information for Walter F. George Lake shows that approximately 14,600 acres (32%) of the lake are less than 10-feet deep at a surface elevation of 190 feet. These shallow areas are located in the littoral zone adjacent to the lake shoreline, with the relative width of the shallow areas increasing in an upstream direction. An additional 11,120 acres of the lake (25%) have depths ranging between 10 and 20 feet at the normal summer pool level of 190 feet. This means that a total of 25,700 acres (57%) of Walter F. George Lake are less than 20-feet deep at normal summer pool levels. Figure 10 shows the 0 to 10-foot and 10 to 20-foot depth zones within the lake.

In 2006, hydrilla was found to be rooted down to the approximate 10-foot depth contour at several locations within Walter F. George Lake. Hydrilla and other aggressive aquatic plants are known to "create their own habitat" as plant beds extend into deeper waters by the ability of the plant beds to calm wind induced waves that encourage the settling of suspended sediments which in turn further reduces turbidity levels.

Given the biological characteristics of hydrilla, it is possible that the hydrilla infestations at Walter F. George Lake have the potential to continue to expand until hydrilla covers somewhere between 32 to 57% of the lake's surface area, reaching downward to depths of 20 feet. The projected rate of expansion of hydrilla is impossible to predict with great confidence. A number of factors will act to determine the eventual extent of hydrilla coverage. Included among those factors are the success of the existing herbicidal control program, human activities, severity of winter conditions, flood flows, prevailing turbidity levels, and occasional tropical storms.

For the purposes of this analysis, it is conservatively estimated that hydrilla could eventually cover most of the Walter F. George Lake's 14,600 acres having a depth <10 feet. Based on actual experiences in Lake Seminole which is located 50 miles downstream, it is projected that level of hydrilla coverage could be reached on Walter F. George Lake within the next 30 years. Expansion of the lake's hydrilla infestations is anticipated to occur even with the continuation of the present herbicide treatment program.

4.0 PROPOSED ACTION

The proposed action is to reduce the infestation of submersed invasive aquatic plants (predominantly hydrilla) within Walter F. George Lake. The proposed action will be effectively accomplished by satisfying the following objectives:

- Maintain and enhance the establishment of as much native submersed aquatic vegetation in the lake as possible. Until a significant acreage of native plants develops, hydrilla will be controlled so that it does not expand past the 2,400 acres that existed in 2006, representing <5% of the lake's surface area. That target acreage of hydrilla will be maintained to provide aquatic habitat for the lake fishery and waterfowl in the absence of a comparable amount of native plants. At such time as native plants begin to develop, the coverage of hydrilla will be gradually reduced over time.

- Reduce the density of submersed hydrilla plants occurring within infested areas to less than 30%.

- Enhance development of mixed native aquatic plant communities, in lieu of monotypic beds of hydrilla.

- Reduce infestations at Corps operated public use areas to a level of no impact on public use and operations facilities.

- Achieve the desired level of aquatic plant reductions at an annual cost that does not exceed the average annual cost of $280,000 for aquatic plant management that was incurred during the five-year period 2002 through 2006.

For the purposes of this Environmental Assessment, a 30-year period of analysis has been selected to evaluate the alternatives considered to implement the proposed action. The 30-year period was selected based on the potential for hydrilla to expand at a linear rate to eventually cover 14,600 acres (32%) of Walter F. George Lake having depths <10 feet over that period of time.

This estimate is believed to be a very conservative projection of the rate of expansion, since as discussed in Section 6.3 and depicted in Figure 11 in Section 6.3, it is possible that hydrilla could spread at a much faster rate to cover the 14,600 acres. Further, it is also possible for hydrilla to extend to depths of around 20 feet which means that an additional 11,120 acres of the lake (i.e., 25%) having depths ranging between 10 and 20 feet could become infested with hydrilla under a worst case scenario.

5.0 ALTERNATIVES

This section describes the alternatives evaluated to achieve the level of hydrilla control desired at Walter F. George Lake as stated in the proposed action. The alternatives were based in large part upon information and data considered in the development of the Lake Seminole Hydrilla Action Plan prepared in 1998 and modified where appropriate to address the conditions at Walter F. George Lake.

5.1 Alternatives Considered and Eliminated

The following alternatives were considered but eliminated from detailed evaluation.

Insects as Biological Control Agents

Several insect species have been identified that feed on hydrilla. A number of these species have been investigated as potential biological control agents. Insects that have received the most attention include the tuber-feeding weevil (*Bagous affinis*), the Australian stem-boring weevil (*Bagous hydrillae*) and the leaf-mining fly (*Hydrellia pakistanae* and *Hydrellia balciunasi*).

For a variety of reasons, only a few of these insect species have proven to be effective for use in the United States. The stem boring weevil (*B. hydrillae*) was released in 1992 in Lake Seminole (downstream of Walter F. George Lake) in an attempt to control hydrilla. However, that insect failed to become established in the lake.

During 1990-1993, the leaf-mining fly (*H. pakistanae*) was also introduced into Lake Seminole. Although subsequent surveys indicate this insect appears to have become established within the lake, there is no evidence that this species has significantly impacted hydrilla in the lake. According to the 1998 Hydrilla Action Plan for Lake Seminole, monitoring of hydrilla in the lake as of that time had not indicated damage levels had reached the threshold level necessary to reduce biomass and the surface matting capacity of hydrilla on the lake.

The 1998 Hydrilla Action Plan for Lake Seminole concluded that based on the literature and field data observed for Lake Seminole it is unlikely the use of insects as biological control agents will be able to reduce hydrilla on Lake Seminole in the near future. No evidence has been generated since 1998 to invalidate that earlier conclusion. Therefore, the use of insects as biological control agents was eliminated from consideration as an alternative to implement the proposed action at Walter F. George Lake which is 50 miles upstream of Lake Seminole.

Confined Release of Grass Carp

Following the conduct of an extensive field experiment at Lake Seminole during the mid 1990s, a larger release of triploid (sterile) grass carp (i.e., white amur or *Ctenopharyngodon idella*) was successfully accomplished into confined areas on Lake

Seminole following the recommendations contained in the 1998 Hydrilla Action Plan for that lake. Subsequent monitoring indicates that grass carp have been effective in reducing hydrilla within the confined areas. The confined areas involve tributary embayments to the lake that are around 1,000 acres or less in size.

Confined areas were selected for the release of grass carp into Lake Seminole that would allow the fish to be concentrated in high vegetative areas. The grass carp were confined to prevent individual fish from escaping from the lake and migrating into the downstream Apalachicola River and to other locations upstream of the lake. The confining barriers were constructed from fencing materials and equipped with low voltage electronic fish barrier devices to discourage grass carp from exiting through the boat passage openings that were constructed into the barrier fencing. The addition of electric fish barrier component to the physical barriers was required to document unacceptable levels of grass carp escape during demonstration tests in 1995-1996. Due to the cost of the construction materials, sites were selected at constricted locations near the mouths of tributary embayments to minimize the length of the confining barriers and reduce construction costs.

Walter F. George Lake is considerably different from Lake Seminole. First, Walter F. George Lake is a much deeper lake which means that the cost of barrier fencing would be significantly higher. Second, the ratio of the lake's surface area associated with its tributary embayments to the area of open water in the main lake is much smaller than is the case at Lake Seminole. Third, many of the existing hydrilla problem areas on Walter F. George Lake occur within open water portions of the mid to upper reaches of the lake that experience seasonally high flows from the Chattahoochee River. High current conditions could prove to be problematic for the construction of rigid barriers that must be able to withstand river current forces and the debris carried by high flows. This represents an additional consideration that would further contribute to higher construction costs.

To accommodate the above conditions in a workable fashion, the cost of constructing confined enclosures on Walter F. George Lake would be considerable. Also, construction of an electric fish barrier at the lock, hydropower turbine intakes, and dam spillway areas to prevent the downstream movement of grass carp would be extremely cost prohibitive. Due to the depths occurring at these locations, the higher voltages required to discourage fish from passing through and over these structures would pose potential safety issues. Another drawback with the use of electric fish barriers at the spillway and hydropower intakes (areas experiencing high water flows) would be their lack of effectiveness in containing grass carp within the lake, as the flowing water would carry any "stunned" fish downstream into G. W. Andrews Lake. In addition, the deeper waters would reduce the effectiveness of the electric fish barriers. For these reasons, the confined release of grass carp alternative was eliminated from further consideration.

Mechanical Harvesting

Mechanical harvesting of hydrilla uses mechanical devices to cut submersed aquatic plants. The cut portions of the plants would be removed from the water and loaded on a work barge for transportation to a central collection area from which the plant matter would be removed from the waterbody, placed on dry land, and allowed to die through drying and decomposition of the organic matter.

Mechanical harvesting provides only short-term control. Most equipment allows the plants to be cut only to depths of 4 to 6 feet. This leaves the roots and lower portions of the plants to remain intact to resume growth following harvesting. Aquatic vegetation like hydrilla can recover relatively quickly to pre-harvest levels within as short a time as 30 days during the warm summer months. Thus, this approach to aquatic plant control can require multiple harvests of an area during a typical growing season.

For aquatic plants like hydrilla which have the capability to be spread through fragmentation of stems, mechanical harvesting can actually contribute to the spread of undesirable vegetation in an aquatic environment. This is because removal of the cut portions of plants during harvest is not 100% efficient, leaving a considerable amount of the smaller cut plant materials in the water. The resulting small stem fragments can be carried by flow and wind driven currents to other locations within the lake to become established and add to the overall aquatic plant problem affecting the lake. In short, mechanical harvesting would in all likelihood actually exacerbate the hydrilla problem in Walter F. George Lake.

Major factors determining the cost to mechanically harvest plants from a waterbody are the following:

- Acreage to be cut
- Frequency of harvest
- Harvest rate of equipment used
- Operation and maintenance cost of the harvesting equipment
- Travel distances to disposal sites
- Labor
- Supplies and other miscellaneous costs

Experience has shown that mechanical harvesting is labor and energy intensive, resulting in significant costs. Thus, the control of aquatic vegetation by mechanical means only is not typically cost-competitive with other methods of plant control. As a result, mechanical harvesting is generally used only for selected situations.

For the purposes of this analysis, it was assumed that the Mechanical Harvesting Alternative would be used to control “topped out” hydrilla infestations only at Corps operations areas and within the Sandy Creek embayment where vegetation densities are high. It is anticipated that 230 acres would be harvested up to three times over the course of the growing season that extends from May through September. At a cost of

$1,200/acre to harvest and remove the cut hydrilla from the lake, the estimated average annual cost for the Mechanical Harvesting Alternative is $1,152,000. This would represent an average cost of over $5,000 per acre harvested each year, while less than 8% of the total acreage (considering the projected 2007 estimate) infested with hydrilla would be managed.

After considering the above, the mechanical harvesting alternative was dropped from detailed evaluation for the following reasons:

- This method would in the long term contribute to the increased spread of hydrilla in the lake through the production of copious amounts of stem fragments, with each one potentially representing a new plant.

- This method is extremely costly, resulting in the highest cost per managed acre of all the alternatives considered

- Only a small portion of the lake's hydrilla problem areas could be addressed with this method, with multiple re-treatments of the same areas being required each year.

- Merely cutting the plants tops provides no real control of the hydrilla infestation since the plants are not killed and are allowed to remain within the lake in an actively growing condition.

Lake Drawdown

The Drawdown Alternative would involve lowering Walter F. George Lake by 10 feet from the normal summer elevation 190 feet to 180 feet. A drawdown of this magnitude would expose all 14,600 acres of the lake bottoms having a depth of <10 feet.

Drawdown would occur at some point during the summer growing season that extends from May through September. The lowered pool level would be maintained for a minimum of 6 weeks to provide sufficient time for the plants occurring on the exposed lake bottoms to be stranded and allowed to die and decompose before water levels would be allowed to return.

The actual timeframe required to accomplish the drawdown operation would be considerably longer than the six weeks during which the target elevation of 180 feet would be maintained. The physical actions of lowering the lake would have to begin several weeks and possibly months prior to the specified exposure dates. In addition, the time required for lake levels to return to normal operating levels could extend well into the following year. Should the drawdown occur during a drought situation, it is possible that up to two years could be required for lake levels to fully recover.

The lake's recreation areas would not be usable during an extended period of reduced water levels. Actions would have to be taken to close recreation areas and signage would

have to be installed within the lake to warn against navigation hazards. More intensive monitoring of the recreation facilities would also be required by Project staff during the drawdown period to assure that the special actions implemented to safely manage the drawdown were not being violated by the public.

Given the importance of Walter F. George Lake to Eufaula, Alabama, Fort Gaines, Georgia, and the surrounding areas, an extended drawdown would have serious repercussions as the affects of reduced recreation visitations to the area multiplied throughout the local economies. Businesses dealing with lodging; restaurants; bait and tackle; boat services, etc. would be especially hard-hit, with the possibility that some may not be able to withstand a prolonged drawdown period when the lake is essentially closed to recreation. The regional loss in business income and tax revenues associated with a drawdown event would create a serious impact for the local communities and their municipal and county governments.

A significant consequence of a lowered pool level would be the curtailment of hydropower generation from the Walter F. George powerhouse. The loss of the Project's power generation potential for an extended period of time would require that advance measures be pursued to assure that adequate replacement power sources would be available to meet anticipated peak power demands when needed during the period the powerhouse was out of operation. Once it is determined that the Corps could not fulfill power supply commitments specified in the contracts between the Southeastern Power Administration and its customers, alternate sources of power would be required. The replacement power would be purchased at higher costs that would be passed on to the consumer.

As the major industry located on the lake depending upon water for its operations, an extended drawdown of this magnitude would essentially force a prolonged shutdown of MeadWesvaco Corporation's paper and pulp plant located in the upper portion of the lake south of Phenix City, Alabama, or require that industry to install water withdrawal pump intakes deeper into the river channel.

Although commercial navigation is not currently a major activity in the Apalachicola-Chattahoochee-Flint River system, an extended drawdown would prevent navigation in the authorized 9-foot channel through Walter F. George Lake to Columbus, Georgia.

The 10-foot drawdown would be targeted toward killing all hydrilla occurring in areas less than that depth. While it should be theoretically possible to accomplish this objective in the short term, experience at other locations indicate that the exposed sediments may not dry enough to kill the tubers/turions and the mats of vegetation may retain sufficient moisture to allow some plants to survive. An unwanted long term consequence of this alternative would be the creation of temporary conditions that would encourage hydrilla to spread to deeper portions of the lake. The lowered lake levels would temporarily improve growing conditions below the normal 10-foot bottom contour that would make it easier for hydrilla to gain a foothold in these deeper so that hydrilla could continue to thrive and grow once the lake returned to normal levels. Further, the

plants growing at the deeper levels would in time provide a source of new plants to re-colonize the shallower areas after the lake levels recovered. Therefore, it is likely that the drawdown option would actually exacerbate the hydrilla infestation in Walter F. George over the long-term. This is consistent with the results of research conducted by the University of Florida that has led to the finding that hydrilla cannot be controlled by drawdown because of the resiliency of the species and its ability to successfully exploit habitat opportunities available within aquatic systems.

After considering the above, the drawdown alternative was not considered in detail for the following reasons.

- This alternative would create significant economic losses that would have to be borne by the local businesses, communities and governments.

- The losses that would result from the inability of the Water F. George Project to generate power for an extended period of time would be considerable and the higher replacement power costs would be passed along to the power consumers.

- A lake drawdown would actually encourage hydrilla to spread to deeper levels within the lake which would then serve as a reservoir of plants to facilitate re-colonization of the shallow lake areas after pool levels returned to normal.

- A drawdown would temporarily remove from use important habitat critical for spawning and rearing of many members of the lake's fish community. In addition, desirable native submersed aquatic plant species would be lost during a drawdown event.

- Despite incurring the high costs that would be required, a drawdown of Walter F. George Lake would not represent a permanent solution to the problem as the hydrilla infestation would be expected to redevelop within the lake over an unknown period of time after the drawdown is completed.

5.2 Alternatives Considered in Detail

The following alternatives were considered in detail:

- No Action (i.e. Minimum Chemical Treatment)
- Maximum Chemical Treatment
- Flow Assisted Delivery System
- Release of Triploid Grass Carp Only
- Integrated Plan (i.e. Recommended Plan)

No Action (i.e. Minimum Chemical Treatment)

The No Action (i.e. Minimum Chemical Treatment) Alternative would depend entirely upon the use of chemical herbicides to control hydrilla. The No Action Alternative

represents a level of chemical treatment that could be reliably accomplished within the anticipated annual budget amounts received by the Walter F. George Project. This alternative would represent a reduced level of treatment than has been conducted during the last three-year period (i.e. 2004, 2005 and 2006) as shown in Table 1.

Table 1 shows that while the amount of funds expended on chemicals increased significantly during each of the three years between 2004 and 2006 compared to the prior years, the total O&M budget allocation for the Project remained at a relatively consistent level. The aggressive level of chemical treatment performed in those three years was possible only because of actions that were taken to make additional funds available to purchase increased quantities of herbicides beyond the amounts that could have otherwise been supported by the project's budget for those years. The funds used for the aquatic plant control activities were obtained through two avenues: (1) end of year re-programming of un-expended funds from other projects to purchase herbicides; and (2) project level decisions to forego other maintenance activities in order to make additional funds available for aquatic plant control. It will not be possible to sustain into the future the level of expenditures on herbicides observed during that three-year period.

There are significant financial constraints that will prohibit the level of chemical treatment performed between 2004 and 2006 from being continued indefinitely into the future. First, policy changes have elevated re-programming authority decisions to higher levels within the agency. This change will make it more difficult in the future to shift Operation and Maintenance (O&M) funds between projects to assist in meeting non-budgeted needs for specific projects.

Second, due to the future unreliability of re-programmed funds, to sustain the level of chemical expenditures that occurred during 2004 through 2006, an increasingly larger portion of Walter F. George Project annual maintenance budget would have to be diverted from other project activities (i.e. recreation, navigation, and hydropower) to the hydrilla control program. This approach would prove to be detrimental over the long-term to other Project assets as maintenance suffered because of the diversion of funds. Currently, the unmet funding needs of recreational facilities have resulted in temporary closures of campsites and other facilities. This trend would continue to accumulate and pose significant infrastructure issues. This would negatively affect the utility of these facilities and could present safety hazards for both Project staff and the visiting public.

As a result of the above considerations, for the purposes of this analysis, it is assumed that the annual cost of herbicides for the No Action Alternative would be $100,000, and that approximately 230 acres of hydrilla infested areas would be treated. Herbicides would typically be applied by airboat during the growing season that extends from May through September.

Chemical applications would be made in the following order of priority:

- Corps operational areas

- Corps public use areas (boat ramps, swimming beaches, campgrounds, day use areas, etc.)
- Environmentally sensitive areas (isolated patches which could impact larger areas)
- Other areas (State and County recreation areas, subdivisions, etc.)

The objective of the No Action Alternative would be limited to preventing hydrilla infestations from interfering with the use of specific facilities occurring on the lake. Due to the high costs involved, treatment could not be directed at controlling the growth of hydrilla in the existing large expanses of the lake affected by this plant outside of the priority areas or its continued spread to other areas of the lake.

The EPA-labeled herbicides that have traditionally been used to control submersed aquatic vegetation would continue to be applied in accordance with prescribed label rates and instructions. The major herbicides include liquid and/or granular formulations of endothall, diquat, fluridone, and copper. The following summarizes pertinent information about each herbicide.

- Chelated copper is the most popular form of copper herbicide to use due to its longevity in the water column (http://plants.ifas.ufl.edu_March_2007). Copper is a contact herbicide used to kill a variety of plant life. The half-life of copper ranges from hours to days depending upon the conditions in which it is applied and which copper isotope is used in the formulation. For effective control, proper chemical concentration (dependent on water conditions) should be maintained for a minimum of three hours contact time. The cost of treating with copper is around $100 per acre. Waters treated with most copper products may be used for swimming, fishing, drinking, livestock watering or irrigating turf, ornamental plants or crops immediately after treatment.

- Diquat is effective in killing hydrilla. Diquat is a contact herbicide that is effective at controlling target weeds in close proximity to structures such as boat docks, marinas, boat ramps, bridges, channel markers, dams, etc., where accurate placement of herbicide is necessary and/or access is limited. Once in contact with unwanted vegetation, diquat enters the target weeds and disrupts photosynthesis, resulting in control of actively growing weeds. Diquat kills aerial parts of plants between 24 and 36 hours. The half-life of diquat is 48 hours in the water column, but can be up to 160 days in sediments due to its high affinity for clay and peat particles. A major consideration for use of diquat is that this herbicide is “deactivated” in turbid waters as the active ingredient adsorbs onto clay particles and renders the herbicide ineffective. The cost of treatment is usually between $200 and $400 per acre. Water use restrictions apply to Diquat products and include restrictions on drinking water, livestock consumption, fishing, and swimming. The time length of restrictions depends on the concentration used and the formulation of the product. The Corps is one of the few agencies approved to apply diquat in waterways.

- Endothall is a contact herbicide intended for use in lakes and ponds and should be applied when flow is minimal to be most effective. Endothall is indiscriminate in its killing effects on all species of submersed aquatic plants. However, egeria demonstrates some resistance to this herbicide. It is not toxic to fish, fry, and eggs as an inorganic salt in low concentrations. The organic salt form is very toxic to fish and not advised for use where fish are present. The half-life of endothall is around 7 days. In order to be effective, the contact time of endothall should be from 48 to 72 hours. The cost of endothall treatment is about $300 per acre. Due to labor and material cost considerations, it is not recommended for large scale applications. Water from treated areas should not be used for irrigation, to spray food crops, or for domestic purposes until after 7 days from treatment. Fish from areas of treatment should not be used for food or feed within 3 days of treatment.

- Fluridone is intended for use in ponds and lakes. It inhibits the synthesis of carotenoid pigments and is usually applied to hydrilla in late winter or early spring for maximum effectiveness. It has a relatively low toxicity to fish and is the most popular of the herbicidal controls. Although some hydrilla biotypes have arisen that show some resistance to fluridone, the form that occurs within Walter F. George Lake is not resistant. The half-life of fluridone is around 20 days and it may require a contact time of up to 45 days. Fluridone costs $500-$1000 per acre of treatment. Fluridone products should not be applied in irrigation canals. In lakes and reservoirs, fluridone should not be applied within ¼ of a mile of any functioning potable water intake. Irrigation of crops with treated water is discouraged for periods ranging from 7 to 30 days.

Maximum Chemical Treatment

The Maximum Chemical Treatment Alternative would also depend entirely upon the application of herbicides. This alternative would be directed at treating the entire 2,800 acres of submersed aquatic plants that are projected to cover Walter F. George Lake in 2007. The objective of this alternative would be to prevent the hydrilla coverage from expanding beyond this acreage.

The Maximum Chemical Treatment Alternative would provide a more aggressive level of herbicide treatment program than the No Action Alternative. The 2,800 acres of the lake's surface area projected to be infested in 2007 would be treated at least once each year, with specific areas receiving a second treatment if warranted. The same herbicides used in the No Action Alternative would also be used and the same methods employed to apply the chemicals.

The Maximum Chemical Treatment Alternative does not recognize the existing budget constraints that presently influence the hydrilla control program. Instead, this alternative assumes additional funds would be provided to accommodate the increased treatment activities without diverting funds from other Project activities. The estimated annual cost of this alternative is $1,404,000. Over the 30-year period of analysis, it is possible that

additional funds may have to be added to this amount should the hydrilla infestation spread beyond the projected 2,800 acres in 2007.

Flow-Assisted Herbicide Delivery System

The Flow-Assisted Herbicide Delivery System Alternative would take advantage of the flow of water through Walter F. George Lake produced by the upstream Chattahoochee River inflows and selected smaller tributaries entering the lake. The use of a contact herbicide to control hydrilla in medium-flow moving waters has been successfully accomplished in the Wakulla River by the Florida Department of Environmental Protection. The method used a continuous application of endothall at a concentration of 1.5 ppm applied over a period of 48 hours. The effectiveness of this method of chemical treatment utilizes water movement to treat downstream portions of the system during the active half-life of the herbicide. All water passing the injection site is treated at a known concentration of the herbicide for 48 hours. The half-life, and therefore, the effective downstream treatment zone of endothall is dependent upon water temperature. Since the herbicide's half-life is longer in cooler water, more area can be treated downstream of the injection point during cool weather treatments.

Two different methods would be used to deliver the herbicide depending upon the location within Walter F. George Lake to be treated.

- For the hydrilla infestations occurring in the main stem of the lake upstream and downstream of the mouth of Cowikee Creek, the herbicide would be injected into the river to allow all of the water passing that point to be treated with the herbicide. Injection would be accomplished by anchoring a barge in the middle of the river upstream of Florence Marina above the hydrilla infestations. The barge would support reservoir tanks containing the herbicide. From the barge, piping would be submersed to a depth of at least 5 feet below the surface. The piping would contain nozzles through which the herbicide would be released into the water column to be dispersed by the flow. The amount of herbicide injected would be based upon prevailing flow rates to produce the desired concentrations at the injection sites. This method is suitable for the portion of the lake located upstream of the U.S. Highway 82 causeway crossing.

- In Cowikee Creek, a land based injection site would be established. Injection would be timed so that the river treated water and the creek treated water would meet at the mouth of the embayment. By correctly timing the treatments, dilution from either the river or creek should be minimized.

The flow-assisted herbicide delivery system would be employed once a year, in either February or March due to the increased longevity of the herbicide's half-life in the cooler waters associated with these months. However, average flow rates are generally higher at this time of year which will result in the need to use larger quantities of herbicide to compensate for the higher dilution rates. The exact timing of treatment would be

determined based upon prevailing flow rates. It is estimated that 2,280 acres of hydrilla would be treated by this alternative, at a total annual cost of $1,202,000.

Since this method of chemical treatment requires that adequate flow rates be available within the area treated to adequately dilute and disperse the herbicide applied, its use used was not considered for the main body of the lower lake downstream of the U.S. Highway 82 causeway. Downstream of the causeway, increased depths would slow the horizontal movement of treated water. The short half-life of the herbicide then becomes a limiting factor. Further, there may be a tendency for the Chattahoochee River flows to be funneled down the impounded former channel, which means higher quantities of herbicide may have to be applied to achieve the necessary concentrations in the shallow littoral areas some distance away from the old river channel.

Other potential sites for use of this method may exist within some of the lower lake's embayments that have larger tributary streams. Application of land-based herbicide delivery systems similar to that considered for the upstream Cowikee Creek drainage have not been included in the cost analysis or benefits for this alternative. Additional analysis would be required for the streams in the lower lake.

Discussions with representatives from the companies that distribute endothall have indicated serious consideration of this alternative should proceed with caution because of the large size, depths and physical configuration of Walter F. George Lake. Dye studies should be conducted to fully evaluate the potential effectiveness of this alternative to manage hydrilla.

Release of Triploid Grass Carp Only

Grass carp at a minimum of 12 inches in length that have been certified to be triploid (i.e., sterile) would be released into Walter F. George Lake. This alternative would depend entirely upon the feeding behavior of grass carp to control the hydrilla infestations and would not include the use of any herbicides.

A stocking rate of 20 to 22 fish per hydrilla vegetated acre would be followed, with the lower rate being used if stocking took place during the cooler months of the year and the higher rate being used if stocking occurred in the more unfavorable warmer months when mortality would be expected to be higher. A high stocking rate is included with the "grass carp only" alternative since this alternative does not include other control methods such as herbicides. This stocking density is based upon an examination of the literature and experience gained for other large multipurpose reservoirs in which grass carp have been used to control hydrilla infestations.

Information from a variety of sources indicates that grass carp are already present in the lake. Grass carp have been used for a number of years by landowners throughout the Apalachicola-Chattahoochee-Flint Basin to control aquatic plant problems in small ponds and lakes occurring on their properties. Through the years, an unknown number of grass carp have escaped and made their way to the larger impoundments within the basin.

Although grass carp are already present in Walter F. George, the number of fish is unknown and is insufficient to measurably influence the hydrilla infestations.

The drought conditions affecting the drainage basin upstream of Walter F. George Lake are creating favorable conditions for the growth of submersed aquatic plants in 2007. As a result, it is projected that the area covered by these plants will expand to 2,800 acres, with the density of coverage of hydrilla-dominated vegetation increasing from 30% to 40% (i.e., 720 acres to 1,120 acres) within the infested areas. The number of grass carp that would be released with this alternative was calculated using the 1,120-acre estimate. Using that acreage and the above stocking rate, the total number of fish that would be released would range between 22,400 and 24,640 individuals. For the purpose of this analysis, the higher number of fish is used to calculate the cost and to assess the environmental impacts of the initial stocking effort.

Since triploid grass carp would be used, these fish would be sterile and incapable of reproduction. The literature indicates the average lifespan of triploid grass carp to be approximately 10 years, approximately two thirds the longevity of genetically normal fish (Kirk and Socha 2003). However, predation, disease, migration, and other factors will combine to gradually reduce the number of fish that would remain in the lake each year following the initial release. To assure that an effective population of grass carp remains in the lake, it is assumed that up to 5 fish per hydrilla vegetated acre would be stocked every 5 to 7 years for maintenance control. Using the same 1,120-acre area representing 40% plant density for hydrilla infested area considered to determine the initial stocking quantities, a total of 5,600 fish would be restocked at 5- to 7-year intervals for maintenance control. The actual maintenance stocking density and time intervals between maintenance stocking events would be based upon prevailing hydrilla growth occurring at the time of release.

Triploid grass carp of 12 inches in length are estimated to cost $5.35/individual. At this price, the initial stocking cost would be $131,824, depending upon the time of year at which the fish would be released. Assuming that maintenance restocking of fish will be required to maintain hydrilla at the desired level of control, a recurring cost of $29,960 would be required every 5 to 7 years. Amortizing these costs over the 30-year period of analysis would produce an average annual costs of $8,454 for the initial stocking effort and $3,708 for the four individual maintenance restocking efforts that would be required 7, 14, 21, and 28 years following the initial release of grass carp. Adding these two amounts results in a total average annual cost of $12,162 which is rounded down to $12,000. It should be noted that it is likely the maintenance re-stocking costs could increase over time due to inflation and other factors. However, because of the uncertainty associated with those factors, the projected maintenance stocking costs are based on a consistent cost of $5.35/fish.

Integrated Plan (i.e. Recommended Plan)

The Integrated Plan which is also the Recommended Plan consists of three components:

- Release triploid grass carp.
- Continue chemical treatment at minimal levels, with diminishing applications over the 30-year period of analysis as the effectiveness of grass carp in controlling hydrilla begins to be demonstrated.
- Encourage establishment of native aquatic plants.

The following describes the characteristics of each of the plan components.

Release of Grass Carp. The first component of the Integrated Plan is essentially the same as the above discussed stand alone release of grass carp, with the exception that a smaller number of triploid grass carp would be released. A stocking rate of 10 to 15 fish per hydrilla vegetated acre would be followed, with the lower rate being used if stocking took place during the cooler months of the year and the higher rate being used if stocking occurred in the more unfavorable warmer months when mortality would be expected to be higher. For the purposes of this analysis, a stocking rate of 12 fish per vegetated acre will be considered.

The same 1,120-acre vegetated area that was used for the "stand alone" Release of Grass Carp Alternative was used to calculate the numbers of fish that would be released for the Integrated Plan. At a stocking rate of 12 fish per hydrilla vegetated acre, 13,440 fish would be released with the Integrated Plan. To assure that an effective population of grass carp would remain in the lake, it is assumed that up to 3 fish per hydrilla vegetated acre would be stocked ever 5 to 7 years for maintenance control. Using the same 1,120-acre area representing 40% plant density for hydrilla infested area considered to determine the initial stocking quantities, a total of 3,360 fish would be restocked at 5- to 7-year intervals for maintenance control. The actual maintenance stocking density would be based upon prevailing hydrilla growth occurring at the time of release.

Using the same estimated cost $5.35/individual, it is estimated the initial stocking cost would be $71,904. Assuming that maintenance restocking of fish will be required to maintain hydrilla at the desired level of control, a recurring cost of $17,976 would be required every 5 to 7 years. Amortizing these costs over the 30-year period of analysis would produce an average annual costs of $4,611 for the initial stocking effort and $2,225 for the four individual maintenance restocking efforts that would be required 7, 14, 21, and 28 years following the initial release of grass carp. The addition of these two amounts results in a total average annual cost of $6,836 to release grass carp into the lake. Again, it should be noted that it is likely the maintenance re-stocking costs could increase over time due to inflation and other factors. However, because of the uncertainty associated with those factors, the projected maintenance stocking costs are based on a consistent cost of $5.35/fish.

Chemical Treatment. The second component of the Integrated Plan consists of the same Minimum Chemical Treatment option that comprised the No Action Alternative discussed above. Herbicides would be applied at the high priority areas on the lake that primarily involve Corps operation areas and recreation boat ramps. This component of the plan would treat 230 acres once a year.

Chemical treatments would be conducted only to augment the beneficial effects of grass carp in reducing hydrilla. It is anticipated that during the first six years following release of the fish, approximately $100,000 per year would be expended on herbicides. However, as the grass carp began to effectively reduce the coverage of hydrilla in the lake, the cost of chemicals would decline to around $50,000 during the next six years. Thereafter, it is anticipated that approximately $25,000 may be required each year to continue treating the high priority areas since the level of stocking proposed is not intended to completely eradicate hydrilla from the lake. Integrating these variable costs over the 30-year period of analysis produces an average annual cost of $56,812 that would be expended on continuing the selective application of herbicides to control hydrilla.

Establish Native Submersed Aquatic Plants. The third component of the Integrated Plan would involve encouraging native aquatic plants to become established in areas of the lake having depths <10 feet. This would be accomplished principally by controlling the spread of hydrilla so that more desirable native submersed aquatic plants have an increased opportunity to colonize areas of the lake in the absence of competition from the considerably more aggressive hydrilla and other exotic invasive plant species.

Walter F. George Lake has been impounded for 44 years. During that period, desirable aquatic plants have become established in some areas of the lake. However, large portions of the lake having depths sufficient to support submersed aquatic plants are still devoid of vegetation. A number of factors undoubtedly contribute to the dearth of native aquatic plants in much of the lake. Lake fluctuations and the large open expanses of the lake shoreline that are exposed to periodic high wave energy conditions probably make it difficult for most aquatic plant species to become established and thrive in the lower regions of the lake. In addition, flow conditions through the lake and periodic high turbidity levels may at times not be conducive to successful plant growth. It is also possible that the characteristics of the lake sediments may not be adequate to facilitate the establishment and growth of a diverse native aquatic plant community.

Opportunities will be pursued when available to promote the establishment of plants through plantings and assisting the research of others. Costs associate with this effort are expected to vary and gradually decline over the 30-year period of analysis. During the first three years, it is anticipated that $10,000 will be expended annually in this endeavor. After that, the costs are projected to decline to approximately $5,000 per year until year 10. Thereafter, $2,000 would be expended each year to promote the continued establishment of native aquatic plants in the lake. Integrating these variable costs over the 30-year period of analysis produces an average annual cost of $4,400 that would be devoted to the establishment of native aquatic plants.

Implementation of the Integrated Plan. The total average annual cost of the Integrated Plan is estimated to be $68,048.

Flexibility is required to effectively manage unconfined biological systems in order to account for the many dynamic variables that can influence the ability of management measures to achieve the desired outcome. Inclusion of the three components of the Integrated Plan is based upon a combination of experience and research and represents what is believed to be the most appropriate approach to gain control of the expanding hydrilla populations within Walter F. George Lake.

The Integrated Plan will be implemented by applying the principals of adaptive management in which the results of field monitoring will be considered to determine the effectiveness of the management measures in satisfying the objectives of the proposed action. As needed, adjustments will be made in the implementation of each component to assure that hydrilla is effectively controlled without creating unintended adverse consequences to other lake resources, while continuing to maintain no more than 2,400 acres of submersed aquatic plants within the lake.

A relatively low stocking rate of 12 fish per vegetated acre has been selected for the initial release of triploid grass carp. Since mortality and other "losses" from the lake will influence the actual number of fish in Walter F. George Lake that would be available to feed upon hydrilla, there is some degree of uncertainty as to whether the initial stocking rate will be sufficient to gain the desired level of control within the first five years of release. To assess the effectiveness of the Integrated Plan, the Corps will continue the Annual Aquatic Plant Surveys of the lake that were begun in 2002. The annual surveys will measure the lake's surface that is covered by aquatic plants; identify the species that are present; and estimate the relative abundance of the individual species of plants. The data will be added to the Corps' GIS database and used to intuitively assess the effectiveness of grass carp in controlling the spread of hydrilla within the lake.

The information provided by the Aquatic Plant Surveys will be particularly important during the four years following the initial release of grass carp. After considering each year's data it will be possible to determine if small supplemental stockings of additional grass carp may be needed in advance of the first maintenance restocking effort projected to occur at some time within 5 to 7 years of the initial stocking. The Aquatic Plant Surveys will also provide information on the effectiveness of the herbicide treatment component of the Integrated Plan and the success of other activities that may be undertaken to promote the establishment of native aquatic plants within the lake.

The results of the Aquatic Plant Surveys and the status of other pertinent activities related to the aquatic plant management program will be presented in Annual Reports that will be coordinated with the appropriate state and federal agencies. The Annual Reports will be considered in shaping future aquatic plant management activities at Walter F. George Lake.

Comparison of Costs Alternatives Considered in Detail

Table 2 presents a comparative summary of the alternatives considered in detail. The comparison shows the acres of submersed aquatic plants that would be managed; the percentage of submersed aquatic plants that would be managed relative to the total acreage covering Walter F. George Lake; the total average annual costs, and the average annual costs/acre of submersed aquatic plants managed. The average annual costs shown in Table 2 do not include any indirect costs that may be associated with hydropower generation losses, navigations losses, marina closures, recreational losses, and other losses or indirect costs that could be attributable to any of the alternatives.

Table 2
Comparison of Average Annual Costs for Alternatives Considered to Control Hydrilla at Walter F. George Lake [1/]

Alternatives Considered	Area Controlled (acres)	Percent of Hydrilla Plant Coverage (%) [2/]	Total Average Annual Costs ($)	Average Annual Cost/Acre Managed ($/acre)
No Action (i.e. Minimum Chemical Treatment)	230	<8	100,000	435
Maximum Chemical Treatment	2,800	100	1,404,000	501
Flow Assisted Herbicide Delivery System	2,280	81	1,202,000	527
Release of Triploid Grass Carp Only	2,800	100	12,000	4
Integrated Plan (i.e., Recommended Plan)				
➢ Unconfined release of triploid grass carp	2,800	100	6,836	-
➢ Minimum chemical treatment	230	<8	56,812	-
➢ Encourage establishment of native aquatic plants	-	-	4,400	-
Total	2,800	100	68,048	24

[1/] The Average Annual Costs for the chemical treatment alternatives are based on the cost of herbicides alone and do not reflect labor, fuels, materials, and other items related to their application. The alternatives involving the release of triploid grass carp are based on the cost of the fish alone.
[2/] Based on 2,800 acres of hydrilla-dominated submersed aquatic plants that is projected to cover the lake in 2007 at an estimated plant density of 40% in the infested area.

6.0 ENVIRONMENTAL SETTING

6.1 General

The environmental setting of the Walter F. George Project was described in a 1979 Environmental Impact Statement (EIS) that addressed the effects associated with the operation and maintenance of the overall Project. That document is incorporated by reference within this Environmental Assessment (EA). Only those aspects of the Environmental Setting of the project area that have changed since the EIS was prepared or require elaboration to facilitate analysis of the effects of the proposed action are presented. The following describes the environmental conditions that would result from implementation of the No Action Alternative (i.e., Minimum Chemical Treatment).

6.2 Climate

Climatic conditions and patterns remain unchanged from those reported in the 1979 EIS. The principle climatic parameter of interest to the proposed action is the length of the growing season because of its singular influence on the duration and intensity of vegetative growth.

From an agricultural standpoint, the growing season is defined as that part of the year when air temperatures at 19.7 inches above the soil surface are higher than biologic zero (i.e., 5º C (41º F)). In the absence of specific temperature measurements, the growing season can be approximated as the period of the average date of the last killing frost in spring to the average date of the first killing frost in fall or winter. For Walter F. George Lake area, the average dates of the last and first killing frosts each are April 1 and October 31, respectively. This results in an average growing season of around 214 days each year for terrestrial vegetation.

Unlike air temperatures which can fluctuate considerably in response to weather systems, water temperatures tend to be more stable and resist wild swings. As a result, temperatures in shallow water areas are generally more consistent than adjacent land/air areas and demonstrate a pattern of more stable warming in the spring. Similarly, the same areas can stay warmer a little longer in the fall. The net result is that the length of the average growing season in shallow water areas can be longer than 214 days. The length of the growing season has an influence on the amount of submersed aquatic vegetation that can produced in a given year.

6.3 Biological Resources

The type and quality of the terrestrial resources have not markedly changed since the 1979 EIS was prepared. Therefore, the following discussion concentrates on the aquatic biological resources.

Aquatic Vegetation. Areas within Walter F. George Lake that tend to be inhabited by aquatic plants include the extensive littoral shoreline areas of the main lake and the

tributary embayments. As shown in Figure 10, these areas are generally <10 feet in depth, and flank the original Chattahoochee River channel that is now impounded. A total of 14,600 acres of the lake are <10 feet deep, with approximately 62% of those acres being above the U.S. Highway 82 causeway that crosses the approximate mid portion of the lake.

A mix of native and non-native aquatic plants now occurs within Walter F. George Lake, with both groups having some problematic invasive representatives. Historically, the problematic invasive plants found in the lake have been hydrilla, water hyacinth, egeria, and giant cutgrass. The lake's aquatic plant community has developed gradually through the years in response to natural colonization processes and introductions by man.

The 1979 EIS did not reveal the presence of any problem aquatic plants. That document was prepared approximately 15 years after the lake was impounded and it is likely that sufficient time had not passed as of that time to allow for substantial aquatic plant communities to have become established.

A comprehensive aquatic plant survey of Walter F. George Lake was conducted in 1991, two years before hydrilla was first reported from the lake. Table 3 shows each species encountered during the survey and the type of habitats occupied by each species. The 1991 survey showed Walter F. George Lake as having a much different plant community than what is in place now. The most common plants encountered were alligatorweed (*Alternanthera philoxeroides*), water willow (*Justicia americana*), maidencane (*Panicum hemitomon*), and black willow (*Salix nigra*). The only submersed species found were chara (*Chara* spp.) and coontail (*Ceratophyllum demersum*). Based on the 1991 survey results, it was concluded that submersed aquatic vegetation was very scarce in Walter F. George Lake and similar to the conditions that existed when the 1979 EIS was prepared.

Since 1991, submersed aquatic vegetation has greatly expanded its coverage in the lake. Egeria was the initial submersed aquatic plant of concern. However, the more aggressive hydrilla has replaced egeria as the principle component of the submersed aquatic community.

The first account of hydrilla in the Walter F. George Lake was reported in 1993. Since that time, the hydrilla population in the lake has continued to increase despite repeated chemical treatments. As shown in Table 1, hydrilla coverage has increased every year since 2000 despite rigorous herbicide control attempts. The continued expansion of hydrilla has caused concerns for both the Corps and stakeholders who have a great interest in the lake.

Table 3
Aquatic Plants Observed on Walter F. George Lake in 1991

Growth Habitat	Common Name	Scientific Name
Submersed	Chara	*Chara* spp.
	Coontail	*Ceratophyllum demersum*
Floating and Floating Leaf	Duckweed	*Spirodela* spp.
	Watershield	*Brasenia schreberi*
	American lotus	*Nelumbo lutea*
	Spatterdock	*Nuphar luteum*
	Fragrant water-lily	*Nymphaea odorata*
	Floating hearts	*Nymphoides aquatica*
Shoreline and Emergent	Cattail	*Typha* spp.
	Arrowhead	*Sagittaria* spp.
	Smartweed	*Polygonum hydropiperoides*
	Alligatorweed	*Alternanthera philoxeroides*
	Primrose	*Ludwigia peploides*
	Water pennywort	*Hydrocotyle* spp.
	Lemon bacopa	*Bacopa caroliniana*
	Water willow	*Justicia americana*
	Elephant ear	*Colocasia esculata*
	Wax myrtle	*Myrica ceritera*
	Ogeche tupelo	*Nyssa ogeche*
	Button bush	*Cephalanthus occidentalis*
	Black willow	*Salix nigra*
Grasses, Sedges & Rushes	Southern watergrass	*Hydrochloa caroliniensis*
	Maidencane	*Panicum hemitomon*
	Torpedo grass	*Panicum repens*
	Arundo cane	*Arundo donax*
	Giant cutgrass	*Zizaniopsis miliacea*
	Spikerush	*Eleocharis* spp.
	Woolgrass bulrush	*Scirpus cyperinus*
	Softstem bulrush	*Scirpus validus*
	Rush	*Juncus* spp.

In response to the concerns over hydrilla and egeria, the Corps began conducting annual aquatic weed surveys in 2002 to better monitor the expanding coverage of submersed aquatic plants. While the surveys consider the entire spectrum of aquatic plants occurring on the lake, the principle focus is on hydrilla and egeria.

The 2002 aquatic plant survey showed a significant increase in the total number of submersed aquatic plant species from that reported in the 1991 survey. Seventeen species of submersed aquatic plants were recorded: hydrilla, egeria, chara, coontail, variableleaf pondweed (*Potamogeton diversifolius*), narrowleaf pondweed *(P. pusillus*), Illinois pondweed (*P. illinoiensis*), southern naiad (*Najas guadalupensis*), spinyleaf naiad (*N. minor*), lyngbea (*Lyngbea* spp), slender spikerush (*Eleocharis acicularis*), creepingrush (*Juncus repens*), fanwort (*Cabomba caroliniana*), parrotsfeather (*Myriophyllum aquaticum*), bladderwort (*Utricularia sp.),* and water hyssop (*Bacopa caroliniana*).

As documented in Table 1, the results of these surveys reveal that despite the increasingly aggressive treatments of the hydrilla infestations, this invasive aquatic plant has continued to expand its coverage within Walter F. George Lake. Most recently, the 2006 survey identified several new populations of hydrilla which may have become established as a result of the drought in that year that created favorable conditions for the growth of this plant. Again, hydrilla has continued to infest additional areas of the lake despite efforts to control the plant with herbicides.

Hydrilla coverage has now expanded within Walter F. George Lake to the extent that it is no longer economically feasible to treat all areas of the lake within which the plant occurs with herbicides. Budget limitations will not allow the level of expenditures on herbicides shown in Table 1 to be continued into the future. As a result, the rate of hydrilla spread in the lake is anticipated to increase, eventually affecting most if not all of the lake's 14,600 acres having depths <10 feet. Should this occur, the dominance of hydrilla within the lake will increase to the detriment of the more desirable native aquatic plants that will decline in coverage and abundance.

Potential expansion rates for hydrilla to cover the 14,600 acres of the lake having depths <10 feet are shown in Figure 11. Figure 11 was constructed using the hydrilla coverage data measured since the plant was initially detected on Walter F. George Lake in 1993 and measured through 2006, with the most continuous data being available for the period 2001 through 2006. Based on this data, it is conceivable that hydrilla could eventually cover all lake areas with depths <10 feet by as early 2009. This projection is based on a "perfect world" from a biological standpoint in which all conditions would be favorable to support a geometric expansion of hydrilla, similar to the actual rate of increase observed to have occurred between 2001 and 2005. It is possible that the geometric rate of expansion was prevented from continuing in 2006 due in part to the aggressive herbicidal treatment conducted in that year as reflected in the amount of funds expended on chemicals (see Table 1).

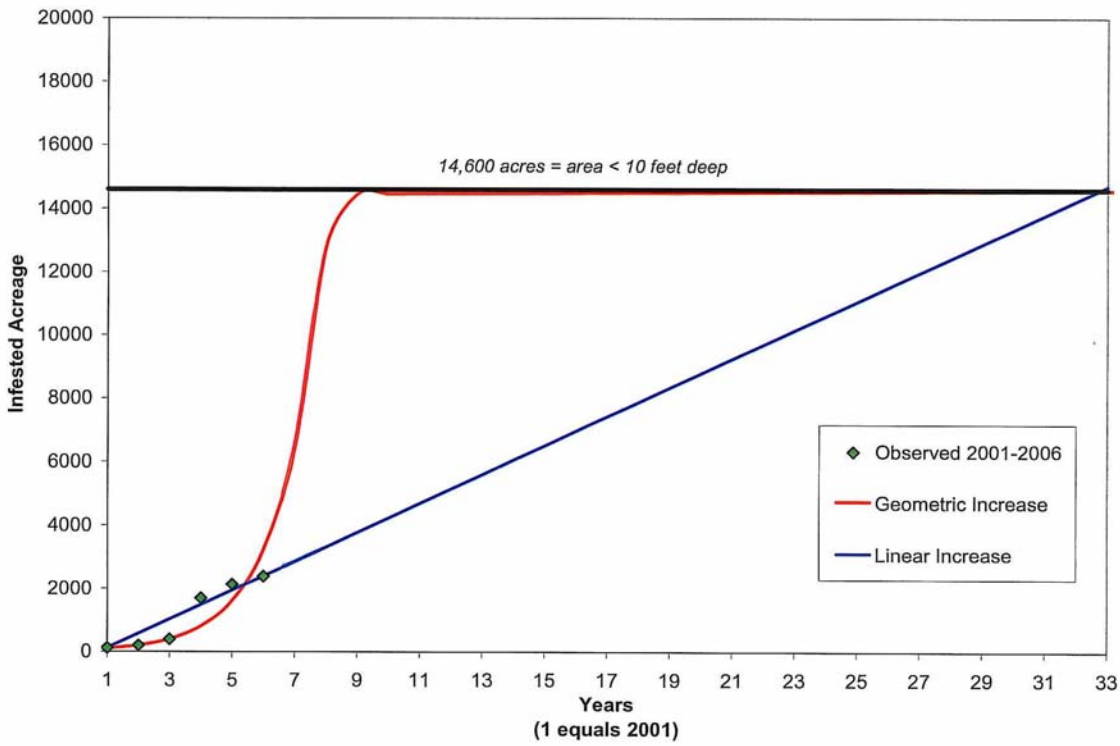

Figure 11. Possible Hydrilla Expansion Scenarios for Walter F. George Lake

However, it is also possible that the rate of expansion observed since 2001 may not be sustained into the future. Factors that may contribute to a diminished rate of spread of hydrilla in the future include the effectiveness of the ongoing chemical herbicide treatment program; physical conditions in some <10 feet deep may not be conducive to the rapid spread of hydrilla (i.e., the lower reaches of the lake); extreme weather events; and variable flow conditions at different locations within the impoundment. To capture the potential effects of those factors on the expansion of hydrilla, Figure 11 also depicts a second rate of increase that is linear in nature. Although much less explosive, this second rate of expansion is nevertheless deliberate and shows that all 14,600 acres of the lake having a depth of <10 feet could become covered with hydrilla by 2033.

This estimate is believed to be a very conservative projection of the rate of expansion, since it is possible that hydrilla could spread at a much faster rate to cover the 14,600 acres. Further, it is also possible for hydrilla to extend to depths of around 20 feet which means that an additional 11,120 acres of the lake having depths ranging between 10 and 20 feet could become infested with hydrilla.

Without a change in the existing aquatic plant management program at Walter F. George Lake, it is likely the actual rate of hydrilla expansion will represent a condition somewhere between the two projections shown in Figure 11. Further, it is possible that some areas of the lake having depths <10 feet may not become completely covered by hydrilla for a variety of reasons as discussed above. On the other hand, it also possible some areas of the lake having depths greater than 10 feet, particularly in the more quiescent and clear tributary embayments, may also eventually experience hydrilla infestations. As shown on Figure 10, many of these embayments already contain hydrilla and conditions within them are favorable for further expansion.

After considering the available depths in Walter F. George Lake; the observed historic spread of hydrilla in the lake; scenarios for continued expansion; problems experienced by other large multipurpose impoundments in the United States; and continuation of the existing aquatic plant management program, it is projected that over 30% of Walter F. George Lake will eventually become infested with hydrilla at some time within the next 3 to 26 years (i.e. 2009 to 2033). For the purposes of this analysis, a conservative approach is taken in which it is assumed that it would take almost 30 years for hydrilla coverage to expand to cover 14,600 acres of the lake having depths <10 feet.

Support for the potential spread of hydrilla in Walter F. George Lake at the above rates is provided by actual conditions experienced in Lake Seminole, the next large multipurpose impoundment located 50 miles downstream on the Chattahoochee River. Hydrilla was first detected in Lake Seminole in 1967. By 1992, in just 25 years, hydrilla had become the dominant submersed aquatic plant, covering 53% of that lake's surface area. While the physical conditions within the two lakes are not completely similar, the sustained expansion of hydrilla in Lake Seminole indicates that the projected growth rates in Figure 11 are certainly within the realm of possibility.

Waterfowl. The Eufaula National Wildlife Refuge (NWR) occupies 11,184 acres of Walter F. George Project lands above the normal pool elevation 190 NGVD. The refuge's lands are located on both sides of the lake and are centered on the Cowikee Creek embayment as shown in Figure 12. The refuge provides habitat for both resident and migratory waterfowl, wading birds, and rookeries for colonial nesting egrets and herons. Data for the 2000-2006 shows that the refuge averaged about 20,000 ducks and geese per year. The refuge benefits from the open waters of the lake through the added feeding and resting sites provided for waterfowl within the lake. Although hydrilla has little nutritional value, the vegetation provides substrates upon which waterfowl browse for crustaceans, insects, and other invertebrates.

A major feature of the Eufaula NWR is the management of its system of 17 impoundments totaling 645 acres. These impoundments are typically planted with crop plants and slowly flooded during the late fall and winter with water pumped from the lake to provide supplemental foods for waterfowl. Table 4 provides information on the impoundments.

The Eufaula NWR has 8 pumps that pump approximately 3 billion gallons of water a year to manage water levels in the impoundments. There are two major pumping cycles each year. Water is pumped out of the impoundments beginning March 1 over a period of 4 – 6 weeks depending on the area and amount of rainfall. After the impoundments are sufficiently dried, crops are planted and not harvested. Then, beginning on November 1, water is pumped from the lake in phases to gradually flood the impoundments over a period of 2 -3 weeks to make the planted food more accessible to waterfowl.

Table 4
Waterfowl Impoundments at Eufaula National Wildlife Refuge

Name of Impoundment	Number of Sub-Impoundments [1/]	Total Acreage
Kennedy	NA	300
Bradley	7	200
Houston	4	60
Molnar	2	20
Upland	NA	40
Goose pen	NA	15
Hourglass	NA	10

[1/] NA – The impoundment consists of a single cell.

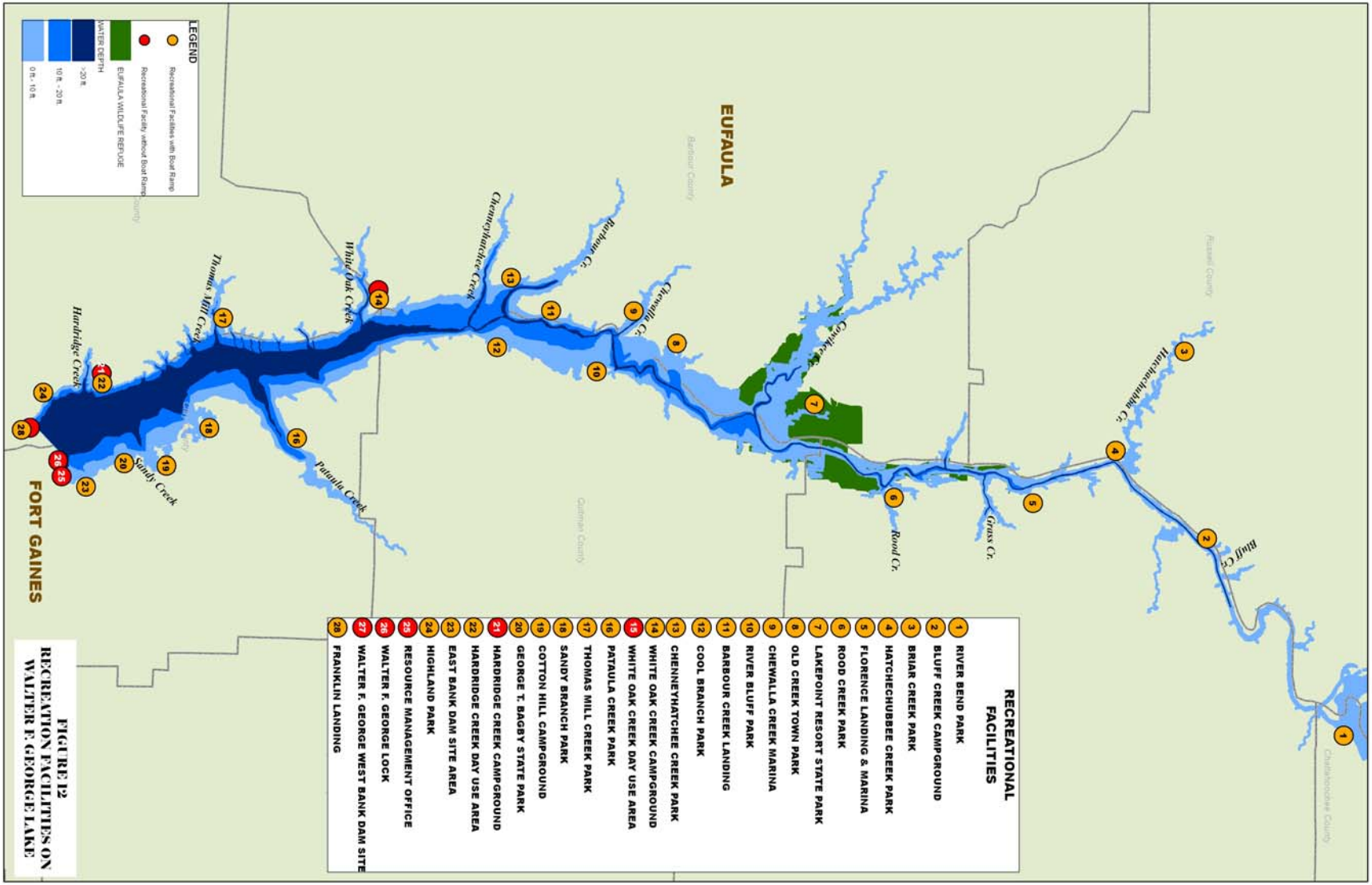

FIGURE 12
RECREATION FACILITIES ON
WALTER F. GEORGE LAKE

Fishery. During the 1960s and 1970s following its impoundment, Walter F. George Lake was known as the "Bass Capital of the World" because of the numerous sizable largemouth that were caught. Typical of large manmade reservoirs, the fertility of Walter F. George Lake has diminished over the years as the remnant terrestrial vegetation decomposed following impoundment and nutrients either became associated with the sediments or were transported downstream. In addition, increased levels of wastewater treatment for municipal and industrial dischargers has reduced the nutrient loading on the Chattahoochee River and associated chlorophyll production. As the gradual loss of fertility occurred, the initial "boom" period in the lake fishery that followed impoundment has given way over the 44-year life of the reservoir to a somewhat smaller, but more sustainable sport fishery in which largemouth bass is still the most highly sought after species.

The fish community within the lake is dominated by species that either prefer lacustrine habitats or are tolerant of low to nonexistent flow conditions. In addition to largemouth bass, other predatory sunfishes such a spotted bass, bluegill, redear, redbreast, longear, and crappie are abundant. The lake also supports a viable catfish fishery that is comprised primarily of channel catfish, with blue and white catfish. Threadfin shad and gizzard shad make up the primary forage base upon which largemouth bass and crappie depend. In addition, the Georgia Department of Natural Resources stocks the lake with both striped bass and hybrid striped bass. Small numbers of tilapia of unknown origin have also been collected in the lake. A variety of nongame species, such as carp, suckers, drum and small minnow-like cyprinids, form the balance of the lake's fish community.

Because of Walter F. George Lake's shared boundary between Alabama and Georgia, the state's respective fisheries agencies are both involved in monitoring and management of the lake's fisheries. Alabama's Wildlife and Freshwater Fisheries Division and Georgia's Department of Natural Resources – Wildlife Resources Division sample the lake in the spring and fall of each year. Information gained from the sampling efforts has documented the cyclic nature of the gizzard shad, threadfin shad, and largemouth bass populations that have characterized the lake since the 1980s. Variability in nutrient levels, water clarity, forage fish abundance, rainfall patterns, other weather parameters, drought conditions, aquatic vegetation, fishermen catch and release patterns, and a viral disease known as the Largemouth Bass Virus have all been attributed as factors influencing the structure of largemouth bass populations in Walter F. George Lake. These factors interact in a complex fashion that is not completely understood.

The characteristics of Walter F. George Lake's largemouth population provide an interesting insight into the overall dynamics of the lake's fish community. The annual fisheries data indicate that a major factor influencing the distribution of numbers and their respective sizes between respective year classes of largemouth bass are determined in part by the relative abundance of threadfin shad. Although the numbers of young, smaller largemouth bass are fairly high, the older individuals demonstrate slow rates of growth and low weights. This disparity between numbers and size of fish is attributed in part to the lack of a sufficient forage base (i.e., lower threadfin shad numbers) to allow all of the largemouth bass produced in the lake to reach a quality size.

This led the states of Alabama and Georgia in 2000 to reduce the minimum size limit fishermen were allowed to keep from 16 inches to 14 inches. The intent of the size reduction was to encourage fisherman to keep more small fish in order to reduce competition for food between the remaining fish so that larger more desirable largemouth bass would be produced. According to data provided by Georgia fisheries personnel, the percentage of 16-inch and larger bass voluntarily released has steadily increased through the years, from 12.5% in 1984 to 39.3% in 1987, 65% in 1991, and 92% in 1999. To date, the success of the reduction in the minimum size in improving the growth rate and size of the lake's largemouth bass fishery has not yet been determined because of the fishermen's continuing tendency to practice voluntary "catch and release".

State fisheries personnel have also expressed concerns over the possible effects of the increasing aquatic plant communities, particularly hydrilla, on the lake's future fish community. The concern results form the utilization by rooted vegetation of dissolved and suspended nutrients which removes them from use by plankton. As plankton levels decrease in response, the threadfin shad and gizzard shad community that forms the forage base for largemouth bass and other predatory sport fish would be expected to decline in numbers and size. In addition, the filtering effects of submersed aquatic plants like hydrilla contribute to increased water clarity which could further adversely affect the abundance of forage fish.

As the shad populations decrease in the lake in response to an increasing growth of rooted vegetation, an increase in the numbers of sunfishes would be expected to occur. Over time, this could produce a shift from the present shad dominated forage community to one in which sunfish provide the forage base used by largemouth bass, white bass, striped bass, and hybrid striped bass. Should hydrilla spread to occupy the 14,600 acres of the lake with depths <10 feet, this shift in the forage base may occur. This could result in a smaller overall largemouth bass population in the lake.

6.4 Endangered and Threatened Species

The seven counties that border Walter F. George Lake are included within the ranges of a number of federally listed endangered, threatened, and candidate species. In addition, a number of species of concern to the States of Alabama and Georgia also occur in the area. A species is considered to be endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered to be threatened if it is likely to become endangered in the foreseeable future.

Table 5 lists the species of concern, identifies their federal or state status; identifies which counties the species have been reported from; describes their preferred habitat; and projects if they are likely to occur within Walter F. George Lake. Of the federally listed species, only the threatened bald eagle and the endangered wood stork utilize the Walter

Table 5
Threatened and Endangered Species Reported to Occur in the Seven Counties Bordering Walter F. George Lake

Species	Status [1/]		Habitat	Likely to Occur in Walter F. George Lake	Alabama			Georgia			
	Fed	State			Barbour	Henry	Russell	Clay	Chattahoochee	Quitman	Stewart
Bald eagle *Halieaeetus leucocephalus*	T	E	Water bodies	Yes	X	X	X	X	X	X	X
Red-cockaded woodpecker *Picoides borealis*	E	T	Mature upland pine forests	No			X	X	X	X	X
Wood stork *Mycteria Americana*	E		Wetland swamps and marshes		X	X					
Alligator snapping turtle *Macroclemys temminckii*	No status	T	Rivers, lakes and streams	Yes				X	X	X	X
Barbour's map turtle *Graptemys barbouri*	No status	T	Restricted to larger streams	Possible				X	X		X
Gopher tortoise *Gopherus polyphemus*	No status	T	Pine forests	No				X	X	X	X
Bluestripe shiner *Cyprinella callitaenia*	No status	T	Brown water streams	No				X	X	X	X
Highscale shiner *Notropis hypsilepis*	No status	T	Blackwater and brown water streams	No							X
Bay star-vine *Schisandra glabra*	No status	T	Alluvial woods	No					X		
Croomia *Croomia pauciflora*	No status	T	Rich woodlands	No				X	X	X	
Georgia rockcress *Arabis georgianus*	C	T	Rocky bluffs on waterways	No			X	X	X		X
Lax water-milfoil *Myriophyllum laxum*	No status	T	Sandy streams draining swamps	No					X		
Pickering's morning-glory *Stylisma pickeringii*	No status	T	Sand hills near Fall Line	No					X		

Table 5 (Cont'd)
Threatened and Endangered Species Reported to Occur in the Seven Counties Bordering Walter F. George Lake

Species	Status [1/]		Habitat	Likely to Occur in Walter F. George Lake	Alabama			Georgia			
	Fed	State			Barbour	Henry	Russell	Clay	Chattahoochee	Quitman	Stewart
Plumleaf azalea *Rhododendron prunifolium*	No status	T	Moist soil hardwood ravines along Flint River	No				X	X	X	X
Alabama milkvine *Matelea alabamensis*	No status	T	Oak-hickory hardwood slopes	No				X			
Relict trillium *Trillium reliquum*	E	E	Piedmont hardwood forest ravines	No		X		X			
Fuzzy pigtoe *Pleurobema strodeanum*	C		Rivers and streams with moderate current	No	X	X					
Shiny-rayed pocketbook mussel *Hamiota subangulata*	E		Rivers and streams with moderate current	No			X				

Source: U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, and Georgia Department of Natural Resources.

[1/] Status: E – endangered, T – threatened, C – candidate
State: The state designations are for the State Georgia. A similar list does not exist for Alabama.

F. George Lake project area. Individual bald eagles are frequent visitors to the lake during the winter and occasionally build nests on or near the lake. Due to the successful recovery of the bald eagle in the contiguous 48 states, the U.S. Fish and Wildlife Service is evaluating whether to remove this species from the endangered and threatened species list. The wood stork may be an occasional visitor to the lake during the summer, feeding in shallow littoral areas that have abundant vegetation.

6.5 Water Quality

Walter F. George Lake is located is classified by the Georgia Environmental Protection Division and by the Alabama Department of Environmental Management for recreation and fish and wildlife.

The Corps contracted for a water quality management study of Walter F. George Lake in April 1978 through December 1979. The parameters studied included temperature, dissolved oxygen, pH, conductivity, heavy metals, sediment grain size, pesticides, oil, grease, fecal bacteria, phytoplankton, zooplankton, macroinvertebrates, and nutrients. The following conclusions resulted from the study.

- The measured levels of the physical-chemical water quality data indicated no problems that would be environmentally degrading within the lake. Dissolved oxygen concentrations in the surface waters were consistently above 5.0 mg/L during summer months and good water clarity. However, dissolved oxygen levels in the deeper portions of the lake are typically depressed and have created water quality problems in the Chattahoochee River downstream of the dam during power generation discharges.

- A fairly constant low level of nutrients (Nitrogen & Phosphorus) occurred in the lake with only a slight peak during the spring and early summer months. This peak was attributed to farm runoff through non-point sources (tributaries) entering the lake.

- No heavy metal concentrations were indicated that would seriously affect natural aquatic biota distribution patterns or affect the river as a water supply source or recreational water body.

- Walter F. George Lake stratifies seasonally, with lower dissolved oxygen concentrations occurring in the bottom waters. Stratification occurs at an approximate depth of 30 feet in the deeper portions of the lower lake.

- Seasonal variations occurred in some constituents such as suspended matter, nutrients, and conductivity.

- The biological sampling showed the lake at that time to be highly productive with a balanced aquatic community structure. Plankton and invertebrate populations were found to be sufficient to support secondary consumers such as fry, juvenile,

and adult gamefish. Greatest phytoplankton abundance was seen during the summer months when nutrient availability was greater. Zooplankton populations tended to follow the population shifts of phytoplankton which is their food source. Benthic micro invertebrates also followed the same seasonal population increase.

- Aquatic biota was observed to be relatively diverse, indicative of good water quality, and demonstrated seasonal variations common to aquatic biological communities.

The 1978-1979 water quality management study was conducted when the lake had been impounded for approximately 15 years and was near the end of the "boom" period for productivity that is typical of new reservoirs. The results at that time indicated the lake was a highly productive system, with the upper reaches of the lake having somewhat higher nutrient levels.

A Draft Environmental Impact Statement was prepared in 1998 in connection with evaluations to allocate water use between the States of Alabama, Georgia, and Florida that share the Apalachicola-Chattahoochee-Flint Rivers Basin. That EIS contained a review of water use and water quality conditions in the basin. Water withdrawals were assigned to three categories of water use: metropolitan areas, surface water withdrawal locations, and thermal power plants. Of these, none were listed to be in the vicinity of Walter F. George Lake.

Although some groundwater withdrawals for agricultural purposes occur in the counties surrounding Walter F. George Lake, the majority of water used for agricultural irrigation purposes in both Alabama and Georgia is taken from the ground or other surface sources that do not involve Walter F. George Lake.

Section 303(d) of the Clean Water Act requires states to develop a list of impaired waters. This list is commonly referred to as the "303(d) list." A water body is considered impaired if the current water quality does not meet the numeric or narrative criteria in a water quality standard. A review of the 303(d) lists for Georgia and Alabama concerning the seven counties surrounding Walter F. George Lake shows three creeks that are impaired that flow into the lake. In Alabama, Barbour Creek (Barbour County) is listed as impaired due to elevated sedimentation. In Georgia, Pataula Creek (Clay County) is listed as impaired due to elevated levels of fecal coliform bacteria. Bustahatchee Creek (Quitman County), which is confluent with North Fork, is listed as impaired due to abnormal sediment biota. These types of biota can involve plant and animal species, but the key is that they are closely associated with aquatic sediments during some stage of their life. Abnormal readings can include high or low numbers of sediment biota.

Water quality modeling was also performed in connection with the 1998 Draft EIS for Water Allocation for the Apalachicola-Chattahoochee-Flint (ACF) River Basin. The results of this extensive modeling effort were used to clarify the water quality parameters associated with the health of Walter F. George Lake. Predictions were made for the

loadings of the years 2020 and 2050. All point sources are regulated by the States and meet U.S. Environmental Protection Agency standards and criteria.

Mead Coated Board is the only major industrial point source discharging into Walter F. George Lake. This company discharged 24 MGD in 1995 and is modeled to stay consistent at 24 MGD in 2020 and 24 in 2050. As of 1995 the discharge had the following composition: 5 day BOD was 49 mg/L, the ammonia level was 4 mg/L and the phosphate level was 2 mg/L.

Major municipal point dischargers into Walter F. George Lake include Columbus Water Pollution Control Plant (WPCP), Phenix City Waste Water Treatment Plant (WWTP), Ft. Benning and Eufaula Waste Water Treatment Plant (WWTP). Below is a list of the municipality point source dischargers and their corresponding loading values.

Point Source	**Q (MGD)**			**5-day BOD (mg/L)**	**Ammonia (mg/L)**	**Phosphate (mg/L)**
	1999	**2020**	**2050**			
Columbus WPCP	27.46	30.85	34.65	29.88	16.45	4.85
Phenix City WWTP	3.41	8.42	2.92	30	15	5
Ft. Benning	2.95	3.34	4.17	30	15	5
Eufaula WWTP	2.41	2.99	3.32	30	15	5

These results show that there will likely be elevated levels of nutrients in the Walter F. George Lake in the coming years. Hydrilla would benefit from increased nutrients in the lake, as would all submersed aquatic vegetation. This could cause a boom in the submersed aquatic plant growth separate from any other type of plant biomass increase.

Should hydrilla continue to spread and eventually cover 14,600 acres of the lake, the magnitude of rooted plant growth would be expected to have a pronounced influence on local water quality conditions within Walter F. George Lake experiencing the heaviest infestations. The rooted plants would consume large quantities of the nutrients in order to maintain their biomass. This would result in smaller quantities of nutrients being available to support phytoplankton, which would in turn result in reduced numbers of zooplankton followed by diminished threadfin shad and gizzard shad populations that depend upon plankton. Forage fish would shift from a shad-based to a centrachid-based system. This shift would result in a smaller biomass of forage base due to the higher energy conversion factor of centrachids compared to shad. The effects of a smaller forage fish base would be carried up the food web, reducing the numbers of predator fish such as largemouth bass, crappie, white bass, striped bass, and hybrid striped bass.

Dissolved oxygen levels would also be affected within the areas of the lake supporting large growths of hydrilla. Although plants produce oxygen through photosynthesis during the day, at night plants convert to respiration, becoming net consumers of oxygen to fuel their biological processes. In particularly dense infestations of hydrilla, dissolved oxygen levels could drop to below 5.0 ppm standard that is generally deemed to be necessary to sustain desirable habitat conditions. Under those conditions, the affected areas would become inhospitable to members of the fish community requiring higher oxygen concentrations. As a result, it is possible that expanses of the lake containing extensive growths of hydrilla could essentially become devoid of largemouth bass, crappie, and other sunfishes during the warmer summer months as a consequence of severely reduced dissolved oxygen levels. Further, oxygen concentrations could also be reduced following winter die-off of hydrilla as the plants decompose.

6.6 Geology and Soils

The basic geological setting within which Walter F. George Lake is located has not changed since the 1979 EIS was prepared. However, the lake has experienced an accumulation of sediments during the 44 years that it has been impounded. The sediments are derived from the 7,460 square mile drainage basin surrounding the lake and stretching upstream well into north Georgia.

The delivery of sediments into the lake depends upon local land use activities and rainfall patterns in the immediate drainages emptying into lake. In addition, large basin-wide flow events can transport considerable quantities of sediments from the upper basin.

The coarse grained sediments that are transported by the numerous tributaries draining into the lake tend to settle at the interface where the impounding effect of the reservoir tends to slow the velocities of the streams. Settlement of the smaller diameter suspended sediments is more uniformly distributed over the lake, with decreasing quantities occurring in the lower reaches of the lake.

Wave action, currents, and turbulence influence the deposition and periodic re-suspension of the small grain sediments. Gradually, these sediments accumulate and are incorporated into the underlying bottom sediments that existed at the time the lake was originally impounded.

Aquatic plants can have a substantial influence on the rate of sedimentation and consolidation of bottom sediments. Dense growths of submersed aquatic plants like hydrilla can dampen wave action and local currents, encouraging even the smallest of particles to settle and accumulate at a faster rate. All water bodies are destined to be filled through the external delivery of sediments and by the interaction of internal biological processes. Dense growths of submersed aquatic plants can accelerate these processes and cause localized changes in depth at a faster rate than would be the case in the absence of the plants.

The projected expansion of hydrilla to cover 14,600 acres of Walter F. George Lake over the next 30 years is expected to produce localized changes in water depths. The changes will be more pronounced in the shallow nearshore littoral areas as sediment runoff from the surrounding lands is trapped by the thick plant growths. In addition, suspended sediments originating from the upstream basin will also be encouraged to settle in the dense plant growths that could cover all areas of the lake having depths of <10 feet. A long-term consequence of the hydrilla infestations will be to speed the reduction in the depth of the nearshore littoral areas. This will degrade aquatic habitats, recreation areas, private boat docks, and adversely affect other activities that presently take place in those areas of the lake to be affected.

6.7 Land Use

The seven-county region in which Walter F. George Lake is located is rural in nature, with agriculture and forest production being the dominant land uses. Eufaula, Alabama, and Fort Gaines, Georgia, are the two largest towns located near the lake. Figure 13 contains an aerial photograph of the lake showing the land uses immediately adjacent to the lake.

In addition to the lake, the Walter F. George Project includes an additional 37,640 acres of land above elevation 190 NGVD. A sizable portion of this acreage is concentrated in 27 recreation areas that are operated by the Corps and other entities at selected areas around the lake. Within the recreation sites, the level of development varies from intense such as at the Lakepoint Resort State Park to less intense at a number of day use areas scattered around the lake. Most of the recreation areas are associated with the many tributary embayments that empty into the lake. Since hydrilla has displayed a tendency to date to become established first in the more tranquil conditions present within the tributary embayments, it is anticipated that increasingly over the 30-year period of analysis hydrilla vegetation will become so dense as to adversely affect the use of most of the recreation areas.

The U.S. Fish and Wildlife Service operates the 11,184-acre Eufaula National Wildlife Refuge on Project lands. The refuge is managed to improve the quality of waterfowl and terrestrial wildlife habitat occurring on these lands. The refuge lands include a considerable portion of the Project's lower elevation shoreline areas on the Alabama and Georgia sides of the lake upstream of Cowikee Creek.

The remainder of the project lands is contained within a narrow strip of land of varying width that separates the 640 miles of the lake shoreline from adjacent private property. Over the years since the lake was impounded, much of the private lands bordering the lake has been developed for lakefront homes, both as primary residences and as secondary vacation homes. Through the Corps' Shoreline Management Program, permits have been issued for 1,100 private piers associated with some of these homes.

Figure 13
Land Use in the Immediate Vicinity of Walter F. George Lake

Over the next 30 years, it is anticipated that hydrilla will continue its expansion in the lake, with the vegetation producing thick mats alone the shoreline. That vegetation will envelop most of the private piers, interfering with their use. In addition, excessive growths of hydrilla may detract from the water views available from the many private homes around the lake, possibly adversely affecting property values at those locations around the lake with the heaviest hydrilla infestations. Figures 6, 7, 8 and 9 provide examples of how the Walter F. George Lake shoreline could look within 30 years.

6.8 Wetlands

Executive Order 11990 requires Federal agencies to take actions to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in managing Federal lands and facilities.

In the 44 years since the lake was impounded, minor wetlands have developed at various locations around Walter F. George Lake. Where the wetlands occur, they are generally small in coverage and occur as narrow strips along segments of the shoreline interface with the lake. The wetlands are generally associated with areas having gentle slopes and/or are located in the extreme upper reaches of the lake's many embayments having developed on sediment accumulations derived from the surrounding drainages.

As discussed in Section 6.6, aquatic plants can have a substantial influence on the rate of sedimentation in waterbodies. Dense growths of submersed aquatic plants like hydrilla can dampen wave action and local currents, encouraging even the smallest of suspended particles to settle and accumulate at a faster rate than would be the case in the absence of the plants.

The projected expansion of hydrilla to cover up to 14,600 acres of Walter F. George Lake over the next 30 years is expected to produce localized changes in water depths. The changes will be more pronounced in the shallow nearshore littoral areas as sediment runoff from the surrounding lands is trapped by the thick hydrilla vegetation. In addition, suspended sediments originating from areas upstream of the lake will also demonstrate an increasing to settle in the dense plant growth that could cover all areas of the lake having depths of <10 feet.

A long-term consequence of the hydrilla infestations will be the acceleration of sediment deposition in the nearshore littoral areas and the concomitant reduction in water depths. As water depths diminish over time, they will gradually be invaded by emergent plants, cypress trees, and other plants that are tolerant of moist soil conditions. Eventually, a pronounced band of wetland vegetation could begin to make its appearance at selected locations around the lake near the end of the 30-year period of analysis.

For the purposes of this analysis it is assumed that the upper one foot of the lake between normal pool elevation 190 NGVD and 189 will be the most susceptible depth for the accumulation of sediments delivered to the lake via sheet flow runoff. While sediment deposition will certainly vary geographically around the lake in response to a variety of

factors, with some areas receiving larger amounts than others, insufficient data is available to accurately identify the differences between locations. Therefore, in the absence of definitive information, it was assumed that the sediments would accumulate evenly around the lake. Table 6 shows that 1,516 acres is contained in the upper one foot of the lake. The 1,516-acre band varies in width around the lake depending upon local elevation contours.

The upper lake above the U.S. Highway 82 causeway is more conducive than the lower lake for wetland development because of the relative abundance of shallow flats. For example, 62% of the lake's surface acreage <10 foot deep is located above the causeway. Below the causeway, the lake is characterized by steeper slopes and shoreline erosion creates conditions that are not favorable for wetland development. Application of the 62% to the 1,516-acre band between elevation 189 and 190, indicates that approximately 940 acres of littoral wetlands could develop in Walter F. George Lake over the next 30 years as a result of the anticipated excessive hydrilla growth that is anticipated to occur if changes are not made to the aquatic plant management program administered for the lake.

Table 6
Area-Capacity Data for Walter F. George Lake

Elevation (Feet –NGVD)	Area (acres)		Incremental Storage (acre-feet)
	Total Area	Incremental Area	
180	30,577	* 30,577	* 556,300
181	31,897	1,320	31,300
182	33,396	1,499	32,600
183	34,880	1,484	34,200
184	36,375	1,495	35,600
185	37,784	1,409	37,100
186	39,210	1,426	38,500
187	40,735	1,525	39,900
188	42,210	1,475	41,600
189	43,665	1,455	42,900
** 190	45,181	1,516	44,400
191	46,850	1,669	46,100
192	48,615	1,765	47,600
193	50,356	1,741	49,500
194	52,250	1,894	51,400
195	54,045	1,795	53,100

***** Total surface area and storage volume at elevation 180 NGVD
****** Normal pool elevation

6.9 Floodplains

Executive Order 11988 requires Federal agencies to take actions to reduce the risk of flood loss; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains in managing Federal lands and facilities.

Should hydrilla expand over the next 30 years to cover 14,600 acres of Walter F. George Lake having depths <10 feet, the extensive volume of vegetative matter associated with that level of plant growth would occupy a considerable volume of the lake. Examination of Table 6 shows that the total volume of water contained within the upper 10 feet of the lake is 378,100 acre-feet. Less than 30% of that volume (i.e. less than 113,00 acre-feet) occurs over the 14,600 acres of the lake having depths <10 feet.

While theoretically, excessive hydrilla growth could be assumed to displace a portion of the lake's storage volume, in actuality this may not be the case since a considerable portion of the plant materials is comprised of water. Although the water is an important constituent of the make-up of hydrilla plants, when the vegetation is exposed during low lake levels, the water is released during plant decomposition and either evaporates into the air or is freed to return to the lake.

Since flood control is not an authorized purpose of the Walter F. George Project, the condition of the submersed aquatic plant community within the lake is not believed to have an effect on floodplains either within the lake or areas downstream of the dam.

6.10 Recreation

Recreation has been an important activity at Walter F. George Lake since it was first impounded and made available for public use. Recreation has grown over the years in response, at least in part, to its reputation as an excellent lake in which to fish for largemouth bass.

Through an outgrant arrangement with the Corps, the State of Alabama operates the Lakepoint State Park, while the State of Georgia operates the George T. Bagby State Park. Two marinas are also located on the lake – the Chewalla Marina in Alabama and the Florence Landing Marina in Georgia.

The Corps has also outgranted 11,184 acres of project lands to the U.S. Fish and Wildlife Service which manages them as the Eufaula National Wildlife Refuge. Portions of the refuge are located in Alabama and Georgia. Recreation activities available within the refuge include nature trails, fishing, wildlife observation, photography, and hunting (including youth hunts). The refuge receives about 325,000 visitors per year. Of this figure, approximately 600 people visit for the purposes of waterfowl hunting and over 4,000 people visit to bird watch. From 2000 to 2006, waterfowl harvests ranged from 750 to 1,500 per year.

The Corps operates campgrounds at Bluff Creek, Cotton Hill, Hardridge Creek, and White Oak Creek. In addition, 19 other day use areas are located around the lake that provide picnicking facilities, with 16 also having boat launches.

It is estimated that Walter F. George Lake receives around 4.5 million visitors a year at all of the recreation facilities occurring around the lake. The Corps operated facilities received on the average over three million visitors a year. Table 7 shows the total number of visitors to the lake from 2000 to 2006 as determined by the Corps.

Recreational activities include fishing, birding, hiking, swimming, boating, camping, canoeing and a variety of other sports associated with water. The annual fishing tournaments held on Walter F. George Lake are a significant source of income for the local communities. Most of the tournaments are headquartered at the Lakepoint State Park.

In addition to the designated recreation areas, a large number of permanent residences and vacation homes are located on adjacent private lands neighboring the Corps lands that fringe the lake. A considerable amount of recreational use of the lake is based from these homes, with almost all of the 1,100 permitted private boat docks being associated with these homes.

Should the hydrilla infestations develop over the next 30 years to eventually cover 14,600 acres of the lake <10 deep, it is likely recreational visitations will gradually decline from the levels shown in Table 7. The excessive vegetation will make it difficult for boating, swimming, fishing, skiing, and other water oriented activities. If the recreational experience is not pleasurable, many visitors will not return. In addition, the owners of the 1,100 private boat docks may experience difficulties as hydrilla expands and interferes with the ability to swim, fish and boat from the docks. Figures 6, 7, and 8 demonstrate how severe hydrilla infestations could adversely affect recreational activities in large areas of Walter F. George Lake .

Table 7
Total Number of Visitors to Corps Recreation Areas at Walter F. George from 2000 to 2006

Year	2000	2001	2002	2003	2004	2005	2006
Total Visitations	6,339,735	4,656,702	4,397,237	4,384,766	4,423,694	3,693,899	4,340,890

6.11 Socioeconomics

Walter F. George Lake is bordered by seven counties. The three Alabama counties are Barbour, Henry and Russell. The four Georgia counties are Chattahoochee, Clay, Quitman, and Stewart. The counties are rural in nature, with agriculture and forestry being the major land use activities.

According to the 2000 Census, Eufaula in Barbour County, Alabama, had a population of 13,908 making it the largest town in the region surrounding the lake. Fort Gaines in Clay County, Georgia, is the second largest town, with a 2000 population of 1,110.

Table 8 presents a summary of key demographic data for the seven counties. The population density data indicate that the counties are generally sparsely populated compared to the overall data for both Alabama and Georgia. This is to be expected given the rural nature of the counties.

Although Russell County has the largest population of the seven counties, most of its residents actually live in the extreme north end of the county near Phenix City, well upstream of Walter F. George Lake. The populations in the remaining six counties range between a low of 2,598 in Quitman County, Georgia, to a high of 29,038 in Barbour County, Alabama. A comparison of projected population data for 2005 with the 2000 Census indicates that six of the seven counties experienced an overall population decline during that five-year period, with the losses in each county ranging from a low of 1.4% to a high of 7.2%. The greatest population losses occurred in the three Georgia counties of Stewart, Quitman, and Clay Counties, which also had the smallest populations and were the least densely populated.

Henry County, Alabama, was the only one of the seven counties to have exhibited a population increase between 2000 and 2005. The population growth in Henry County is probably related to the growth that is occurring in the neighboring Dothan metropolitan area and the desire of some people to move to the quieter and less developed areas of Henry County as they seek a less urbanized residential setting. The proportion of the population under the age of 18 in each of the seven counties is similar to the overall percentages for their respective states. The percentage of the population in each of the three Alabama counties over the age of 65 is also similar to the overall state percentage. However, with the exception of Chattahoochee County, the population data for the Georgia counties seem to indicate a trend for an aging population compared to the overall state population. This is consistent with the population loses that were projected to have occurred between 2000 and 2005 for these counties. Apparently, younger individuals may be emigrating from those counties as they seek better economic conditions and leaving behind the older residents. Only in Chattahoochee County is there a marked difference in the age make-up of the population, where there are more people under the age of 18 and a considerably less people over the age of 65 compared to the overall State percentages. This may be attributable in part to the influence of Fort Benning and the numbers of young service members residing in that county.

Table 8
Demographic Characteristics of Seven Counties Bordering Walter F. George Lake

Data Category	USA	Alabama				Georgia				
		State	Barbour	Henry	Russell	State	Clay	Chattahoochee	Quitman	Stewart
Population										
2000	281,421,906	4,447,100	29,038	16,310	49,326	8,186,453	3,357	14,882	2,598	5,252
2005	296,410,404	4,557,808	28,414	16,610	49,326	9,072,453	3,242	14,679	2,467	4,882
Percent change	5.3%	2.5%	-2.1%	1.8%	-0.9%	10.8%	-3.4%	-1.4%	-5.0%	-7.2%
Persons per square mile	87.6	79.6	32.8	29.0	77.6	141.4	17.2	59.8	17.1	11.4
Age										
Under 18	24.8%	23.9%	23.3%	22.5%	25.1%	26.0%	24.7%	27.7%	23.8%	23.7%
Over 65	12.4%	13.2%	13.2%	15.9%	13.6%	9.6%	17.5%	2.3%	17.8%	18.6%
Race										
White	80.2%	71.4%	52.2%	67.6%	56.1%	66.1%	39.2%	65.3%	54.6%	37.8%
Black	12.8%	26.4%	46.8%	31.7%	42.1%	29.8%	60.3%	28.8%	45.1%	61.6%
Native American	1.0%	0.5%	0.4%	0.2%	0.3%	0.3%	0.0%	0.8%	0.1%	0.2%
Asian	4.3%	0.8%	0.3%	0.0%	0.5%	2.7%	0.3%	2.1%	0.0%	0.3%
Pacific Islander	0.2%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.9%	0.0%	0.0%
Two or more races	1.5%	0.9%	0.3%	0.5%	0.9%	1.0%	0.2%	2.1%	0.2%	0.1%
Hispanic	14.4%	2.3%	3.1%	2.1%	2.2%	7.1%	0.9%	10.7%	1.3%	1.8%
Education										
High School graduates	80.4%	75.3%	64.7%	66.7%	66.5%	78.6%	64.3%	88.8%	57.8%	63.2%
+Four-year college degree	24.4%	19.0%	10.7%	14.1%	9.7%	24.3%	10.1%	25.5%	6.1%	9.3%
Persons per household	2.59	2.49	2.53	2.47	2.49	2.65	2.45	3.41	2.48	2.48
Income										
Median household	$43,318	$36,131	$25,962	$31,442	$28,467	$42,421	$23,300	$35,552	$25,832	$23,780
Per capita	$21,587	$18,189	$13,316	$15,681	$14,015	$21,154	$16,819	$14,049	$14,301	$16,071
Persons below poverty	12.5%	15.2%	22.1%	16.3%	18.6%	13.3%	24.5%	14.5%	20.0%	21.2%

Source: U.S. Census Bureau: State and County QuickFacts. Last Revised January 12, 2007.

From an education standpoint, the 2000 Census showed that the percentage of the populations in six of the seven counties having a high school education was also statistically lower compared to the overall percentages for their respective states. Indicative of this trend, the percentage of the populations in each of these six counties having a four-year college degree or higher was also significantly lower compared to their respective state percentages. Only Chattahoochee County had a higher percentage of high school graduates compared to the average for the State of Georgia, while matching the State's overall percentage of residents possessing at least a four-year college degree.

The average median household income for the State of Georgia is $42,421 which compares closely with the $43,318 average for the entire nation and considerably higher than the average of $36,131 for Alabama. Examination of the average median household incomes for the seven counties demonstrates that the region's income levels lag considerably behind their respective state averages. Only in Henry County, Alabama, and Chattahoochee County, Georgia, do the income levels approach their respective state averages. The higher median household incomes in these two counties may be due to the segments of their populations that have sought to live in these two counties in response to the sprawling growth occurring in the respective neighboring metropolitan areas of Dothan, Alabama, and Columbus, Georgia.

Since Walter F. George Lake was first impounded 44 years ago, it has contributed to the overall economic well-being of the seven-county region. The lake is an important recreation resource and has developed a national reputation for its fishery. As a result, a diverse recreation related economy has developed in the region that includes marinas, boat sales, tackle, restaurants, and lodging and the host of supporting businesses that reflect the multiplier affect the recreational activities have on the surrounding community. Many local jobs have been created as a direct and indirect result of the lake's presence.

An evaluation of the economic benefits of the lake was performed by the U.S. Army Corps' Engineer Research and Development Center at Vicksburg, Mississippi, using 1999 recreation visitation data. That study concluded that Walter F. George Lake was responsible for visitor expenditures totaling $111,270,000 within 30 miles of the lake. Further, 59% of the expenditures was captured by the local economy as direct sales effects. When those sales are multiplied through the surrounding area, the total economic impact of Walter F. George Lake to the local and regional economies becomes obvious in terms of total sales, income, jobs supported by the lake, and tax revenues.

6.12 Environmental Justice and Protection of Children

Environmental Justice. Executive Order (EO) 12898 entitled *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (dated February 11, 1994) requires that federal agencies conduct their programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, polices, and activities do not have the effect of excluding persons or populations from participation in, denying persons or populations the benefits of, or subjecting persons or populations to discrimination under such programs, policies, and activities because of their race, color, or national origin or economic status

Table 8 shows the racial and ethnic composition of the seven counties as determined from the 2000 Census. In general, the populations in six of the seven counties are comprised of somewhat higher percentages of blacks and smaller percentages of whites compared to the overall state percentages for both Alabama and Georgia. Only in Chattahoochee County, Georgia, is the racial make-up similar to the overall state percentage for Georgia. Chattahoochee County and Barbour County, Alabama also had a higher proportion of Hispanic individuals compared to their respective overall state percentages.

Table 8 also shows the percentage of the populations in each of the seven counties that live below the federal family poverty guidelines for a family of 5 having an annual household income at or below $19,950. That percentage ranges between a low of 14.5% to a high of 22.1%. All seven counties have a higher percentage of their populations living below the poverty level compared to their respective state percentages. Of the seven counties, Barbour County, Alabama, and Clay County, Georgia, have the highest numbers of individuals living in poverty, with Quitman and Stewart Counties in Georgia also having a significant percentage of their populations living below the poverty level.

It is difficult to predict with any accuracy the future socioeconomic conditions that may characterize a political jurisdiction because so many factors come into play. Assuming that the present racial, ethnic and economic make-up of the seven-county region will remain essentially unchanged over the 30-year period considered in this analysis, it is possible that the anticipated expansion of hydrilla to cover 14,600 acres of Walter F. George Lake could negatively affect the minority and low income segment of the seven-county region.

For example, should the hydrilla infestation reach the levels that are projected to occur, it is likely that recreational visitations to Walter F. George Lake would be reduced. This would adversely affect the many local businesses that are based upon the recreation industry which in turn could adversely affect local employment and income levels. It is possible that a disproportionate segment of the minority and low income members of the region could bare the brunt of losses of recreation related service jobs.

Many low income residents practice subsistence fishing. Should the excessive growths of hydrilla in the nearshore areas adversely effect the habitability of these areas for fish, this would negatively affect the success rates of bank fisherman that do not have access to boats. Thus, this group would be disproportionately affected by the water quality and habitat suitability problems created by hydrilla.

Protection of Children. Executive Order (EO) 13045 entitled *Protection of Children from Environmental Health Risks and Safety Risks* (dated April 21, 1997) recognizes the growing body of scientific knowledge that demonstrates children may suffer disproportionately from environmental health and safety risks. These arise because children's bodily systems are not fully developed; they eat, drink and breathe more in proportion to their body weight; and their behavioral patterns may make them more susceptible to accidents. Based on these factors, the EO directs each federal agency to (1) make it a high priority to identify and assess environmental health and safety risks that my disproportionately affect children and (2) assure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental or safety risks. All activities undertaken at Walter F. George Lake are required to consider the requirements of this EO.

Section 6.11 identified the percentages of the population within each of the seven counties that are below the age of 18. Whether or not these percentages remain constant or change over the next 30 years, it is not believed the projected expansion of hydrilla to cover 14,600 acres of Walter F. George Lake will have any disproportionate effect on children living within the region or visiting the lake for recreation purposes.

6.13 Noise

Most sounds on Walter F. George Lake are those deal with nature or recreation activities. The lake is home to several egret rookeries and numerous species of waterfowl and other birds. The major sound breaking the solitude of the lake is associated with the hum of outboard motors and other water craft that are regular fixtures on the lake.

Herbicides will continue to be applied over the 30-year period of analysis to treat 230 acres of hydrilla infestations occurring within the above identified priority areas. Treatment will be accomplished periodically during the growing season using airboats which generate considerable noise when in operation.

The priority areas are concentrated in the recreation areas that are frequented by the public. The noise produced by the airboats may be considered by most people to be offensive. Fortunately, herbicide applications will typically be conducted in the daylight hours from Monday through Friday when fewer members of the recreational public are present, thus avoiding potential noise conflicts.

6.14 Aesthetics

The large expanses of water associated with this wide and elongated impoundment provide numerous locations to enjoy the beauty of Walter F. George Lake. Despite the existence of the 27 recreation areas and the numerous private homes located around the lake, there are still significant shoreline areas that have not been developed as of yet.

The water views provided by the lake remain the primary focal point of the recreation areas. Further, the water views are also the principal factor that has led to the construction of the many homes located on private lands bordering the lake.

The excessive growth of hydrilla projected to occur in the lake's nearshore areas over the next 30 years will be viewed negatively by the visiting public and the home owners around the lake. Should the level of the future hydrilla infestations assume the characteristics depicted in Figures 6, 8, and 9, most users of the lake will consider those conditions to detract from the visual appeal of the lake.

6.15 Hazardous and Toxic Materials

Due to wide range of activities involved in operating and maintaining the Walter F. George Project, a variety of hazardous and toxic materials are used by Corps and contractor personnel. These materials include paints, solvents, oils, pesticides, etc. Each of these materials are handled, used, stored, and disposed of in accordance with label recommendations and by applicable Corps regulations and standard operating procedures. All activities involving these materials are conducted consistent with state regulatory guidelines and specifications.

The description of the Environmental Setting recognizes that chemical herbicides will be routinely used to control hydrilla infestations on the lake over the next 30 years. Therefore, this discussion of hazardous and toxic materials concentrates on an evaluation of the herbicides that will be or could be routinely used in the aquatic plant management program for the lake. Herbicides currently used to control submersed aquatic vegetation include fluridone, Aquathol-K® (i.e., endothall), diquat, and a diquat/copper mix.

- **Fluridone.** Fluridone products are harmful if swallowed, absorbed through skin, or inhaled. They can cause moderate eye irritation. The average half-life for fluridone in an aquatic system like Walter F. George Lake is about 20 days. While fluridone does adhere to sediments, it is slowly desorbed into the water column where it is susceptible to photodegradation.

- **Aquathol-K® (i.e., endothall).** Endothall products are corrosive and can cause irreversible eye damage. Endothall is harmful if inhaled or absorbed through the skin. Where fish are present, the lower concentrations should be applied to avoid fish mortalities. Fish consumption from treated areas should be avoided until three days after application. Aquathol-K® is effective against a broad range of aquatic vegetation with a margin of safety to fish. The half-life of endothall (the active ingredient in Aquathol-K®) is between 3 to 7 days, although endothall tends to break down quickly in water.

- **Diquat.** Diquat is toxic and can be fatal, if swallowed. Contact with undiluted liquid products can cause damage to the skin and eyes. Great care must be taken to avoid exposure during handling operations and application in the field. Where inhalation exposure to aerosols containing diquat is likely, proper respiratory protection equipment should be used. Diquat can be toxic to aquatic invertebrates if applied improperly. Once in the soil, diquat has a typical half-life of 1000 days, but is unavailable to plants or microbes due to its strong affinity for clay particles.

- **Diquat/Copper Mix.** Diquat and Copper are often applied simultaneously for effective control of submersed aquatic vegetation. The toxicity information stated above for diquat also applies to the diquat/copper mix. Chelated copper is the preferred form and is applied as elemental copper. Chelated copper persists indefinitely and becomes unavailable in sediment or is recycled by aquatic plants as a micronutrient. Copper herbicides are corrosive and can cause irreversible eye damage and skin irritation. Due to their corrosive nature, they may be harmful or fatal if swallowed. Some products may be toxic to trout and other species of fish depending upon water hardness.

While there is always a risk to human safety and for environmental contamination whenever herbicides are applied, the risk is greatly minimized when the chemicals are stored, handled, and applied in accordance with label directions that have been approved by the U.S. Environmental Protection Agency, the federal agency responsible for registration of pesticides.

6.16 Air Quality

Walter F. George Lake is located in a rural environment. The two largest communities in the area, Eufaula, Alabama, and Fort Gaines, Georgia, are small by typical metropolitan standards and do not generate large quantities of automobile emissions. The largest industry producing air emissions in the region is the MeadWesvaco Corporation's kraft pulp and paper plant located at the extreme north end of the lake near Phenix City, Alabama. However, the plant's air emissions are in compliance with applicable standards and create no problems

for the immediate lake environs. The ambient air quality in the seven-county region surrounding Walter F. George Lake is judged to be good and in attainment for all criteria pollutants as measured against the U.S. Environmental Protection Agency's standards.

6.17 Historic and Archeological Resources

The region within which Walter F. George Lake is located has a rich archaeological and historical heritage. The 1979 EIS stated that cultural resources surveys were conducted prior to impoundment of the lake. According to the EIS, 273 known or reported sites were identified from the reservoir site and adjacent areas. Of that total, 169 sites were reported to exist within the pool reservoir site.

In 1995, the Corps' Mobile District prepared a Historic Properties Management Plan (HPMP) to guide the management of the historic properties occurring on the Walter F. George Project lands and water areas. Based on the results of a historic resources survey conducted during 1983-1984, the HPMP revised the number of historic sites reported from within the Project area. According to the HPMP, 106 historic resource sites are located on fee-owned Federal property, 41 of which were previously recorded sites.

The HPMP states that 19 sites are either listed on the National Register of Historic Places or possess sufficient integrity to be eligible for listing on the National Register. The two historic resources listed on the Federal Register are the Roods Landing Mississippian Indian mound center and the late 17th century Spanish Fort Apalachicola. Both sites are also designated as National Historic Landmarks.

An issue of concern to historic resource sites located near the shoreline of Walter F. George Lake is erosion and the potential for the integrity of the sites to be damaged by erosion and/or looting or vandalism.

The continued expansion of hydrilla within Walter F. George Lake over the next 30 years, potentially covering 14,600 acres of the lake, should have no impact on the cultural resources occurring on the Project lands above the normal pool elevation of 190 NGVD, or any sites that may lie within the lake below that elevation.

7.0 ENVIRONMENTAL IMPACTS OF THE RECOMMENDED PLAN

7.1 General

The following identifies the anticipated environmental impacts that would result from implementation of the five alternatives (see Section 5.2) considered in detail to control hydrilla at Walter F. George Lake. The Environmental Setting presented in Section 6.0 describes the existing environmental conditions within the study area and the projected changes to key resource categories expected to occur from the continued expansion of hydrilla over the 30-year period of analysis under the No Action Alternative. The No Action Alternative would apply herbicides to only 230 acres of hydrilla infested areas at the previously identified high priority Corps operation and recreation areas around the lake. This minimum level of treatment, which is all that can be accomplished with the present budget provided to Walter F. George Project, would be unable to effectively control the continued spread of hydrilla throughout the lake. The No-Action Alternative serves as the baseline against which the effectiveness of the other four alternatives in controlling hydrilla are compared, along with the direct and indirect and primary and secondary environmental impacts attributed to those alternatives. The Integrated Plan is identified as the Recommended Plan to control hydrilla at Walter F. George Lake.

7.2 Climate

None of the alternatives considered would have any effect on climatic conditions. The length of the aquatic growing season may be somewhat longer than the average 214-day terrestrial growing season because of the high latent heat capacity of water. A somewhat longer growing season would facilitate the growth and expansion of hydrilla for those alternatives that do not aggressively target this invasive exotic species.

7.3 Biological Resources

No Action (Minimum Chemical Treatment): The description of biological resources contained in Section 6.0 for Walter F. George Lake's submersed aquatic vegetation, waterfowl, and fishery communities reflects the conditions that are projected to occur over the 30-year period of analysis for the No Action Alternative. These conditions would occur as a result of the minimum herbicide treatment levels that would only target 230 acres of hydrilla infestations at the priority locations on the lake that are listed in Section 5.2.

The minimum level of chemical treatment would allow the 2,400 acres of submersed vegetation measured in 2006 to increase to 2,800 acres through 2007, and to potentially cover within 30 years most if not all of the 14,600 acres of the lake having depths <10 feet as depicted in Figure 11. Over that period, existing

scattered hydrilla patches will continue to coalesce, forming large monotypic expanses of hydrilla to the essential exclusion of other submersed aquatic plant species, particularly the less competitive native species. In addition, the numbers of newly established colonies of hydrilla will intensify each year, expanding in subsequent years to encompass increasingly larger areas of the lake. The actual rate of expansion will be determined by the interaction of a variety of physical, chemical, and biological factors. The process may be hastened if some hydrilla biotypes become tolerant to fluridone, a phenomenon that has been noted in Lake Seminole.

The rate of hydrilla expansion is expected to be greater in the upper reaches of Walter F. George Lake above the U.S. Highway 82 causeway where the relative proportion of the lake having depths <10 feet to deeper areas is higher as shown in Figure 10. In the lower and deeper regions of the lake downstream of the causeway, hydrilla infestations are expected to expand their coverage in the existing affected embayments and to gain new toeholds in other embayments that are presently devoid of hydrilla. As the embayments become saturated with hydrilla, the infestations will increasingly spread to the higher energy and somewhat less hospitable, littoral shoreline areas of the open portions of the lower lake. Eventually, it is possible that all areas of the lake having depths <10 feet could be covered with hydrilla.

During the 30-year period, hydrilla is also expected to gradually extend to deeper portions of the lake, possibly down to 20 feet in some areas. The quieter and clearer embayments of the lower lake would be more likely to experience expansion of hydrilla to depths below 10 feet. During periods of extended drought over the growing season when lake levels decline and water clarity is improved, hydrilla expansion to deeper portions of the lake could be accelerated.

The existing level of hydrilla coverage within Walter F. George Lake is beneficial to the lake's fishery resources. The approximately 2,400 acres of scattered hydrilla-dominated patches of submersed aquatic vegetation provide important habitat for the largemouth bass and the other sunfish species that support the lake's recreational fishery. Given the 44-year age of the lake, submersed aquatic vegetation can provide structural cover that is otherwise lacking in the extensive shallow water flats of the lake. In addition, the existing level of hydrilla coverage is also not detrimental to gizzard shad and threadfin shad populations.

However, as hydrilla continues to expand over the 30-year period of analysis, forming monotypic mats, the habitat value of hydrilla will increasingly become detrimental as the coverage of plants approaches 14,600 acres which represents 32% of the surface area of Walter F. George Lake. That percentage is very close to the 40% value reported in the literature where habitat quality problems begin to develop in hydrilla infested lakes. Water quality conditions can deteriorate, decreasing dissolved oxygen concentrations, reducing the availability of nutrients,

and contributing to a diminishment of plankton levels. The forage base can shift from one dominated by shad to sunfish, which could alter the predatory fishery.

As the biomass of the submersed aquatic vegetation increases, so does the potential for higher levels of dead plant matter, particularly during winter die-offs. Decomposition of the dead plant materials is largely dependent upon microorganisms that consume large amounts of dissolved oxygen. In addition, while plants produce oxygen through photosynthesis during the day, plants convert to net consumers of oxygen at night during respiration as they continue biological processes. Both conditions associated with excessive quantities of vegetation can be problematic for the fishery community. An extreme deficiency of dissolved oxygen is known as hypoxia. Hypoxia can lead to the stress and death of fish and aquatic invertebrates. Should fish and invertebrate populations be diminished in areas with depressed dissolved oxygen concentrations, it is possible that other members of the animal community could be indirectly impacted and be displaced to other areas on the lake as they pursue alternative food sources.

Resident and migratory waterfowl may benefit from an expansion of hydrilla to cover up to 14,600 acres of Walter F. George Lake over the 30-year period of analysis. The extensive mats of hydrilla would provide added habitat for invertebrates that form an important component of the diet of waterfowl species. Thus, waterfowl utilizing the lake would benefit from the habitat afforded by the hydrilla. However, should hydrilla vegetation in the vicinity of the pump intakes used by the Eufaula National Wildlife Refuge become thick enough to impede their operation, the management effectiveness of the 645 acres contained within the refuge's system of impoundments listed in Table 4 could be hindered. At the very least, the refuge could incur increased operating costs to clear hydrilla from the intakes.

While waterfowl would benefit from the cover and forage afforded by large expanses of hydrilla, large growths of hydrilla have the potential to pose problems for waterfowl. Avian Vacuolar Myelinopathy (AVM) is a nervous tissue disease found in birds associated with hydrilla. This disease is caused by a toxin(s) produced by cyanobacteria. *Stigonematales* spp is a cynobacteria that has been found growing on or around hydrilla in conjunction with every known case of AVM. While the exact combination of toxins and the level of toxicity is unknown, scientists have drawn a clear correlation between presence of *Stigonematales* spp infested hydrilla and AVM deaths. *Stigonematales* spp was present on the surface of hydrilla plants at every site in the Southeast United States where AVM cases were diagnosed in 2001 through 2004, but was absent or scarcely found in areas where AVM was not observed. To date, no known cases of AVM have been reported from Walter F. George Lake and the presence of *Stigonematales* spp has not been documented from the lake. However, the possibility exists that AVM could affect waterfowl populations and visiting bald

eagles at Walter F. George Lake should the coverage of hydrilla expand to the levels projected with the No Action Alternative.

Maximum Chemical Treatment: This alternative would target for treatment all 2,800 acres of hydrilla-dominated submersed aquatic vegetation that is projected to exist by the end of 2007. This aggressive level of herbicide treatment is anticipated to be effective in controlling the expansion of hydrilla and maintain the level of submersed aquatic plant coverage in Walter F. George Lake to the existing 2,400 acres.

The positive habitat contributions to the lake's fishery associated with 2,400 acres of hydrilla would continue to occur over the period of analysis. Since hydrilla would not be allowed to expand to cover 14,600 acres, the negative fishery impact attributed to the No Action alternative would not occur.

Waterfowl would continue to benefit from maintaining the existing 2,400 acres of hydrilla-dominated submersed vegetation. Also, there would be decreased possibility of AVM becoming an issue for the WFG Lake. When applied according to label instructions, herbicides used in this alternative should have little or no impact on invertebrates and other lake-ecosystem dependent organisms.

Flow-Assisted Herbicide Delivery System: This alternative would effectively control hydrilla and most other species comprising the submersed aquatic plant community within the areas treated. Although the effectiveness of endothall as a contact herbicide is almost absolute within the areas treated, by conducting treatment during the February-March timeframe when most submersed aquatic plants are dormant, the impact on desirable native plant species would be lessened.

Figure 14 shows the primary portion of Walter F. George Lake above the U.S. Highway 82 causeway that is suitable for application of this alternative. The area treated covers 10,460 acres, representing over 23% of the lake's entire surface area of 45,181 at the normal pool level. Past experience at WFG Lake shows that non-native egeria is somewhat resistant to the effects of endothall at the proposed application rates. Thus, it is likely that egeria would gradually resume its former abundance in the treated areas, possibly becoming a nuisance at some point over the 30-year period of analysis and eventually requiring additional treatment measures specifically directed at controlling that species.

The elimination of essentially all submersed aquatic vegetation within the 10,460 acres treated shown on Figure 14 would be detrimental to both fishery and waterfowl resources. The loss of structural cover and feeding habitat would be expected to reduce both numbers and size of fish within this portion of the lake,

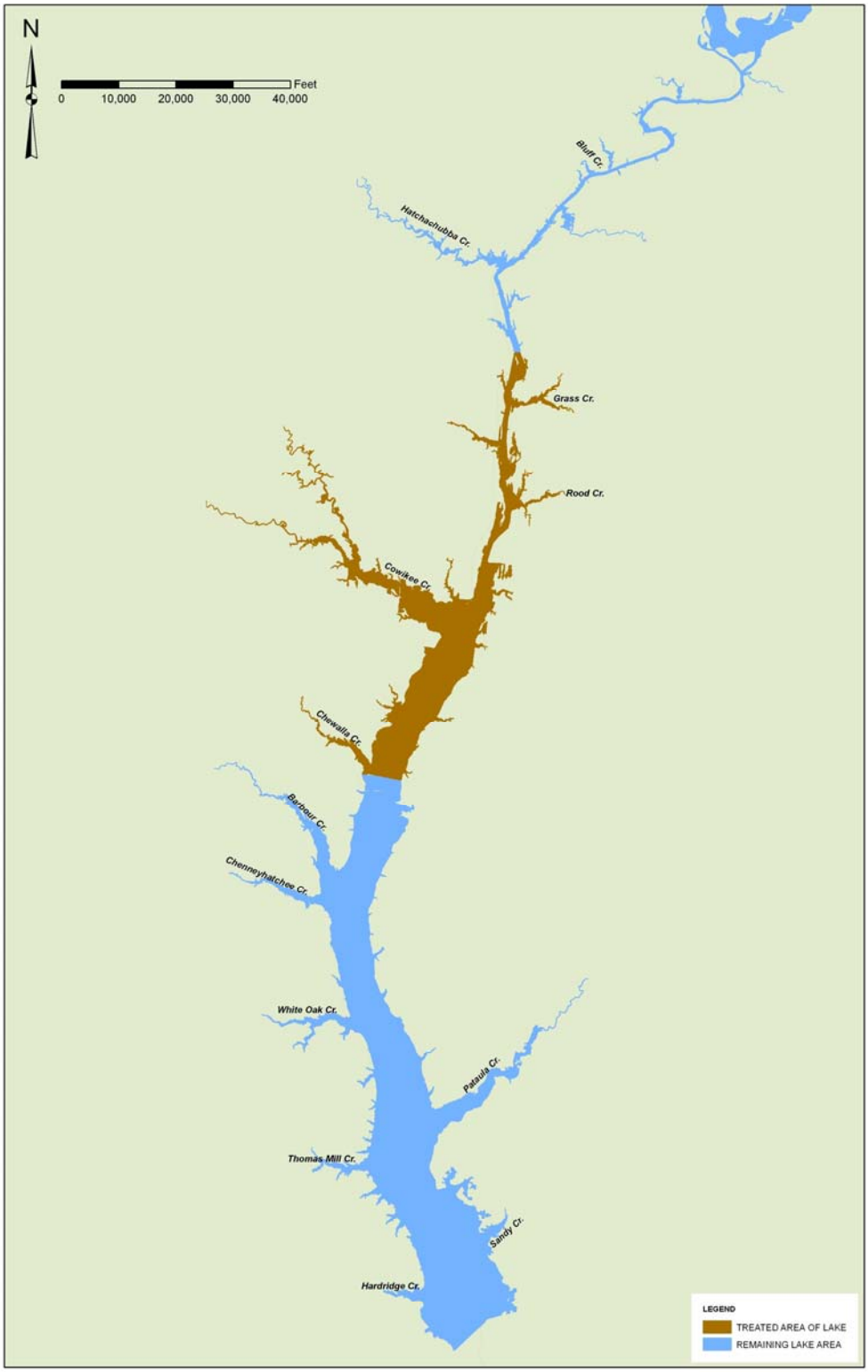

Figure 14
Portion of Walter F. George Lake Treated by the Flow-Assisted Herbicide Delivery System Alternative

and could adversely affect the fishery populations in the untreated areas portions of the lake as well. Repercussions of this alternative could result in decreased invertebrate populations and hardships on other lake-ecosystem dependant organisms. However, as stated above by conducting treatment during the February-March timeframe when most submersed aquatic plants are dormant, the impact on desirable native plant species would be lessened which in turn would reduce the magnitude of impacts on other aquatic animal species that utilize these plants for food and cover.

Since this method of treatment is not conducive for use at most locations in the lower lake due to the absence of sufficient flow rates, existing hydrilla populations would continue to grow unabated by this alternative. Over the 30-year period of analysis, the 5,548 acres of the lower lake below the causeway with depths <10 feet would experience a steady increase in hydrilla coverage. The growth of hydrilla could eventually increase to such levels that localized treatment using traditional treatment measures may be required.

Release of Triploid Grass Carp Only: This alternative would exclusively take advantage of the feeding behavior to grass carp to control hydrilla populations within the entirety of Walter F. George Lake. The use of grass carp to control submersed aquatic plants has become common place. It is the least expensive and most reliable method of control available to individual landowners of small ponds and lakes and to managers of large multipurpose reservoirs.

The results of studies and actual experience at large reservoirs have shown that grass carp exhibit a preference for hydrilla when grass carp densities are closely matched with available vegetation. Based on the literature, the dietary preference of grass carp in priority order is as follows:

- Hydrilla
- Muskgrass
- Pondweeds
- Southern naiad
- Brazilian elodea
- Watermeal
- Duckweed
- Coontail
- Hygrophila
- Cattail

There are risks associated with grass carp. When excessive numbers of grass carp are stocked, the competition for a finite amount of vegetation in a closed reservoir system can be disastrous. When a body of water is overstocked with grass carp, the carp will eat all submersed aquatic vegetation within reach, including emergent vegetation to which they show little or no preference. Removal of all vegetation has negative impacts on lake fisheries, sportfishing, and waterfowl

habtiat. Species potentially impacted by reductions in macrophytes include, but are not limited to, pigmy sunfishes, native centrarchids, and the redeye chub. Complete defoliation removes the habitat and forage base, resulting in adverse consequences to sportfish and waterfowl. Overstocking can also cause drastic water chemistry changes in some lakes. One of these changes is a heightened phosphate availability which can lead to a buildup of toxic cyanobacteria.

The classic example of where a high stocking density was used is the 21,000-acre Lake Conroe, Texas. The San Jacinto River Authority stocked non-sterile grass carp in 1981 and 1982 at a density of 30 fish per vegetated acre to control hydrilla. Within two years, the fish had successfully removed all vegetation from the lake. It was 13 years before hydrilla and other submersed aquatic plants began to re-emerge in the lake.

A more favorable example of the success of using triploid grass carp to control hydrilla in a large reservoir without decimating the submersed aquatic plant community is the 170,000-acre Santee Cooper Reservoir system. Grass carp were incrementally stocked from 1989 through 1996 to eventually produce a density of 16 fish per vegetated acre. After control was achieved in 2004, a density of only one fish for every seven formerly vegetated acres has been sufficient to maintain control.

For the Unconfined Release of Triploid Grass Carp Alternative, a stocking rate of 20 to 22 grass carp per hydrilla vegetated acre was used. Although this rate is slightly higher than the Santee Cooper Reservoir system experience, this rate is not expected to totally eliminate aquatic vegetation from Walter F. George Lake. Thus, this alternative should allow the goal of maintaining around 2,400 acres of submersed aquatic plants to remain in the lake. Further, since only sterile triploid grass carp would be released, any adverse impacts to the aquatic ecosystem would be reversible as a result of mortality and reduced feeding as the fish aged.

Another issue of concern to reservoir managers is the loss of “escaped” grass carp through movements both upstream and/or downstream from the impoundment. The concern is associated with the potential for escaped grass carp to damage other ecosystems through the unintentional consumption of desirable submersed vegetation. In the case of Walter F. George Lake, grass carp can only migrate downstream of the dam since the next dam upstream of the lake does not have a lock or other structure to facilitate upstream fish passage. Thus, the major area of concern is the downstream movement of fish into Lake Seminole and then into the Apalachicola River and eventually all the way to the lower salinity portions of the Apalachicola Bay.

To evaluate the potential escape of grass carp from Walter F. George Lake, the analysis previously developed for the evaluation of grass carp stocked in Lake Seminole was applied with appropriate modifications to reflect the Walter F. George Lake stocking scenario. One major factor influencing the escape of grass

carp is mortality. Various studies have estimated annual mortality rates for triploid grass carp to be about 20%. In Walter F. George Lake, predation by the lake's large alligator (*Alligator mississippiensis*) and osprey (*Pandion haliaetus*) populations should produce a grass carp mortality rate at least equal to 20%. Predation by ospreys would only occur during the first year of release since grass carp would be too large (>5 pounds) for osprey after that time.

As a sensitivity analysis, the effects of annual mortality rates of 10, 20, and 30% were determined for the initial release of 24,640 grass carp and re-stocking of 5,600 additional fish every 7 years. Table 9 summarizes how the population of grass carp would be expected to gradually decline over the 30-year period considered in this evaluation. Even with periodic re-stocking, the total grass carp population would decrease steadily, reducing both the numbers of fish within Walter F. George Lake and any fish that may exit the lake and enter the downstream areas. At an annual mortality rate of 20%, near the end of the 30-year period of analysis the total population of grass carp is estimated to be around 7,120 fish.

Table 9
Grass Carp Population with 10, 20, & 30 and Mortality Rates

	Grass Carp Alone Alternative with 5,600 Fish Re-stocked Every 7 Years			**Integrated Plan with 3,360 Grass Carp Restocked Every 7 Years**		
Stock year	**10% Yearly Mortality**	**20% Yearly Mortality**	**30% Yearly Mortality**	**10% Yearly Mortality**	**20% Yearly Mortality**	**30% Yearly Mortality**
0	24,640	24,640	24,640	13,440	13,440	13,440
7	17,385	10,767	7,629	9,788	6,179	4,467
14	13,915	7,858	6,228	8,042	4,656	3,728
21	12,256	7,248	6,113	7,206	4,336	3,667
28	11,462	7,120	6,130	6,807	4,269	3,662

While mortality will reduce the total number of grass carp available to exit Walter F. George Lake, the large acreage of downstream water bodies and the presence of suitable submersed aquatic vegetation will also influence the downstream densities of grass carp within the total drainage system. Should some of the grass carp move downstream of the Walter F. George Dam, the potential adverse effects

on aquatic vegetation would be minimized as the numbers of fish become "diluted" with increasing distance downstream. To gain an adequate understanding of the potential density of grass carp that may result in the entire drainage system from Walter F. George Lake all the way downstream to Apalachicola Bay, salinity and vegetation are two factors that must be taken into account.

- *Salinity Considerations:* Grass carp studies have shown that the upper salinity level in which they could feed, grow and survive is 9 parts per thousand (ppt). Thus, the probable impacts of grass carp on brackish water ecosystems and salt marshes with salinities greater than 9 ppt would be minimal and only short-term invasions would be possible. The salinity distribution in the Apalachicola Bay system at any given time is affected primarily by river flow, local rainfall, basin configuration, wind speed and direction, and water currents. Low bay salinities typically coincide with high river flows, generally during winter and spring periods. Only the brackish (i.e., river-diluted) portions of western St. George Sound, Apalachicola Bay, St. Vincent Sound, and East Bay demonstrate salinity patterns that are occasionally suitable for grass carp. The surface acreage of habitable water is summarized in the following:

  - 45,181 acres in Walter F. George Lake.
  - 1,620 acres in Andrews Lake downstream of Walter F. George Lake
  - 800 acres in Flint River section
  - 165,000 acres includes Lake Seminole and downstream to Apalachicola Bay

  Thus the total habitable acreage for the entire system from Walter F. George Lake through Apalachicola Bay is approximately 212,601 acres.

- *Aquatic Vegetation Distribution*: For purposes of this analysis, only freshwater submersed and emergent plant communities dominated by species that are high on the feeding preference by grass carp were considered. Plant distribution data contained in the Lake Seminole Hydrilla Action Plan EIS was considered in this analysis. The following list shows where suitable aquatic vegetation preferred by grass carp is located within the drainage system from Walter F. George Lake downstream to Apalachicola Bay.

  - 2,400 acres in Walter F. George Lake.
  - 20 acres in Andrews Lake downstream of Walter F. George Lake
  - 15,000 acres in Lake Seminole
  - 10,000 acres from Lake Seminole downstream to Apalachicola Bay

Thus the total acreage of suitable aquatic vegetation for the entire system from Walter F. George Lake through Apalachicola Bay is approximately 27,420 acres.

The "dilution" of grass carp was evaluated by considering separately the surface area of habitable water (i.e., 212,601 acres) and the appropriate acreage of aquatic plants that are preferred by grass carp (i.e., 27,420 acres). The results of both approaches are presented in Table 10 and consider variable mortalities of 10, 20, and 30% over the 30-year period of analysis. Since grass carp will be drawn to food sources, the analysis considering the availability of suitable vegetation may provide a more realistic approach. Nevertheless, as shown in Table 10, when considering either the availability of the acreage of surface water or the amount of suitable vegetation, the escape of grass carp from Walter F. George Lake would be expected to result in <1 grass carp per acre. For example, considering only the acreage of suitable vegetation and a 20% mortality rate, at the end of the 30-year period of analysis, a system-wide density of 0.26 fish/vegetated acre would result. This is equivalent to approximately one fish for every four vegetated acres. This approach represents a worst case analysis since it assumes that sufficient numbers of grass carp would exit Walter F. George Lake to become evenly distributed throughout the entirety of the 212,601 acres considered in this evaluation. However, it is much more likely that a majority of the grass carp would remain in the lake. Further, it is also likely that those grass carp that do escape downstream may tend to concentrate in areas having abundance coverage of submersed aquatic plants like Lake Seminole. To conclude, the densities shown in Table 10 would not pose a threat to the ecosystems or to the aquatic vegetation downstream of Walter F. George Dam.

Table 10
Densities of Grass Carp for the Carp Alone Alternative

Stock year	Population / Open System Acreage			Population / Vegetated Acres of Open System		
	10% Yearly Mortality	20% Yearly Mortality	30% Yearly Mortality	10% Yearly Mortality	20% Yearly Mortality	30% Yearly Mortality
0	0.12	0.12	0.12	0.90	0.90	0.90
7	0.08	0.05	0.04	0.63	0.39	0.28
14	0.07	0.04	0.03	0.51	0.29	0.23
21	0.06	0.03	0.03	0.45	0.26	0.22
28	0.05	0.03	0.03	0.42	0.26	0.22

Integrated Plan (i.e. Recommended Plan): This alternative combines the minimal treatment of chemicals similar to the No Action Alternative; the release of a smaller number of triploid grass carp; and measures to establish native submersed aquatic vegetation to replace the hydrilla.

Chemicals would be applied to the same 230 acres of high priority areas. However, the Integrated Plan differs from the No Action Alternative in the manner in which chemicals would be applied. The volume of herbicides used would decrease over the period of analysis as the feeding behavior of grass carp gradually brought the hydrilla under control. The above described impacts associated with the No Action Alternative would also apply to this component of the Integrated Plan, but at a reduced scale of impact over time.

A stocking rate of 10 to 15 grass carp per hydrilla vegetated acre would not be expected to totally eliminate aquatic vegetation from Walter F. George Lake. This lower stocking rate, compared to the alternative involving only the release of grass carp, would require a slightly longer period time for the effects of the fish in controlling hydrilla to be demonstrated. Since only sterile triploid grass carp would be released, any adverse impacts to the aquatic ecosystem would be reversible as a result of mortality and reduced feeding as the fish aged.

Research and experience in other aquatic systems has shown that a stocking rate of 10-15 triploid grass carp per vegetated acre to produce an appropriate density of fish that would not remove all submersed vegetation from a lake. This stocking rate should allow the goal of maintaining up to 2,400 acres of vegetation to be realized, while controlling the expansion of hydrilla. This should allow the positive habitat attributes of the existing submersed aquatic plants to be maintained and to preserve the outstanding sport fishing of the lake.

The same analysis performed on the above alternative that would only involve the release of grass carp was also conducted for the grass carp component of the Integrated Plan. Again, variable mortality rates of 10, 20, and 30% were used to determine the numbers of grass carp that would remain from the initial release of 13,440 fish and the additional 3,360 fish re-stocked every 7 years. The results of the mortality analysis are also shown for the Integrated Plan in Table 9. That analysis shows that even with periodic re-stocking, the total grass carp population within Walter F. George Lake would decrease steadily over the 30-year period of analysis. This would reduce the number of fish that would be available to exit the lake each year. At an annual mortality rate of 20%, near the end of the 30-year period of analysis the total remaining population of grass carp released into Walter F. George Lake is estimated to be around 4,269. This number would only

be 60% of the population that would remain with the alternative involving only the release of grass carp.

The "dilution" of grass carp with the Integrated Plan was also evaluated by considering separately the surface area of habitable water (i.e., 212,601 acres) and the appropriate acreage of aquatic plants that are preferred by grass carp (i.e., 27,420 acres). The results of both approaches are presented in Table 11 and consider variable mortalities of 10, 20, and 30% over the 30-year period of analysis. Since grass carp will be drawn to food sources, the analysis considering the availability of suitable vegetation may provide a more realistic approach. Nevertheless, as shown in Table 11, when considering either the availability of the acreage of surface water or the amount of suitable vegetation, the escape of grass carp from Walter F. George Lake would be expected to result in <1 grass carp per acre. For example, considering only the acreage of suitable vegetation and a 20% mortality rate, at the end of the 30-year period of analysis, a system-wide density of 0.20 fish/vegetated acre would result. This is equivalent to approximately one fish for every five vegetated acres. This approach represents a worst case analysis since it assumes that sufficient numbers of grass carp would exit Walter F. George Lake to become evenly distributed throughout the entirety of the 212,601 acres considered in this evaluation. However, it is much more likely that a majority of the grass carp would remain in the lake. To conclude, the densities shown in Table 11 would not pose a threat to the ecosystems or to the aquatic vegetation downstream of Walter F. George Dam.

Table 11
Densities of Grass Carp for the Integrated Plan

	Population / Open System Acreage			**Population / Vegetated Acres of Open System**		
Stock year	**10% Yearly Mortality**	**20% Yearly Mortality**	**30% Yearly Mortality**	**10% Yearly Mortality**	**20% Yearly Mortality**	**30% Yearly Mortality**
0	0.06	0.06	0.06	0.50	0.50	0.50
7	0.05	0.03	0.02	0.40	0.20	0.20
14	0.04	0.02	0.02	0.30	0.20	0.10
21	0.03	0.02	0.02	0.30	0.20	0.10
28	0.03	0.02	0.02	0.20	0.20	0.10

Lastly, over the 30-year period of analysis, actions would be taken to undertake experimental plantings of various native plants would be undertaken to replace

the hydrilla vegetation consumed by the grass carp. Native plants would be selected that are not preferred food for grass carp. Species planted may include, but are not limited to, southern Vallisneria (*Vallisneria americana*), arrowhead (*Sagittaria* spp.), and sago pondweed (*Potamogeton pectinatus*). Such plantings will attempt to provide favorable submersed aquatic plants that will make positive contributions to maintaining the lake's sport fish community.

7.4 Endangered and Threatened Species

None of the alternatives considered are expected to have any adverse effects on listed endangered and threatened species or any state identified species of concern. However, there is a very remote chance that some of the grass carp may escape from the lake and make their way downstream into Lake Seminole and then upstream into the Flint River where they could feed upon the Georgia state listed endangered spider lily. However, the effects of such an impact would be insignificant and likely not observable.

7.5 Water Quality

No Action (i.e. Minimum Chemical Treatment): Should hydrilla continue to spread and eventually cover 14,600 acres or more of the lake, the vast expanses of vegetation could have a pronounced influence on local water quality conditions within Walter F. George Lake, particularly in those areas experiencing the heaviest infestations.

The rooted hydrilla plants would consume large quantities of the nutrients in order to maintain their biomass. This would diminish the amount of nutrients available to support the lake's plankton community that is necessary to maintain populations of forage fish (i.e., threadfin shad and gizzard shad) that is a major food source for predator fish such as largemouth bass, crappie, and hybrid bass.

Dissolved oxygen levels would also be affected within areas of the lake supporting large growths of hydrilla. Although plants produce oxygen through photosynthesis during the day, at night plants convert to respiration, becoming next consumers of oxygen to fuel their biological processes. In particularly dense infestations of hydrilla, dissolved oxygen levels could drop to well below the 5.0 ppm standard that is generally deemed to be necessary to support healthy, well balanced fisheries. Under those conditions, the affected areas would become inhospitable to most fish species requiring higher oxygen concentrations. As a result, it is possible that expanses of the lake containing extensive growths of hydrilla could essentially become devoid of largemouth bass, crappie, and other sunfishes during the warmer summer months because of severely reduced dissolved oxygen levels. Further, oxygen concentrations could also be adversely affected following winter die-off of hydrilla as dissolved oxygen is consumed during the decomposition of the plants.

The No Action Alternative would involve the annual application of chemical herbicides on 230 acres. When applied in accordance with label instructions, the herbicides will not adversely affect water quality within Walter F. George Lake.

Maximum Chemical Treatment: This alternative involves a more aggressive application of herbicides that would treat 2,800 acres of hydrilla-dominated submersed aquatic plants, with the goal being to maintain hydrilla coverage to around 2,400 acres. By preventing hydrilla from forming extensive mats of vegetation, the adverse water quality conditions associated with the No Action Alternative would be avoided.

Following treatment, for a short period of time each year, as the plants die and decompose localized declines in dissolved oxygen concentrations could occur. Such occurrences should be temporary and would not be expected to have a significant influence on overall water quality conditions within the lake.

A positive consequence of reducing the amount of hydrilla vegetation in the lake would be the "freeing up" of nutrients that would otherwise be bound up in vegetation so that the nutrients are made available to phytoplankton serve as the food source for the lake's forage fish base. This should benefit the lake's sport fishery.

This alternative would apply considerably larger quantities of herbicides than would be used with the No Action Alternative. Again, when applied in accordance with label instructions, the herbicides will not adversely affect water quality within Walter F. George Lake

Flow Assisted Herbicide Delivery System: This alternative also represents an aggressive use of chemical herbicides to control hydrilla infestations. However, because of its dependence on flow, it would only be implemented in the upper lake above the U.S. Highway 82 causeway.

Removal of hydrilla from the 10,460 acres that would be treated in the upper lake (see Figure 14) would prevent the water quality problems associated with extensive growths of submersed vegetation from occurring. Following treatment, as the plants die and decompose, localized declines in dissolved oxygen concentrations may occur. However, this should represent a temporary occurrence and would not be expected to have a significant influence on overall water quality conditions within the lake.

This alternative would apply a large quantity of the herbicide endothall to obtain an effective concentration within the area of the lake treated. When applied in accordance with label instructions, the herbicide would not adversely affect water quality within Walter F. George Lake

Release of Triploid Grass Carp Only: The use of grass carp would effectively control the expansion of hydrilla within a few years of their release. The reduced levels of vegetation would avoid the adverse water quality conditions attributed to the No Action Alternative.

Since hydrilla would be gradually controlled by the consistent grazing by grass carp, the short term die-off of plants that typically follow chemical treatment would be avoided, thus reducing potential impacts on dissolved oxygen concentration.

According to the literature, grass carp can increase phosphate levels as a waste product from their consumption of submersed aquatic plants. In excessive concentrations, phosphate levels may stimulate algal blooms that could produce undesirable water quality impacts similar to those associated with excessive growths of hydrilla. However, the stocking rate of 20 to 22 fish per vegetated area is low enough that it should not adversely affect water quality within Walter F. George Lake.

This alternative would also negate the need for the extensive application of herbicide chemicals in the lake.

Integrated Plan (i.e. Recommended Plan): Implementation of the three components that comprise this alternative will not adversely impact water quality while preventing the spread of hydrilla in Walter F. George Lake.

Since only 12 grass carp per vegetated acre would be stocked, the potential for problem levels of phosphate to be generated from fish excrement would be non-existent.

Maintenance of a hydrilla dominated submersed aquatic plant community totaling 2,400 acres would not adversely affect the lake's overall water quality.

7.6 Geology and Soils

None on the alternatives considered would affect the geological characteristics of the study area. On the other hand, aquatic plants have the potential to greatly influence the deposition and accumulations of sediments (i.e., soils) in ponds and lakes.

No Action (Minimum Chemical Treatment): The minimum level of chemical treatment that would be provided with this alternative would not prevent hydrilla from spreading to eventually cover most of the 14,600 areas of the lake having a depth of <10 feet. Over the 30-year period of analysis, the dense mats of submersed aquatic vegetation would accelerate the accumulation of sediments within the vegetation. The changes will be more pronounced in the shallow nearshore littoral areas as sediment runoff from the surrounding lands is trapped

by the hydrilla mats. A long-term consequence of the hydrilla infestations will be the acceleration of deposition of sediments and the corresponding reduction in the depth of the nearshore littoral areas. This will degrade aquatic habitats, recreation areas, private boat docks, and adversely affect other activities that presently take place in those areas of the lake to be affected.

Maximum Chemical Treatment: This alternative would be effective in controlling the spread of hydrilla beyond the 2,400 acres that are targeted to be maintained within the lake. The smaller total area of hydrilla (compared to the No Action Alternative) would not materially influence the deposition and accumulation of sediments in the nearshore littoral areas. Therefore, the changes in depth projected to occur with the No Action Alternative would not be as pronounced or widespread within the lake.

Flow Assisted Herbicide Delivery System: The primary area of influence of this alternative is associated with the 10,460 acres of the upper portion of the Walter F. George Lake above the U.S. Highway 82 Bridge. By killing essentially all submersed aquatic plants within this portion of the lake, any sediment deposition that would occur along the shoreline would not be related to the presence aquatic plants, but would be the result of other processes and activities.

Should hydrilla become widespread in the lower portion of the lake downstream of the U.S. Highway 82 causeway, it is possible that nearshore sediment deposition patterns could be influenced. However, due to the steep shoreline that characterizes much of the lower lake, it is unlikely submersed aquatic plant growth would have a material influence on sedimentation in the nearshore areas of the main body of the lake.

Release of Triploid Grass Carp Only: By reducing the coverage and density of plants within the hydrilla infestations through the feeding behavior of grass carp, this alternative would severely limit the influence of submersed aquatic vegetation on sedimentation patterns within the lake. Thus, the nearshore sediment accumulations and depth reductions projected to occur with the No Action Alternative would not occur.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.7 Land Use

The primary effect that hydrilla is expected to have on land use relates to the 27 recreation areas scattered around the lake and the numerous homes located on private lands that are separated from the lake by the narrow strip of Corps managed lands that surrounds much of the lake.

No Action (Minimum Chemical Treatment): With this alternative, hydrilla is expected to eventually cover almost all of the 14,600 acres the lake having depths <10 feet. As hydrilla continues to spread throughout the lake, the tributary embayments should experience the most serious infestations initially. Since most of the lake's recreation areas are associated with embayments, it is likely the expanding hydrilla infestations will interfere with the boat ramps and impede navigation. In addition, when viewed from the recreation areas, the surface mats will detract from the visual appeal of the lake. Eventually, visitations could decline in the most seriously affected recreation areas.

The U.S. Fish and Wildlife Service depends upon water pumped from Walter F. George Lake beginning on November 1 of each year to fill the 645 acres of waterfowl impoundments located within the Eufaula National Wildlife Refuge. Although the timing of pumping occurs at the end of the annual growing season, the hydrilla plants would typically not have begun to experience winter die-off, with abundant quantities of the submersed aquatic still being present. It is possible that over the 30-year period of analysis, hydrilla infestations in the vicinity of the pump intakes could become so dense as to interfere with the operation of the pumps, increasing operation and maintenance costs for the essential pumping activities.

The thick mats of hydrilla plants will also envelop most of the private piers that are permitted on the Project shoreline, interfering with their use. In addition, excessive growths of hydrilla may detract from the water views from the many private homes around the lake, possibly adversely affecting property values at those locations experiencing the heaviest hydrilla infestations. Figures 6, 7, 8 and 9 provide examples of how the Walter F. George Lake shoreline could look within 30 years.

Maximum Chemical Treatment: This alternative would prevent the coverage of hydrilla from expanding beyond 2,400 acres. As a result, land use activities associated with the lake's recreation areas and operation of the Eufaula National Wildlife Refuge's waterfowl impoundments would not be adversely impacted by the hydrilla infestations that would occur with the No Action Alternative. In addition, by preventing large expanses of hydrilla from developing around the lake, water oriented activities, water views, and property values associated with the private homes surrounding the lake would not be impacted.

Flow Assisted Herbicide Delivery System: This alternative would prevent hydrilla from infesting the 10,460 acres of the lake occurring between the U.S. Highway 82 causeway upstream to Florence Marina which is above the present upstream limit of hydrilla on the lake. This would prevent hydrilla from affecting the use of recreation areas occurring within that portion of the lake, while avoiding adverse impacts on waterfowl impoundment pumping operations at the Eufaula National Wildlife Refuge.

Since this alternative cannot be effectively applied on a large scale basis downstream of the U.S. Highway 82 causeway, hydrilla could expand its coverage in the lower lake, particularly within the many embayments. These infestations could adversely affect use of the recreation areas. In addition, expanses of hydrilla in the lower lake may adversely impact water oriented activities, water views, and property values associated with the private homes bordering the lake.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.8 Wetlands

No Action (Minimum Chemical Treatment): Under this alternative, hydrilla is projected to expand its coverage to 14,600 acres of the lake <10 feet deep. The plant infested areas would experience a high rate of sedimentation with the sediment accumulations being highest in the shallow lake areas nearest the shoreline in areas one foot below normal pool levels (i.e., from 190 to 189 NGVD). Over the 30-year period of analysis, this pattern of sediment accumulation is expected to produce a 1,516-acre band of sediment deposits of varying width around the lake (depending upon local elevation contours) that would be favorable for the development of emergent vegetation.

The upper lake above the U.S. Highway 82 causeway is more conducive for wetland development because of the relative abundance of shallow flats. For example, 62% of the lake's surface acreage <10 foot deep is located above the causeway. Below the causeway, the lake is characterized by steeper slopes and greater shoreline erosion that creates conditions that are less favorable for wetland development. Application of the 62% to the 1,516-acre band between elevation 189 and 190, indicates that approximately 940 acres of littoral emergent wetlands could develop in Walter F. George Lake as an indirect result of the No Action Alternative's inability to control the spread of hydrilla within the lake.

Maximum Chemical Treatment: This alternative would effectively control hydrilla from expanding beyond 2,400 acres of the lake's surface area. Over the 30-year period of analysis, this would reduce the acreage of shallow littoral areas within which sediments would accumulate that would be favorable for the development of emergent wetlands. Thus, the acreage of wetlands that would develop with this alternative would be considerably less than the 940 acres attributed to the No Action Alternative.

Flow Assisted Herbicide Delivery System: The primary area of influence of this alternative is associated with the 10,460 acres of the lake from the U.S. Highway 82 Bridge upstream to Florence Marina. By killing essentially all submersed aquatic plants in this segment of the lake, hydrilla would not influence nearshore sediment deposition patterns. An indirect consequence of the effectiveness of this alternative in controlling hydrilla would be the lack of development of a substantial portion of the 940 acres of wetlands projected to occur with the No Action Alternative.

Downstream of the U.S. Highway 82 causeway, the effects on wetland development are expected to be similar to the No Action Alternative.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.9 Floodplains

All five alternatives considered are non-structural in nature. Therefore, they would have no impact on the storage capacity of Walter F. George Lake or the ability of the Walter F. George Project's capability to convey flood flows through the impoundment to downstream areas.

This applies to the No Action Alternative as well. The reduction in depths that would occur within the large expanses of hydrilla associated with this alternative would not represent additional sediment accumulations within the lake. Instead, the dense hydrilla mats would create conditions favorable for settlement of suspended sediments. In short, the hydrilla infestations would capture suspended sediments that would otherwise settle elsewhere within the lake.

7.10 Recreation

No Action (Minimum Chemical Treatment): The No Action Alternative would be ineffective in controlling the spread of hydrilla in Walter F. George Lake. Over the 30-year period of analysis, up to 14,600 acres of the lake with depths <10 feet are projected to become infested with dense mats of hydrilla. That level of plant growth would interfere with boat ramps, marina operations, impede navigation, adversely affect sport fishing, hinder other water oriented recreational activities, and detract from the visual appeal of the lake.

If the recreational experience of visitors to the lake becomes increasingly negative through the years because of the hydrilla, one would expect the number of visitations to decline over time. It is estimated that Walter F. George Lake receives a total of around 4.5 million visitors a year, with over 3.0 million of those

visiting one of the 27 recreation areas operated by the Corps. Since it is not possible to predict with any degree of accuracy when the hydrilla coverage would reach the 14,600-acre area of coverage, it is not possible to identify the threshold level of hydrilla coverage that will begin to measurably discourage the public from visiting the lake.

In addition to the formal recreation areas that are scattered around the lake, numerous homes have been constructed on private lands adjacent to the lake in order to enjoy the views provided by the lake and to have ready access to the lake for recreational purposes. As hydrilla progressively expands its coverage of the lake, most, if not all, of the existing 1,100 permitted private boat docks around the lake will become enveloped in thick plant mats, making it very difficult for the owners to effectively recreate from them. Figures 6, 7, 8, and 9 depict the types of problems that can be created by excessive growths of hydrilla.

Because of its longstanding reputation for supporting an excellent largemouth bass fishery, a number of bass tournaments are held on Walter F. George Lake each year. Most of the tournaments are headquartered at the Lakepoint State Park located on the Cowikee Creek embayment. These tournaments are a favorite local attraction and serve as an additional source of revenue for the seven-county region within which the lake is located. Should the anticipated future expanses of hydrilla begin to adversely affect the numbers and sizes of largemouth caught and detract from the fishing experience, it is possible the number of tournaments held on the lake each year could begin to decline. Further, if fishing conditions and success rates consistently deteriorate because of problems related to the hydrilla infestations, the larger tournament circuits could remove Walter F. George Lake from consideration for future tournaments. If that were to happen, the loss of the public exposure and free advertising for the region provided by the tournaments would be detrimental to the local business community.

Maximum Chemical Treatment: This alternative would control the spread of hydrilla within Walter F. George Lake while maintaining 2,400 acres of submersed vegetation over a 30-year period of analysis. That level of hydrilla coverage would not be expected to adversely affect recreation activities, and should be beneficial to the lake's sport fishery.

Flow Assisted Herbicide Delivery System: By treating the 10,400 acres of the lake between Florence Marina downstream to the U.S. Highway 82 causeway, this alternative would control the largest infestations of hydrilla that existed at the time this Environmental Assessment was prepared. This should improve conditions for recreation in that portion of the lake.

This alternative cannot be successfully applied to the lower lake downstream of the U.S. Highway 82 causeway, over the 30-year period of analysis. As a result, most of the embayments that lack sufficient inflows from their tributary streams will become clogged in all but their deeper channels with hydrilla. The littoral

areas of the main lake would also experience hydrilla infestations as well. If the hydrilla infestations become severe enough, it is likely that the visiting public will begin to use other recreation areas on the lake that are not affected by hydrilla. The displacement of recreation visitation could place higher demands on some recreation areas while areas affected by hydrilla would receive little use.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.11 Socioeconomics:

No Action (Minimum Chemical Treatment): Under this alternative, hydrilla is projected to expand to eventually cover up to 14,600 acres of Walter F. George Lake having depths <10 feet. The thick mats of aquatic vegetation that would be produced would adversely affect sport fishing and other water oriented recreation activities, and would also detract from the visual appeal of the lake. As the magnitude of these adverse impacts increased with the spread of hydrilla over the 30-year period of analysis, one would expect visitations to the lake to decline. Decreasing visitations would have negative effects on area businesses that are dependent, at least in part, upon activities generated by the presence of Walter F. George Lake (marinas, boat dealers, tackle stores, bait suppliers, lodging, restaurants, etc.). Decreases in sales would flow through the business community, creating additional adverse impacts for a host of other businesses in the region. Eventually, jobs most closely related to the recreation industry could be placed in serious jeopardy. In addition, it is possible the value of private lake front homes could be diminished in those areas of the lake experiencing the most severe hydrilla infestations. The loss of employment income and reduced tax revenues could reduce the capability of local governments to provide the full range of services that are presently provided and may hinder the potential to pursue other infrastructure improvements.

While the economic base of the seven counties surrounding Walter F. George Lake does not depend entirely upon the lake, it is nevertheless an important asset in the region. Economic data developed in 1999 concluded that the lake was responsible for visitor expenditures of $111,270,000 within 30 miles of the lake. Since almost eight years have passed since that analysis was performed, one would expect lake-related expenditures to be higher today. Similarly, it is anticipated such expenditures would increase by a substantial amount in the future should the lake maintain its reputation as a desirable recreation attraction. It is not possible to say with certainty how by much the hydrilla-related problems could reduce visitor expenditures in the region, but the potential for major adverse economic impacts is certainly real.

Table 8 presents demographic data for the seven counties surrounding Walter F. George Lake. Consideration of the demographic changes that have occurred in the seven-county region between 2000 and 2005, indicate that six of the seven counties experienced a net population decrease over that period, with three of the four Georgia counties exhibiting the largest losses. The overall population decrease for the region, combined with information showing that a large percentage of the population lives below the poverty level and that the per capita incomes for most of the counties is below both the respective state and national averages indicate several of the counties have a fragile economic base. As a result, any business losses occurring in those counties that would be associated with a substantial decline in lake visitations would be expected to impact those struggling counties the hardest.

Should hydrilla eventually cover 14,600 acres of Walter F. George Lake that would affect over 32% of the lake's total surface area. The dense mats of vegetation associated with that level of infestation could periodically interfere with hydropower generation, possibly reducing the Project power output and increasing maintenance costs to clear the unwanted plant material.

Maximum Chemical Treatment: This alternative would maintain the hydrilla coverage at the present level of around 2,400 acres. To date, that acreage of hydrilla has had no known or measurable negative effect on recreation visitations. By preventing hydrilla from expanding to the 14,600 acres projected with the No Action Alternative, future visitations to the lake should not be reduced due to concerns related to excessive plant growths. This would allow Walter F. George Lake to maintain its positive reputation as an attractive regional recreation asset. Thus, any changes that would result in the future socioeconomic characteristics of the region would be attributable to larger local, regional and national issues and would not be related to the extent of hydrilla coverage in the lake.

Flow Assisted Herbicide Delivery System: This alternative would effectively control hydrilla in the 23% of the lake that was most heavily infested at the time this Environmental Assessment was prepared. That level of control would prevent hydrilla from impeding recreation in the upper lake above the U.S. Highway 82 causeway. However, downstream of the causeway, this method of treatment is not suitable for use because of the reduced flows in that portion of the lake. In the absence of other treatment measures, hydrilla would be expected to continue to expand its coverage in the lower lake, possibly reaching problem levels at some point in the 30-year period of analysis that could adversely affect recreation visitation. If this occurs, the local socioeconomic conditions in the area, particularly the counties bordering the lower lake could be adversely affected. The degree of adverse impact would not be expected to be as severe as would be the case with the No Action Alternative.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.12 Environmental Justice and Protection of Children

No Action (Minimum Chemical Treatment): Assuming that the present racial, ethnic and economic make-up of the seven-county region will remain essentially unchanged over the 30-year period considered in this analysis, it is possible that the anticipated expansion of hydrilla to cover 14,600 acres of Walter F. George Lake could negatively affect the minority and low income segment of the seven-county region. For example, should the hydrilla infestation reach the levels that are projected to occur, it is likely that recreational visitations to Walter F. George Lake would be reduced. This would adversely affect the many local businesses that are based upon the recreation industry which in turn could adversely affect local employment and income levels. It is possible that a disproportionate segment of the minority and low income members of the region could bare the brunt of losses of recreation related service jobs.

This alternative could adversely affect subsistence fishing for food by minority and low income residents, especially those accustomed to easy access fishing locations such as at public use areas and bank fishing. These areas are likely the most significantly impacted by hydrilla expansion.

It is believed that the projected expansion of hydrilla to cover 14,600 acres of Walter F. George Lake will not have any disproportionate effect on children living within the region or visiting the lake for recreation purposes.

Maximum Chemical Treatment: By maintaining the existing hydrilla coverage in Walter F. George Lake to the existing 2,400 acres, recreational use of the lake should continue in an unimpeded fashion and would avoid the negative socioeconomic effects that are projected with the No Action Alternative. Thus, no disproportionate negative effects would be created for the minority and low income members of the population and/or children in the seven-county region. It is more likely, these segments of the population will be benefit indirectly from the control of hydrilla by preventing the loss of jobs and reducing income and tax revenues that could result from a severe infestation of hydrilla that discouraged visitations to the lake.

Flow Assisted Herbicide Delivery System: The impacts should be similar to the Maximum Chemical Treatment Alternative.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.13 Noise

No Action: Noise would be generated from the use of airboats to apply herbicides to control hydrilla infestations in the 230 acres of high priority recreation and operation areas. This represents a continuation of a longstanding practice to use airboats to control unwanted aquatic plants on Walter F. George Lake. Elevated noise levels would be temporary in nature, occurring only once during the growing season, and would be generated during daylight hours of a typical work week when recreational use is typically low. By being generated on the open water, noise generated by airboats is often substantially attenuated by the time the time the sound reaches the shoreline. Local wind conditions can have a major influence in the deflection of noise levels and its intensity at receptor locations. In any event, the use of airboats and the noise they generate in connection with operation and maintenance activities on the lake is understood and accepted by the public.

Maximum Chemical Treatment: This alternative would treat up to 2,400 acres of hydrilla infested water lake waters. Airboats would be used to apply the chemical herbicides. Since the total area that would be treated is ten times the size of that associated with the No Action Alternative, elevated noise levels would have a greater duration and would effect a much larger portion of the lake. In addition, those areas experiencing the greatest hydrilla problems could be treated twice during the year. This would result in multiple noise events during the course of the year. Noise levels associated with this alternative would detract from recreational experiences for those visitations that occurred during the application of herbicides and for area residents along the shoreline.

Flow Assisted Herbicide Delivery System: By its nature, implementation of this alternative would not be expected to generate unacceptable noise levels. The barge mounted equipment would be anchored in the middle of the lake a considerable from either shore near Florence Marina. Any noise generated by the equipment used to inject the herbicide into the lake would not be perceptible on either shore.

Release of Triploid Grass Carp Only: This alternative would generate no levels.

Integrated Plan (i.e. Recommended Plan): Initially, implementation of the Integrated Plan would produce noise levels similar to the No Action Alternative. However, as the grass carp begin to control hydrilla infestations, it is assumed the need to apply herbicides will gradually diminish over the 30-year period of analysis. No adverse effects are anticipated to result from the limited noise generated by this alternative.

7.14 Aesthetics

How one perceives an outdoor setting is a personal view that is based upon one's past experiences, present expectations, and core values. For those reasons, it is often difficult to conduct an evaluation of the effects of an action on aesthetics. What one person considers as attractive, may be viewed in an entirely different perspective by another individual.

No Action (Minimum Chemical Treatment): Should hydrilla continue to spread at Walter F. George Lake and eventually cover 14,600 acres, or 32%, of the impoundment's surface area, the overall characteristics of the lake would change from the historic condition. The existing expanses of open water that stretch from shore to shore would be replaced by a band of thick mats of vegetation that would ring much of the lake's shoreline areas and cover much of the extensive flats <10 feet deep that are common above the U.S. Highway 82 causeway. Hydrilla would be particularly conspicuous during the summer recreational season and in the early fall. The dense vegetation will also have the tendency to capture all sorts of floating debris that will tend to accumulate and remain as trash amid the vegetation. On still summer days and nights, the odor of the dense aquatic vegetation could also be displeasing to some. In short, most individuals would find a lake setting that is heavily infested with hydrilla to be unattractive.

Maximum Chemical Treatment: This alternative would control the spread of hydrilla and maintain the coverage at around 2,400 acres, representing about 5% of the lake's surface area. This would allow the present visual qualities of the lake to be maintained and would produce positive aesthetic benefits compared to the No Action Alternative.

Flow Assisted Herbicide Delivery System: By effectively controlling hydrilla between Florence Marina downstream to the U.S. Highway 82 causeway, the visual appeal of the 10,400 acres in that portion of the lake would be maintained. However, since this alternative could not be effectively implemented downstream of the causeway, over the 30-yeear period of analysis, it is possible that all of the embayments and substantial segments of the shoreline in the lower lake could become infested with excessive growths of hydrilla. Thus, with this alternative two different conditions could be created in the lake from an aesthetic standpoint: an upper lake portion above the causeway that would be maintained clear of hydrilla, and a lower portion that could contain extensive quantities of hydrilla resembling the conditions described for the No Action Alternative.

Release of Triploid Grass Carp Only: The impacts would be the same as the Maximum Chemical Treatment Alternative.

Integrated Plan (i.e. Recommended Plan): The impacts would be the same as the Maximum Chemical Treatment Alternative.

7.15 Hazardous and Toxic Materials

Four of the five alternatives considered in detail require the use of chemical herbicides. Associated with that use is the risk for spills to the environment and accidental exposure to humans. The degree of risk is intensified as the amount of herbicides used increases, the area to which it would be applied increases, and/or the frequency of application increases. The risks are associated with the storage, transportation, handling, and application of the chemicals. Other risks include those involved with the storage of fuel and oil for operation of the boats that carry the herbicide application platforms.

The risk for problems would be reduced for all alternatives since the herbicides would be stored in approved locations and facilities that comply with applicable regulations, standards, and policies. The herbicides would be transported, handled, and applied in accordance with EPA approved label instructions. All agency and/or contractor personnel involved in the use of the herbicides would be certified for the application of pesticides and would be knowledgeable of the appropriate actions to take should a spill occur or an individual(s) be accidentally exposed to the herbicides.

These measures would considerably minimize the risks to the environment and human health and safety involved in the use of the herbicides. Nevertheless, risks would still be associated with the use of the herbicides. The following qualitatively compares the relative risks associated with each of the five alternatives considered in detail.

No Action (Minimum Chemical Treatment): This alternative would treat only 230 acres of the hydrilla infestations occurring within Corps operations areas and at recreation areas. Treatment would occur only once each year. It is anticipated this level of application would be required on an annual basis over the 30-year period of analysis. This level of application and the quantities of herbicides that would used would represent a condition that is considerably less intense than the treatment program conducted over the last three years as shown in Table 1. Accordingly, the risk for environmental human health and safety problems associated with this alternative are considered to be minimal.

Maximum Chemical Treatment: This alternative would require large quantities of herbicides to treat 2,400 acres of hydrilla at least once each year, with some areas receiving a second treatment. The total area treated annually would be 10 times the size of the area associated with the No Action Alternative. This would require 10 times the amount of herbicide that would have to be stored, transported, handled, and applied. Carrying the comparison further, 10 times as much effort would be required to apply the chemicals, with the application operations in the field extending over much longer periods of time compared to the No Action Alternative. Based on these considerations, the degree of risk for

spillage and accidental exposure associated with this alternative is considered to be the highest of the five alternatives evaluated.

Flow Assisted Herbicide Delivery System: This alternative would apply the herbicide at fixed locations and would depend upon flows to dilute and disperse the chemicals. A total of 10,400 acres would be treated with this approach. Treatment would occur twice a year in late spring/early summer and again in the fall. A considerable quantity of herbicide would be required with this method because of the large volume of water that would have to be treated. For this approach to work, the herbicide must be injected into the water at the treatment sites over a continuous period of 48 hours. That would require the sites to be continuously monitored to address any equipment malfunctions that may occur and to reduce acts of vandalism. Even though large quantities of herbicide would be involved, the relative short time required for application at fixed locations should considerably reduce the risks associated with this alternative. Based on these considerations, the degree of risk for spillage and accidental exposure associated with this alternative is considered to be second to that attributed to the Maximum Chemical Treatment Alternative.

Release of Triploid Grass Carp Only: Since no herbicides would be applied, this alternative would pose no risks for accidental spills or herbicide exposure problems for human health and safety.

Integrated Plan (i.e. Recommended Plan): Initially, the chemical treatment component of this alternative would be similar to the No Action Alternative in that 230 acres would be treated once annually with the same herbicides. Thus, the initial degree of risk associated with the use of herbicides would also be similar. However, as the grass carp that would be released with this alternative begin to control hydrilla within the lake, the total area of hydrilla treated, the frequency of application, and the amount of herbicides used would all decline over the 30-year period of analysis. With that decline, the degree of risk would also diminish. As a result, the Integrated Plan is considered to have a low relative risk for herbicide use related problems.

7.16 Air Quality:

None of the alternatives considered would have any effect on air quality conditions at Walter F. George Lake or the surrounding region.

7.17 Historic and Archeological Resources

None of the alternatives considered will affect historic and archeological resources occurring on the Walter F. George Project's land and water areas.

7.18 Cumulative Impacts

The Council on Environmental Quality's Regulations for Implementing the National Environmental Policy Act requires that the analysis of the effects of a proposed action include a consideration of cumulative impacts. A cumulative impact is defined as…

> "the impact on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency, entity, or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The following discussion considers the cumulative impacts of the proposed action to control the expansion of hydrilla on Walter F. George Lake in the context of other activities occurring within the region.

The 1998 Draft Environmental Statement prepared by the Corps to address the effects of water allocation within the Apalachicola-Chattahoochee-Flint (ACF) River Basin summarized projected land use trend data for the entire basin. That data indicates that through the year 2050 a slight increase in the acreage devoted to agriculture in the basin is projected to occur, along with a substantial increase in the conversion of lands to urban development is expected. These changes will take place at the expense of forested lands in the basin that are projected to decline. Because of the intense urbanization pressures that are being placed on lands upstream of Columbus, Georgia, due to the growth of Atlanta, it is expected that the majority of the future land use changes will occur in the upper Chattahoochee Basin. The general pattern of population decline observed over the period 2000-2005 for the seven counties surrounding Walter F. George Lake indicates that existing land use activities are expected to continue unchanged for some time into the future. Major consequences associated with the conversion of forested lands to agriculture and urban development is increased surface runoff will be the transport of sediments and nutrients to the numerous tributaries that drain into the Chattahoochee River. Since most of the land use conversions are expected to occur within the upper basin, the bulk of the sediments are expected to be retained within the numerous reservoirs upstream of Walter F. George Lake. The fine-grained sediments that are transported into Walter F. George Lake would be encouraged to settle amid the submersed aquatic plant communities that exist in the lake which would decrease water depths in those areas at a somewhat higher rate than in areas of the lake that are devoid of vegetation. The magnitude of this impact would be greater with the No Action Alternative because of the more extensive coverage of plants that is anticipated to occur over the 30-year period of analysis. Since the other alternatives considered (including the recommended plan) represent a more aggressive approach to managing hydrilla, it is expected that the implementation of any of these alternatives would maintain hydrilla a lower levels than the No Action Alternative, thus contributing to a mor uniform settling of sediments within the lake.

Examination of Table 6 shows that over 207,000 acre-feet of water are contained within the upper five feet of Walter F. George Lake. There are increasing pressures to use more and more of the storage in upstream reservoirs to satisfy the water supply of the fast developing upper basin. In addition, there are also downstream demands for flows to meet minimum flow requirements for habitat, water quality concerns, and navigation. Upstream water supply demands may decrease releases from the upper basin reservoirs that may make it more difficult to consistently maintain Walter F. George Lake at the normal pool level of 190 during summer periods while efforts are also being made to satisfy downstream flow requirements. Problems in maintaining lake levels created by the increasing demands for water within the basin and the relatively finite supply of water would be exacerbated during drought conditions. If Walter F. George Lake was to be maintained at a lower level over an extended period of time, conditions would be created that would enhance hydrilla's spread to deeper depths and its infestation of larger areas within the lake.

The release of triploid grass carp into Walter F. George Lake and the escape of some of these fish to downstream areas will add to the numbers of grass carp in the waterways in the lower basin, including Apalachicola River and Apalachicola Bay that have escaped from prior releases made at other locations. However, since the triploid grass carp are sterile, the numbers that do escape will decrease through mortality over their projected 10-year average life. In the interim, the total numbers of fish that would exit Walter F. George Lake and safely transit the downstream two lakes to reach the Apalachicola River would be expected to be small and, as a result, their effect on the submersed aquatic vegetation should be negligible.

8.0 ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS WHICH WOULD BE INVOLVED SHOULD THE RECOMMENDED PLAN BE IMPLEMENTED

The Integrated Plan, which is the Recommended Plan, consists of three components:

- Release triploid grass carp.
- Continue chemical treatment at minimal levels, with diminishing applications over the 30-year period of analysis as the effectiveness of grass carp in controlling hydrilla begins to be demonstrated.
- Encourage establishment of native aquatic plants.

By its very nature, the Recommend Plan represents a non-structural approach to the control the continued expansion of hydrilla within Walter F. George Lake. As such, no natural resources would be committed in order to implement the Recommended Plan, nor would any permanent adverse environmental impacts result from implementation of the plan.

The Recommended Plan would control the spread of hydrilla without eradicating this plant from the lake because of the positive habitat value that hydrilla provides in moderate amounts. The proposed grass carp stocking program was selected as being the most appropriate to satisfy the objectives of the proposed action while maintaining approximately 2,400 acres of submersed aquatic plants in the lake. Since triploid grass carp are incapable of reproduction and have an average life span of around 10 years, grass carp will not become a permanent member of the fish community inhabiting either Walter F. George Lake or the downstream drainage system. Should it be determined in the future that the presence of grass carp is no longer needed and/or desirable in the lake, maintenance restocking efforts can be terminated and natural processes will eliminate the remaining fish from the lake at an anticipated average mortality rate of 20% each year. Should the feeding behavior of the grass carp consume large quantities of hydrilla than anticipated, the resiliency of hydrilla will allow for it to recover over time as the numbers of fish in the lake decline.

The fuels, herbicides, and labor that would be expended annually to treat the 230 acres of high priority Corps operations and public recreation areas would represent a permanent irretrievable commitment of resources. However, as the grass carp begin to effectively control of hydrilla within the lake, the amounts of fuels, herbicides, and labor required to treat the problem areas are anticipated to significantly decline by the end of the 30-year period of analysis.

At an average annual cost of $68,048 (which translates to an annual management cost of $24 per vegetated acre), the Recommended Plan provides a fiscally responsible approach to manage hydrilla. The relatively low cost of this plan would allow the remainder of the Walter F. George Project annual Operations and

Maintenance budget to be devoted to maintaining other project features that are essential to the overall well being of the project and to the safe use and enjoyment of the lake by the recreating public.

9.0 ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The Recommended Plan will generally benefit all resource categories considered in this analysis. However, three minor adverse environmental impacts are associated with the plan as described in the following.

The potential of some grass carp to escape from Walter F. George Lake and move into the downstream system of impoundments, the Apalachicola River and Apalachicola Bay would be unavoidable. However, since over 212,600 acres of surface water are available within the lake and in the downstream drainage system, the numbers of escaped fish would be "diluted" to the point that they would not create problems for downstream native vegetation.

The Recommended Plan would control the spread of hydrilla and limit its coverage of Walter F. George Lake to no more than 2,400 acres. This is in contrast to the 14,600 acres of hydrilla that could develop under the No Action Alternative (i.e. Minimum Chemical Treatment). By controlling the spread of hydrilla, conditions conducive for inducing sediment deposition and accumulation in the shallow littoral areas of the lake would be diminished. This in turn would reduce the potential for 940 acres of shoreline wetlands to develop over the 30-year period of analysis. Depending upon one's perspective, the lost opportunity for conditions to be created suitable for the development of wetland emergent vegetation along the lake's shoreline may be considered as a negative impact by some or as a positive impact by others.

Hydrilla provides forage and resting habitat for waterfowl. By maintaining the coverage of hydrilla on Walter F. George Lake to around 2,400 acres as opposed to the 14,600 acres that could eventually occur under the No Action Alternative, a long-term potentially positive benefit to waterfowl would be prevented from being realized. This could be construed as an unavoidable adverse impact that is associated with the recommended plan.

10.0 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Within two to four years of implementation of the Recommended Plan, the effectiveness of grass carp in controlling the spread of hydrilla on Walter F. George Lake should begin to be apparent. In the short term, this should allow the positive habitat benefits of moderate populations of hydrilla to be realized; the lake' highly regarded sport fishery to be maintained; prevent water quality problems that typically occur in dense mats of hydrilla from developing; assure the surface area of the lake remains clear of vegetation obstructions and open for recreation; and maintain the aesthetic appeal of the lake.

While maintaining around 2,400 acres of submersed vegetation within the lake, but preventing hydrilla from expanding to potentially cover 14,600 acres of the lake <10 feet deep (representing over 32% of the lake's surface area), the long-term productivity of the lake would be maintained from an ecological standpoint and would continue to provide an outstanding recreation asset for enjoyment by the public. Should efforts prove to be successful in establishing native submersed aquatic plants, the overall diversity of the lake's plant community would be enhanced and the productivity of the lake improved. Over the 30-year period of analysis, the amount of herbicides released into the environment would gradually diminish as increasing control of hydrilla is gained through the feeding behavior of the grass carp. Of equal importance, potential problems with hydropower generation that can be associated with excessive quantities of vegetation would be avoided. Lastly, the relative value of the numerous private homes located around the lake would not be diminished since the dense mats of hydrilla that could interfere with shoreline access to the lake would not develop.

Since the triploid grass carp that are an essential component of the Recommended Plan would be sterile and incapable of reproduction, this species should not become a permanent member of the drainage basin's fish community and would not disrupt the existing assemblage of fish species within the basin.

These positive benefits can be achieved with essentially no negative environmental effects and at a relatively low average annual cost as shown in Table 2. This will allow increasing amounts of Operations and Maintenance funds to be devoted over the next 30 years to maintaining and enhancing other project assets around the lake. This will allow the overall Walter F. George Project to better satisfy the congressionally authorized purposes for which the Project was constructed.

11.0 COORDINATION

11.1 Early Scoping Discussions

The proposal to release triploid grass carp into Walter F. George Lake has been several years in its development. Serious consideration in using grass carp began in 2004, when it became apparent that continuation of the traditional aquatic plant management program at Walter F. George Lake would not be capable of controlling the spread of hydrilla. As shown in Table 1, even with the increased expenditure in 2006 of well over a half million dollars for herbicides alone, hydrilla continued to spread throughout the lake.

With the understanding that future constraints in the Operations and Maintenance budget would not allow that level of expenditure be to continued, the Corps began to consider the release of grass carp into the lake to control hydrilla and regularly discuss the issue with the natural resources agencies and various public organizations and interest groups. During this period, the success of the triploid grass carp release in Lake Seminole downstream of Walter F. George Lake was closely monitored and the results shared with the agencies and interest groups.

Beginning in the early 2000s, periodic meetings were held with stakeholders having a particular interest in the fishery and overall well being of Walter F. George Lake to discuss the status of hydrilla and the proposal to release triploid grass carp. These discussions culminated with a meeting on January 10, 2007. That meeting was held to present the details of the Integrated Plan that would include the release of triploid grass carp into the lake in combination with the selected application of chemical herbicides to control the expansion of hydrilla and efforts to establish native submersed vegetation. The Corps also explained its intent to evaluate the potential environmental effects of the Integrated Plan in an Environmental Assessment.

The January 10, 2007 meeting was attended by representatives from the following agencies and organization:

- U.S. Fish and Wildlife Service, Eufaula National Refuge
- U.S. Fish and Wildlife Service, Ecological Services Field Office at Fort Benning Georgia
- Georgia Department of Natural Resources
- Alabama Department of Conservation and Natural Resources, Wildlife and Fisheries Division, Fisheries Section
- Alabama B.A.S.S. Federation Nation

At that meeting, the Corps representatives explained that based on the rate that hydrilla had expanded since 2001 despite the increasing use of herbicides, it was believed the opportunity to gain control of hydrilla using the proposed low stocking rate of triploid grass carp was limited to around two years. If the

proposed action was not implemented relatively quickly during the next two years, it was believed the magnitude of the hydrilla problem would increase to the point that eventually much larger numbers of grass carp would be required.

The discussions at the January 10, 2007 meeting were considered in scoping the issues that should be addressed in this Environmental Assessment. The major concerns expressed by the stakeholders over summarized in the following:

- Alternatives to the release of grass carp should be explored, including the use of measures to confine grass carp and/or a drip system to deliver herbicides
- Make sure the stocking rate would not deplete all submersed aquatic vegetation in the lake
- Information on the proposed action should be made available to the public

The attendees concurred in moving forward with the preparation of this Environmental Assessment, with the request that the agencies and public be kept informed of developments with the proposal.

11.2 Public Meetings

Early in the development of the Environmental Assessment, two public meetings were held to present the proposed action to the public, explain the alternatives that would be considered, and to obtain public views on the proposal. The meetings were held in Fort Gaines, Georgia and Eufaula, Alabama on March 19 and 20, 2007, respectively.

A news release announcing the meetings was issued to local media outlets and individual letters were sent to 147 entities within the following categories of stakeholders:

- Environmental Organizations
- Fishing/Recreational Organizations
- State Parks and Marinas
- Walter F. George Lake Advisory Committee Board of Directors
- Chambers of Commerce and Regional Economic Development Organizations
- Houston, Barbour, and Russell Counties in Alabama
- Clay, Quitman, Stewart, and Chattahoochee Counties in Georgia
- Federal Agencies
- State Agencies (Alabama, Georgia, and Florida)
- Navigation Interests
- Media
- Private Organizations/Businesses/Individuals
- Congressional Contacts (Alabama, Georgia, and Florida)

- Indian Tribes

A total of 32 individuals registered at these meetings. The attendees included representatives from the Georgia Department of Natural Resources and the Alabama Wildlife and Fisheries Division; local residents; individuals with second homes on the lake; elected officials; business/commercial interests; a representative of Alabama B.A.S.S. Federation Nation; and a grass carp vendor. All of the comments received expressed concern over the expansion of hydrilla in the lake. The vast majority of comments received favored the release of triploid grass carp, with some suggesting higher stocking densities than contained in the Integrated Plan. Many also supported continuing the application of herbicides, although one commentor opposed the use of chemicals in the lake. A comment was also offered opposing the drawdown of Walter F. George Lake to control hydrilla. Some accused bass fisherman as being responsible for introducing hydrilla into the lake, with the suggestion that those doing so should be penalized. A number of concerns were expressed over the potential for bow fisherman to kill grass carp and suggested that notifications be issued explaining that grass carp should not be targeted during bow fishing tournaments. Others suggested that a more visible public information program should be instituted to explain the seriousness of the hydrilla problem. Appendix A contains detailed information about each meeting and copies of the comments received.

The views received from the public meetings were considered in developing this Environmental Assessment.

11.3 Agency Letters Received

The Georgia Department of Natural Resources (DNR), Wildlife Resources Division, provided a letter on January 22, 2007, at the beginning of work on this Environmental Assessment. That letter recommended that the Corps initiate a stakeholder process to develop support and public consensus over the issue of hydrilla control at Walter F. George Lake. In expressing their concern over the impacts of hydrilla on waterfowl habitat, the sport fishery, and recreational use of the lake, the Georgia DNR believes "…it is also important for the angling and hunting public to have a good understanding of the advantages and disadvantages of any treatment regimes". The public meetings that were held on March 19 and 20 were directed at informing the public about the hydrilla problem on Walter F. George Lake and the alternatives considered to manage this exotic submersed aquatic plant. A diversity of interests was invited to attend, with the meetings being well advertised in the regional media. Appendix A contains more information on the efforts to inform the stakeholders about the hydrilla problem; the recommended plan; and the alternatives considered, as well as the overwhelming positive responses that were received for the recommended plan.

On April 20, 2007, the U.S. Fish and Wildlife Service (USFWS) sent a letter addressing a number of issues. The below lists those issues and explains how

each was considered in the Environmental Assessment and/or in the recommended plan and the alternatives evaluated.

- The USFWS provided websites as sources to obtain information on the lists of protected species and critical habitat. Those sites have been consulted and the pertinent information is summarized in Table 5.

- The recommendation was made that all grass carp released into Walter F. George Lake be tagged and that a telemetry study be conducted to determine the movement of grass carp in and out hydrilla vegetation areas within the lake, as well as movements out of the lake.

  The literature includes a number of studies (Conover, et al, April 2006) that document that grass carp stocked into open systems will move through navigation locks and over dam spillways. Of particular relevance to the proposed action is the telemetry study conducted in the late 1990s on Lake Seminole which is downstream of Walter F. George Lake. That study monitored the movements of a sample of grass carp released into that lake. Subsequent fish collection efforts confirmed that some of the fish released into Lake Seminole did in fact move downstream into the Apalachicola River. This Environmental Assessment acknowledges that some of the grass carp to be released into Walter F. George Lake will exit the lake and move downstream. The impact analyses summarized in Section 7.3 included a "dilution" analysis that identifies a potential density of grass carp that could result if the entire 212,601 acres that are suitable habitat for use by grass carp and which are accessible to the fish within the lower Apalachicola-Chattahoochee-Flint Basin. That analysis concluded that some grass carp will undoubtedly "escape" from Walter F. George Lake. However, the numbers of fish that could escape would be too small to create problems for downstream vegetation, fishery habitat, or to native fish communities. Additionally, since the triploid grass carp stocked into Walter F. George Lake will have average life span of 10 years and an anticipated annual mortality rate of 20%, this should further diminish any problems for downstream areas.

- A number of concerns were expressed over the potential for grass carp to compete with native fish communities over habitat. The impact analyses presented in Section 7.3 addressed those concerns and did not identify any significant impacts to the waterways downstream of Walter F. George Lake.

- A concern was conveyed that the number of grass carp (i.e. 3.3 fish/acre or 8000 total) to be released would be too low to control or reduce the spread of hydrilla and that herbicide treatments would need to be continued, in addition to an initial application of herbicide prior to stocking the grass carp to assist in the effectiveness of grass carp to control hydrilla. The

recommendation was also made that the Corps should contact Jess M. VanDyke with Florida's Invasive Plant Management Division for additional options for hydrilla control.

The proposed action seeks to manage hydrilla growth in Walter F. George Lake, not to eradicate it. To this end, the recommended plan consists of three components: (1) release of triploid grass carp at an initial stocking density of 12 fish/vegetated acre for a total of 13,440 fish to be followed by an additional 3,360 fish that would be stocked at 5- to 7-year intervals for maintenance control; (2) continue application of herbicides with the anticipation that the total area requiring annual treatment would gradually decline over the 30-year period of analysis as grass carp gain increasing control of hydrilla; and (3) implement actions to encourage the establishment of native submersed aquatic plant species as the growth of hydrilla is controlled. An adaptive management approach has been included regarding implementation of the integrated plan (i.e. recommended plan) which addresses annual monitoring of aquatic vegetation to determine the need for, timing and quantity of supplemental stockings of grass carp to achieve the desired level of vegetation management. Close contact was maintained with Mr. VanDyke during development of the alternative methods of hydrilla control that were considered. In particular, Mr. VanDyke's advice and experience was sought in developing the Flow-Assisted Herbicide Delivery System Alternative.

- The extent of the hydrilla infestations within the Eufaula National Wildlife Refuge on Walter F. George Lake was identified and the concern was expressed over the potential for grass carp to consume desirable native vegetation within this area after hydrilla is brought under control. Recommendations were made that pre- and post-vegetative mapping be conducted to monitor the success or failure of the control measure implemented and that native vegetation be established in areas denuded of aquatic vegetation. Finally, the offer was made for the Refuge to assist in recommending the native species that should be used and a schedule for planting.

  The release of triploid grass carp would occur as close as possible to the areas within the lake most heavily infested with hydrilla. The waters included within the Eufaula National Wildlife Refuge would certainly receive some of the fish. Since 2002, the Corps has conducted annual aquatic plant surveys on Walter F. George Lake to monitor the expansion and/or contraction of aquatic plant coverage on the lake, including an identification of the species of aquatic plants encountered. The locations of the aquatic plant communities observed in the field are recorded using GPS equipment. That data is then used to prepare maps that are incorporated as data layers into the GIS maintained of the project's

various resources. This approach allows the expansion and/or decline of hydrilla and other plants within the lake to be monitored from year to year as shown in Figure 10. The recommended plan includes efforts to encourage the establishment of native submersed aquatic vegetation after hydrilla is brought under control. The offer of assistance by the Refuge in identifying appropriate native plants is much appreciated and will be pursued.

- The recommendation was made to close hydrilla infested areas of Walter F. George Lake from boating to prevent propellers from cutting the vegetation and the resulting plant fragments contributing to the spread of hydrilla within the lake. It was also suggested that boat traffic be directed into marked paths that would be treated with herbicides.

  From a project management perspective, this is not a practical option. This approach would add costs to the aquatic plant management program at Walter F. George Lake without providing substantial benefits in return. Merely placing signs would not prevent boaters from using those areas without some level of enforcement also being required. If barriers were installed to prevent boat traffic in specific areas, they must be capable of withstanding the elements that affect the lake. Such barriers would pose a navigation hazard – particularly at night. Preventing the boating and angling public from using portions of the lake would also not be well received. A significant number of the recreational visitations are represented by individuals that regularly boat on the lake. While pleasure boaters will generally try to avoid areas that are heavily infested with aquatic vegetation, many fisherman and most waterfowl hunters will selectively target the heavily vegetated areas. Recognizing this situation, the Corps periodically issues news releases to inform the public of the problems created by hydrilla. The Corps also maintains signs at the public boat ramps encouraging boat owners to clean aquatic vegetation that may be attached to their trailers, engine propellers, and/or live wells before leaving the ramp.

11.4 Review of Draft Environmental Assessment.

The Draft Environmental Assessment (EA) was made available for review by the interested public and agencies on May 1, 2007. A news release was issued on May 1 announcing the availability of the Draft EA in the Eufaula Tribune. In addition, e-mail notices informing of the availability of the Draft EA were sent to 31 entities representing individuals that had requested copies of the Draft EA or are with organizations and agencies having a vested interest in the proposed action. Electronic pdf copies of the Draft EA were made available on the Corps of Engineers Mobile District website: http://www.sam.usace.army.mil/pd/pd1.htm. Lastly, hardcopies of the Draft EA were made available at the Walter F. George Project Office at Fort Gaines,

Georgia, for those individuals not having ready access to a personal computer and/or the internet.

The Draft EA was made available for review for a period of 15 days. The review period ended and all comments were due on May 15, 2007. A comment – response matrix was composed in order to organize all of the comments and the responses to those comments. This matrix, along with copies of the email comments and letter comments can be found in Appendix B.

A total of ten commentors provided comments. Comments were provided by three agencies: the Georgia Department of Natural Resources, Florida Department of Environmental Protection Alabama Department of Conservation and Natural Resources. The Tri Rivers Waterway Development Association and the Eufaula-Barbour County Chamber of Commerce also submitted comments. The remaining five commentors were represented by a representative of academia and four members of the general public.

Of the comments received, six gave their unqualified support for the release of triploid grass carp or any other action to control hydrilla on Walter F. George Lake. The remaining commentors addressed the following wide range of topics:

- Grass carp stocking densities
- Escape of grass carp from Walter F. George Lake
- Potential for grass carp to adversely impact native submersed aquatic plants in Walter F. George Lake
- Importance of maintaining submersed aquatic plants (including hydrilla) in Walter F. George Lake as fish and waterfowl habitat
- Various biological issues
- Questions on long term expansion of hydrilla

No comments were received that would materially alter the impact conclusions presented in the Draft EA. A number of minor revisions were made to the text to respond to specific comments.

12.0 LIST OF PREPARERS

The following individuals were principally involved in the preparation of this Environmental Assessment.

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	Law Clerk EPA Region VIII	1
	Law Clerk Environmental Organizations: Southeast Alaska Conservation Council Center for Biological Diversity	1

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Appendix A

Summary of Public Meetings

Appendix A

Summary of Public Meetings

Introduction

As part of the NEPA process, the public was informed of the U.S. Army Corps of Engineers intent to release grass carp to the Walter F. George Lake. In order to accomplish this task, the Mobile District US Army Corps of Engineers (USACE) issued a news release outlining the hydrilla problem (see Attachments 1, 2, & 3). In this release, the USACE informed the public of two open house style meetings. Additionally the USACE sent out a letter (Attachment 9) to members of a mailing list (Attachment 10) of 147 organizations including:

- Environmental Organizations
- Fishing / Recreational Organizations
- State Parks and Marinas
- Walter F. George Lake Advisory Committee Board of Directors
- Chambers of Commerce and Regional Economic Development Organizations
- Houston, Barbour, and Russell Counties in Alabama
- Clay, Quitman, Stewart, and Chattahoochee Counties in Georgia
- Federal Agencies
- State Agencies (Alabama, Georgia, and Florida)
- Navigation Interests
- Media
- Private Organizations/Businesses/Individuals
- Congressional Contacts (Alabama, Georgia, and Florida)
- Indian Tribes

The first meeting was held on Monday, March 19, 2007 from 5 to 8 p.m. ET at the Walter F. George Resource Managers Office in Fort Gaines, GA. The second meeting was held on Tuesday, March 20, 2007 from 5 to 8 p.m. CT at the Eufaula Community Center in Eufaula, AL. A sign-in table along with a greeter was available at both meetings. Forms at the sign-in table included a public meeting instruction sheet (Attachment 4), an attendee roster (Attachment 5), comment forms (Attachment 6), NEPA handout (Attachment 7), and a fact sheet summarizing the hydrilla problem at Walter F. George Lake (Attachment 8). Key topics were presented on poster displays to convey information and to promote discussion:

- The Hydrilla Problem
- Biology of Hydrilla
- Proposed Action and Alternatives
- Grass Carp
- NEPA Process and Environmental Assessment

A representative of the USACE was present at each station to answer any questions posed by attendees. To encourage comments, a seating area with tables and pens was provided for comfort. It was stressed that the comments must be provided at the close of each meeting in order for them to be considered in the Environmental Assessment.

Fort Gaines, Georgia Meeting

A total of 16 people signed the attendee roster for the Ft. Gaines meeting and there were 25 completed comment forms. Clay and Henry Counties were represented. In some cases, only one representative of each family/group signed in.

All commenters stated that they were local residents, with one also claiming to be an elected official and another to be associated with business/commercial interests.

Twenty-two commenters were in favor of the introduction of sterile grass carp into the Walter F. George Lake. Three people did not comment on whether or not they supported the introduction of sterile grass carp. The majority of those in favor of sterile grass carp were also in favor of herbicides. The Ft. Gaines group was particularly concerned with the impact of fisherman on the lake. Over half of those leaving comments suggested banning bow fishing to protect the carp. Others wanted to penalize bass fishermen for bringing hydrilla into the lake.

Eufaula, Alabama Meeting

A total of 16 people signed the attendee roster and 14 completed comment forms. There were representatives from Barbour, Henry, and Madison Counties, and 1 left no contact info. Some of those in attendance used the lake as a seasonal home, and may have had a different permanent address.

Nine local residents attended the meeting. Whether those checking “local resident” were permanent residents or seasonal residents was indiscernible. One of the local residents was also a grass carp farmer and another was affiliated with an environmental organization. There were two members of a federal agency and one member from a nongovernmental organization. Two commenters left all affiliation boxes blank.

All commenters were in favor of grass carp. Some suggested better publicity of the hydrilla problem. Several people are in favor of any control method the USACE deems fit. One person was opposed to any chemical treatment whatsoever and another was adamantly opposed to Lake Drawdown. Additional suggestions included greater stocking density of grass carp and protection of the grass carp.

Summary of Comments from Public Meetings

A total of 50 individuals attended both meetings. While not all attendees offered comments, some provided multiple comments. All comments received are listed in Table A-1 below, including those which do not appear to be relevant to the hydrilla problem or to the release of grass carp.

There was overwhelming support for grass carp release in the Walter F. George Lake. All in attendance seemed to realize the need for a change in action to control invasive submersed aquatic vegetation. Furthermore, many supporters were concerned that the grass carp be protected from fishermen.

Table A-1
Comment Description and Count from Each Meeting

Comments	Fort Gaines	Eufaula	Total
Support release of sterile grass carp	22	14	34
Concerns about bowfishing/nightfishing	14	1	15
Suggests increased stocking density of grass carp	0	1	1
Protect lake from hydrilla	2	0	2
Concerns about hydrilla re-introduction	1	0	1
Suggest penalizing bass fishermen who bring hydrilla into the lake	5	0	5
Support any measure to control hydrilla	1	5	6
Oppose chemical treatment	0	1	1
Support chemical treatment	13	0	13
Good public forum	0	1	1
Greater public education needed	0	4	4
Opposed to lake draw down	0	1	1
Suggested dredging	0	1	1
Request a no wake zone	1	0	1

Attachment 1

US Army Corps of Engineers
Mobile District

News Release

Release No. 07-12

Contacts: E. Patrick Robbins 251-690-2512
ervin.p.robbins@sam.usace.army.mil

Lisa Coghlan 251-690-2505
lisa.coghlan@sam.usace.army.mil

For Immediate Release:
March 12, 2007

News Release: www.sam.usace.army.mil/pa/

U.S. Army Corps of Engineers sets public meeting for Environmental Assessment on proposed method of controlling invasive plant species at Walter F. George Lake

Mobile, Ala. – The U.S. Army Corps of Engineers will hold two meetings to seek public comments concerning the Environmental Assessment (EA) for the methods to control the spread of hydrilla verticullata, an invasive plant species, in Walter F. George Lake.. The Corps is proposing to release a controlled number of triploid (sterile) grass carp into Walter F. George Lake as one method to control the spread of hydrilla verticillata.

The first meeting will be held on Monday, March 19, from 5 to 8 p.m. EDT at the Walter F. George Resource Managers Office, Fort Gaines, Ga. The second meeting will be on Tuesday, March 20, from 5 to 8 p.m. CDT at the Eufaula Community Center, Eufaula, Ala.

Bill Smallwood, Walter F. George project manager, explained that despite the increasing use of herbicides used to control hydrilla since since it was first detected in the lake in 1993, hydrilla continues to spread in the lake and could eventually cover the lake. However, it is not possible to accurately project how long it would take for that level of plant growth to occur. Nonetheless, if the hydrilla continues to spread across the lake, it could have an adverse impact on hydropower generation, industrial water intakes, water quality, fisheries, recreation, water sports, navigation and fish and wildlife conservation.

-more-

2-2-2-2 U.S. Army Corps of Engineers sets public meeting for Environmental Assessment on proposed method of controlling invasive plant species at Walter F. George Lake

The Corps is evaluating other methods to control the spread of hydrilla besides herbicide applications, such as the use of sterilized triploid grass carp. This Asian native fish has been used in the United States for more than 30 years to control invasive aquatic plant growth in lakes and in ponds. The plant eating carp can grow up to 65 to 80 pounds and live approximately 10 years.

The Corps proposes to release between 7,500 and 10,800 12-inch long triploid or genetically altered grass carp into the lake. These genetically altered fish are not capable of reproducing. Additional triploid grass carp would be released in 7- year intervals, as needed, to continue to control the hydrilla.

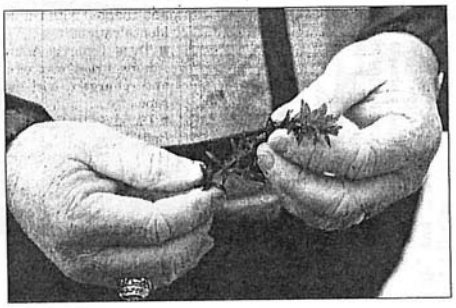
Public comments on the use of trploid grass carp to manage hydrilla growth in Walter F. George Lake will be considered by the Corps in its EA. The EA will analyze the effects of releasing triploid grass carp in Walter F. George Lake as well as effects upstream and downstream of the lake. The EA is expected to be completed this summer.

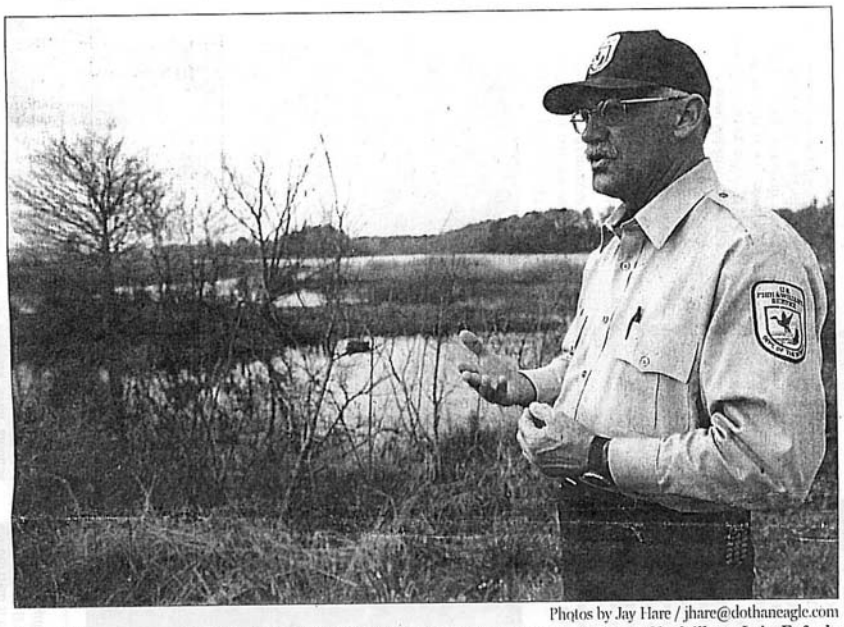
For additional information, contact Bill Smallwood at (229)768-2516 or william.l.smallwood@sam.usace.army.mil or Katie Burge at (251)694-4109 or talmadge.k.burge@us.army.mil).

-30-

Attachment 2

Fighting hydrilla





Photos by Jay Hare / jhare@dothaneagle.com

Rick Silvis, park ranger for the Eufaula National Wildlife Refuge, explains the effects of hydrilla on Lake Eufaula Thursday afternoon. Top photo: Bill Smallwood of the Army Corps of Engineers holds a sprig of hydrilla.

Army Corps of Engineers plans to use fish to control aquatic weed in Lake Eufaula

Peggy Ussery
aussery@dothaneagle.com

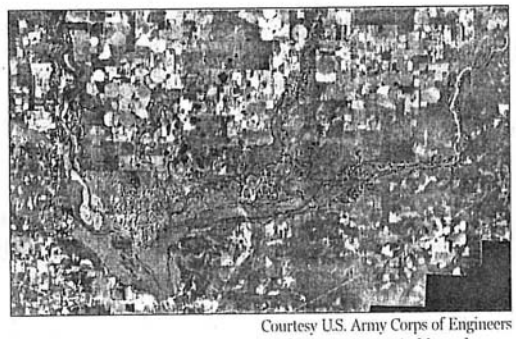
LAKE EUFAULA — Boaters can easily maneuver around the shores of Eufaula National Wildlife Refuge. By mid-summer that will be a different story.

Instead of waters for good fishing, boaters will find thick layers of the aquatic weed hydrilla.

"It will just be like carpet from here to the other side of the bay," park ranger Rick Silvis said while looking out over the lake. " ... It's useful to a point, but when overpopulated that's when the problem comes in because it's not a natural species."

Hydrilla first appeared in Lake Eufaula — or Walter F. George Lake — in 1991. Before 2000, small infestations were treated with herbicide. By 2001, hydrilla covered 120 acres of the northern end of Lake Eufaula. Within five years, the aquatic plant spread over 2,400 acres along the shores of the lake, north and south of Cowikee Creek and around Lakepoint State Park.

See HYDRILLA, 8A



Courtesy U.S. Army Corps of Engineers

Hydrilla plants covering Lake Seminole are represented in red.

The U.S. Army Corps of Engineers will hold two public meetings about its plans to control the aquatic weed hydrilla in Lake Eufaula. The first will be Monday, March 19, from 5 to 8 p.m. EDT at the Walter F. George Resource Manager's Office in Fort Gaines, Ga. The second will be Tuesday, March 20, from 5 to 8 p.m. CDT at the Eufaula Community Center in Eufaula.

Hydrilla

continued from 1A

The U.S. Army Corps of Engineers hopes to stay ahead of the hydrilla by releasing 7,500 to 10,800 grass carp into the lake to eat the hydrilla. The triploid grass carp will be 12 inches long, therefore, they won't be eaten by bass, and will be sterile, unable to reproduce. Plans call for grass carp releases every seven years, as needed.

"We're not looking for a real dramatic effect," said Bill Smallwood, operations project manager for the Corps of Engineers over the Apalachicola, Chattahoochee and Flint rivers. "We're just putting in enough to control."

Still, Smallwood expects opposition from fishermen and environmentalists.

Hydrilla grows from the lake bottom up to the surface. It dies off in colder months, but returns as the water temperature rises. Unlike hyacinth that grows above water, hydrilla can actually grow across the water's surface and form thick mats. Hydrilla, hyacinth and water milfoil are all non-native aquatic weeds found in Lake Eufaula.

While harvesting mechanically or spraying topical herbicides can kill hydrilla, the plant can grow back from fragments that end up in the water.

Bass fishermen like hydrilla because it attracts small bait fish that bass eat. However, when hydrilla gets out of control and grows thick, it will clog boat motors. It can also choke out oxygen and sunlight, running off fish and killing off natural aquatic plants, Silvis said.

"The refuge itself has spent a lot of money on herbicides," Silvis said. "You have to devour the whole plant to kill it."

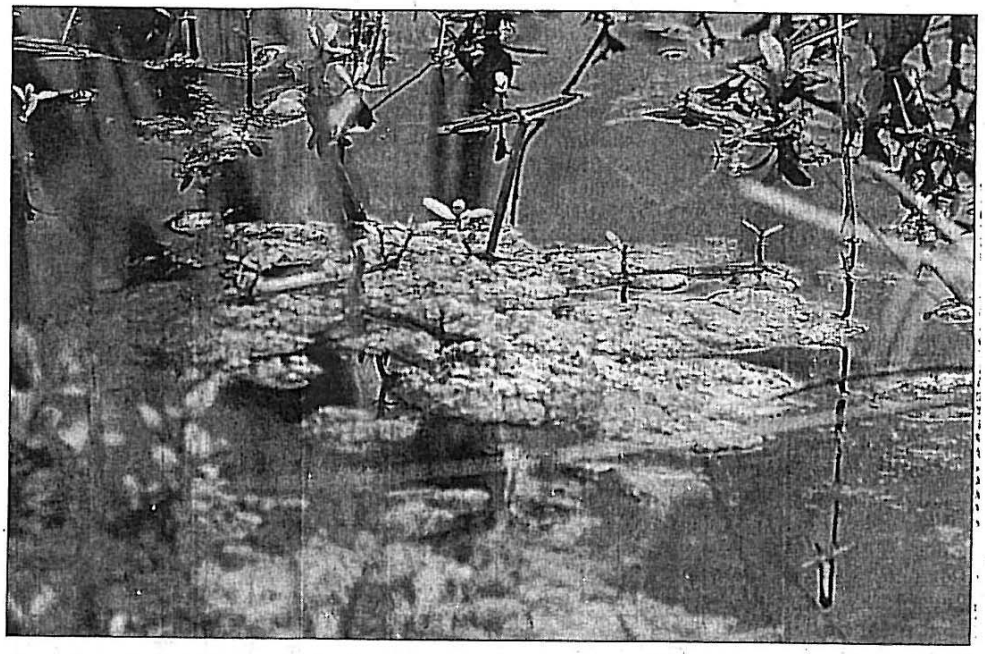
The Army Corps of Engineers spent $400,000 on herbicides in 2004 and another $200,000 in 2005. In 2006, it spent more than $500,000 on herbicide.

If left uncontrolled, Smallwood said hydrilla could have a monetary impact beyond treatment costs. A case in point, he said, is Lake Seminole, located in southwest Georgia. From 1974 to 1993, hydrilla spread from 50 acres to 24,000 acres in Lake Seminole. A hydrilla action plan was put in place in 1994 using state and federal resources. By 2003, the problem seemed to be controllable until new hydrilla types were discovered to be tolerant to the common herbicide used.

As hydrilla grew in Lake Seminole, recreational lake usage dropped and income from the lake with it. Facilities fell into disrepair as money was spent on eradicating hydrilla. And still, the aquatic weed grows in the lake today.

"If we keep taking every penny we've got and pouring it into hydrilla, we're going to go down the same path," Smallwood said.

> *"We're not looking for a real dramatic effect. We're just putting in enough to control."*
>
> **Bill Smallwood**
> operations manager for the Corps of Engineers over the Apalachicola, Chattahoochee and Flint rivers



Jay Hare / jhare@dothaneagle.com

A small patch of hydrilla is shown on the surface of Lake Eufaula. The aquatic plant grows from the bottom of a water body to the surface and can choke out the oxygen that fish need.

Attachment 3

Hydrilla meeting on tap for tonight

The U.S. Army Corps of Engineers will hold a meeting (Tuesday) in Eufaula tonight to seek public comments concerning an environmental assessment (EA) concerning methods to control the spread of hydrilla verticullata.

The Corps is proposing to release triploid (sterile) grass carp into Lake Eufaula to control the spread of hydrilla verticillata. The meeting will be tonight from 5 to 8 p.m. CDT at the Eufaula Community Center.

Interested parties can come at anytime during either of these open-house type meetings. Corps personnel will be available to answer questions and provide information.

There will also be several information displays on the proposal.

Corps officials state if the plant continues to spread across the lake, it could have an adverse impact on hydropower generation, industrial water intakes, water quality, lake fisheries, recreation, navigation, stream flow and fish and wildlife management.

Bill Smallwood, ACF Rivers Project Manager, says that hydrilla was first detected in Walter F. George in 1993, and despite the increasing use of herbicides continues to spread. Smallwood stated that hydrilla could eventually cover over half the lake's surface area, but it is not possible to accurately project how long it would take for that level of plant growth to occur.

The Corps is evaluating other methods to control the spread of hydrilla such as the triploid grass carp. This Asian native fish has been used in the United States for more than 30 years to control aquatic plant growth in lakes and in ponds. The plant eating carp can grow to 65 to 80 pounds and live approximately 10 years.

The Corps proposes to release between 7,500 and 10,800 12-inch long triploid or sterile grass carp into the lake.

These genetically altered fish are not capable of reproducing. Additional triploid grass carp would be released in seven-year intervals.

How to reach us: MAIL: 514 E. Barbour St., Eufaula AL 36027 * PHONE

Attachment 4
Public Meeting Instructions

Welcome to the Public Meeting for the Environmental Assessment that will evaluate the impacts of the proposal to introduce triploid grass carp into Walter F. George Lake. The release of grass carp is proposed to assist in managing hydrilla, an invasive aquatic plant that poses a serious threat to the future use of the lake. The input received from the public will be considered in the preparation of the Environmental Assessment.

Tonight's meeting will be held in an "open house" style. We have found that meetings using this informal approach generally afford the public greater opportunities to interact with the USACE staff most involved in the proposed action. This enhances the public's ability to learn more about the proposed action and to frame those comments they would like to offer for consideration in the decision process.

First, stop at the Information Table to sign in and pick-up the handouts. It is important that you sign in so that we can have a record of your attendance. In addition, you can indicate if you would like to be notified of the availability of the Draft and Final Environmental Assessments. We plan to issue future announcements via e-mail, regular mail, and the news media. Please make sure you give us your e-mail address when you sign in if you would like announcements sent to you electronically. Or let us know if you would prefer to be notified via regular mail.

Then visit the displays in any order that you choose. Numbered displays are placed around the room. Each display focuses on a particular issue related to the proposal to release triploid grass carp into Walter F. George Lake. Personnel are available at each display to elaborate on the information provided in the display and to answer questions. Below is a list of the displays that you can visit:

1. Welcome/Instructions
2. The Hydrilla Problem
3. Biology of Hydrilla
4. Proposed Action and Alternatives
5. Grass Carp
6. NEPA Process and Environmental Assessment
7. Comment Collection Table

Lastly, you can submit any comments you may have on the proposed action at the Comment Collection Table. Please use the comment forms provided at each table. ***All comments must be provided in writing before you leave the meeting so that they may be considered in the Environmental Assessment.*** We need your comments provided at the meeting because of the accelerated schedule under which we are working to complete the Environmental Assessment. Our goal is to complete the environmental analyses as soon as possible in order to take advantage of the cooler water temperatures that would enhance the survivability of released grass carp should that alternative be selected as the approved plan.

Attachment 5
Attendee Roster

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake
(Please print clearly)

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: _____

Organization: _____

Address: _____

City, State, Zip code: _____

Phone: _____

E-mail: _____

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: _____

Organization: _____

Address: _____

City, State, Zip code: _____

Phone: _____

E-mail: _____

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: _____

Organization: _____

Address: _____

City, State, Zip code: _____

Phone: _____

E-mail: _____

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: _____

Organization: _____

Address: _____

City, State, Zip code: _____

Phone: _____

E-mail: _____

Attachment 6
Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

□ Local Resident □ Elected Official □ Industry/Commercial
□ State Agency □ Native America Tribe □ Nongovernmental Organization □ Local Agency □ Business/Commercial Interest □ Academic Institution
□ Federal Agency □ Environmental Organization □ Other _____

II. Demographic Information

*Name(optional)*_ _*County*_ *Address*
_
*City*
*State* _*Zipcode*_

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

_
_
_
_
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_

See reverse side to continue

Attachment 7

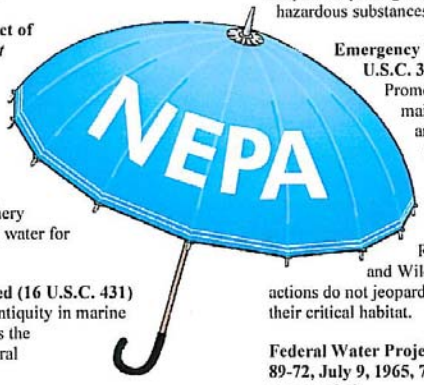
US Army Corps of Engineers
Mobile District

What's covered under the NEPA umbrella?

The National Environmental Policy Act, Public Law 91-190 (NEPA)

Requires Federal agencies to consider impacts on the human environment from proposed actions and document environmental impacts during project planning. The Council on Environmental Quality (CEQ) regulations [40 CFR Parts 1500-1508] and Engineering Regulation 200-2-2 [33 CFR 230] govern how NEPA is implemented by the Corps.

The NEPA process provides a framework for compliance with other environmental statutory requirements. A list describing the most commonly applicable laws and policies for water resource projects is provided below.



Anadromous Fish Conservation Act of 1965, as amended (16 U.S.C. 757 *et seq.*) (AFC)
Authorizes the Secretary of Commerce and the Secretary of the Interior to enter into cooperative agreements with States and other non-Federal interests for the conservation, development, and enhancement of the anadromous fishery (those that migrate from salt to fresh water for spawning) resources of the U.S.

Antiquities Act of 1906, as amended (16 U.S.C. 431)
Regulates salvage of any object of antiquity in marine protected areas in which the U.S. has the authority to protect submerged cultural resources.

Archeological and Historical Preservation Act (16 U.S.C. 469)
Requires federal agencies to identify and recover data from archeological sites threatened by their actions.

Archeological Resources Protection Act (16 U.S.C. 470aa-470ll)
Requires permits and provides for civil and criminal penalties for persons disturbing archeological resources on Federal and Tribal land without a permit.

Clean Air Act (42 U.S.C. 7401) (CAA)
Requires agencies to comply with State air quality standards set in State Implementation Plans.

Clean Water Act (33 U.S.C. 1251 *et seq.*); also known as the Federal Water Pollution Control Act of 1972 (CWA)
Protects, restores, and enhances the quality of the nation's waters.

Coastal Barrier Resources Act of 1982 (16 U.S.C. 3501-3510)
Protects undeveloped coastal barriers and related areas by prohibiting direct or indirect Federal funding of various projects in these areas that might support development.

Coastal Zone Management Act (Public Law 92-583, 16 U.S.C. 1451-1456) (CZMA)
Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs.

Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601-9675) (CERCLA)
Requires reporting of releases and cleanup of releases of hazardous substances; also assigns liability for cleanup.

Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901-3932)
Promotes the conservation of wetlands to maintain the public benefits they provide, and to fulfill international obligations contained in various migratory bird treaties and conventions.

Endangered Species Act (16 U.S.C. 1531) (ESA)
Requires consultation with the U.S. Fish and Wildlife Service (USFWS) to ensure that actions do not jeopardize threatened or endangered species or their critical habitat.

Federal Water Project Recreation Act of 1965 (Public Law 89-72, July 9, 1965, 79 Stat. 213; 16 U.S.C. 4601-12 *et seq.*), as amended
Requires Federal agencies to consider potential outdoor recreational opportunities and fish and wildlife enhancement when planning navigation, flood control, reclamation, hydroelectric, or multipurpose water resource projects.

Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 01/03/95) (FWCA)
Requires consultation with the USFWS on actions affecting stream modifications.

Flood Control Act of 1944, as amended (16 U.S.C. 460)
Authorizes the U.S. Army Corps of Engineers (Corps) to construct, maintain, and operate public park and recreational facilities at water resource development projects.

Food Security Act of 1985 (16 U.S.C. 3811 *et seq.*)
Denies Federal farm program benefits to producers who converted wetlands after December 23, 1985 and creates a system for inadvertent violations allowing farmers to regain lost Federal benefits if they restore converted wetlands.

Historic Sites Act of 1935 (16 U.S.C. 461)
Provides for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes.

Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267; 16 U.S.C. 1801)
Requires Federal agencies to notify National Oceanic and Atmospheric Administration (NOAA) Fisheries regarding a proposed action that may adversely affect Essential Fish Habitat (EFH).

Migratory Bird Treaty Act (16 U.S.C. 701-719c)
Decreed that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected.

National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq.*) and amendments of 1980 (16 U.S.C. 469a) (NHPA)
Requires agencies to identify historic properties subject to effect by their actions, and to consult with the State Historic Preservation Officer and others about alternatives and mitigation.

Native American Graves Protection and Repatriation Act (25 U.S.C. 3001)
Provides protection of Native American graves and for other purposes including to clarify the right of ownership of artifacts.

Reservoir Salvage Act of 1960, as amended (16 U.S.C. 469)
Gives the National Park Service (NPS) major responsibility for preservation of archaeological data that might be lost specifically through dam construction.

Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901-6992k) (RCRA)
Regulates the collection, storage, transport, and disposal of hazardous and solid waste and regulates underground storage tanks.

Rivers and Harbors Act of 1888 (33 U.S.C. 608); of 1899 (33 U.S.C. 401-413); as amended and supplemented (33 U.S.C. 426 *et seq.*)
Corps is authorized to regulate the construction of any structure or work within navigable waters. Further amendments and supplements prohibit the construction of any bridge, dam, dike or causeway over or in navigable waterways of the U.S. without Congressional approval and provide that storage may be included for present and future municipal or industrial water supply in Corps or U.S. Bureau of Reclamation projects.

Safe Drinking Water Act (Public Law 93-523; 42 U.S.C. 300f – j-10) (SDWA)
Protects the quality of drinking water the public receives from public water systems.

Water Resources Development Act of 1986, as amended 1988, 1990, 1992, 1995, and 1996 (Public Law 99-662; 33 U.S.C. 2201-2330,)
Provides for the conservation and development of water and related resources and the improvement and rehabilitation of the nation's water resources infrastructure.

Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001
Provides for cooperation with State and local constituents for the purpose of preventing erosion, floodwater, and sediment damages in the watersheds of the rivers and streams of the U.S. and furthering the conservation, development, utilization, and disposal of water and the conservation and utilization of land thereby preserving, protecting, and improving the nation's land and water resources and the quality of the environment.

Water Pollution Control Act Amendments of 1961 (Public Law 87-88)
Requires Federal agencies to consider, during the planning for any reservoir, storage to regulate streamflow for the purpose of water quality control.

EO 11514: Protection and Enhancement of Environmental Quality
Federal agencies shall initiate measures needed to direct their policies, plans, and programs so as to meet national environmental goals. The CEQ, through the Chairman, shall advise and assist the President in leading this national effort.

EO 11988: Floodplain Management
Directs all Federal agencies to avoid, if possible, development and other activities in the 100-year base floodplain.

EO 11990: Protection of Wetlands
Directs all Federal agencies to avoid, if possible, adverse effects on wetlands and to preserve and enhance the natural and beneficial values of wetlands.

EO 12088: Federal Compliance with Pollution Control Standards
Delegates responsibility to the head of each executive agency for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution.

EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Environmental Justice)
Requires each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

EO 13045: Protection of Children from Environmental Health Risks and Safety Risks
Requires each Federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

EO 13175: Consultation and Coordination with Indian Tribal Governments
In formulating or implementing policies that have Tribal implications, requires agencies to consult with Tribal officials regarding the need for Federal standards and any alternatives that would limit the scope of Federal standards or otherwise preserve the prerogatives and authority of Indian Tribes.

Attachment 8
Fact Sheet
Hydrilla in Walter F. George Lake

Hydrilla is a non-native, submersed (i.e. underwater) plant that was introduced into the U.S. in the 1950s. Hydrilla has since spread throughout the country and now occurs in at least 30 states. Hydrilla is a very adaptable plant and is capable of thriving in a variety of aquatic habitats. The plant has a rapid rate of growth and can extend to depths of 20 feet.

Hydrilla tends to produce thick surface mats of vegetation that can severely restrict waterborne recreation activities and adversely affect water quality and fisheries. Excessive plant growths can also interfere with hydroelectric power generation and create problems for municipal and industrial water intakes.

Typical of many exotic invasive plant species, there are no natural native enemies to hydrilla in the U.S. This fact, combined with hydrilla's rapid growth rate, its ability to out compete native submersed aquatic plants, and the relatively long growing season in our southern States, poses significant problems for large multipurpose reservoirs that have extensive shallow areas like Walter F. George Lake.

Lake Seminole which is only 50 miles down river from Walter F. George Lake provides an example of the problems that can be created by hydrilla. Hydrilla was first detected in Lake Seminole in 1967. By 1992 (a period of 25 years) hydrilla had become the dominant submersed aquatic plant, covering 53% of that lake's surface area. This prompted the USACE to modify its aquatic plant management program to improve control of hydrilla in specific areas of the lake. Today, the hydrilla coverage has been reduced to 42% on Lake Seminole and the USACE has gained control of hydrilla around the priority areas on the lake. Despite these improvements, the remaining abundance of hydrilla on Lake Seminole is still a concern from a lake management standpoint and requires constant attention to maintain this problem plant under control.

Hydrilla was first discovered in Walter F. George Lake in 1993. As of 2006, 2400 acres of the lake was covered in submersed aquatic plants, with hydrilla being the dominant member of the submersed aquatic plant community. Hydrilla poses a serious future threat to infest the 14,600 acres of the lake having depths <10 feet (32% of surface area). Hydrilla could also become established in areas of the lake with depths >10 feet.

To respond to the expanding hydrilla problem in Walter F. George Lake, the USACE dramatically increased the herbicide treatment program. Before 2002, less than $10,000 was spent each year on herbicides. Since 2002, annual expenditures have increased, with $545,789 being spent in 2006 on herbicides alone. That amount does not include labor, fuels, and other costs required to apply the herbicides.

(Over)

Despite the USACE's increased efforts to control the spread of hydrilla using herbicides, the hydrilla-dominated submersed aquatic plant community has continued to expand. During the five-year period between 2002 and 2006, the coverage of submersed aquatic plants increased from 252 acres to 2,400 acres.

The USACE is very concerned over the potential for hydrilla to continue to expand in the lake and to adversely affect recreational activities, hydroelectric power generation, water quality, fisheries, and the commercial interests in the region that depend upon the lake. In addition, it will not be possible for the USACE to continue to support the amounts expended on herbicides over the last five years due to overall budget constraints. For these reasons, the USACE believes the aquatic plant management program for Walter F. George Lake must be modified before the spread of hydrilla makes it even more difficult to control this invasive plant. The USACE believes that the use of grass carp offers great potential to assist in the control of hydrilla in Walter F. George Lake.

Attachment 9

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

March 9, 2007

REPLY TO
ATTENTION OF
Inland Environment Team
Planning and Environmental Division

To Whom It May Concern:

The U.S. Army Corps of Engineers (Corps), Mobile District has developed a proposal to improve hydrilla control at Walter F. George Lake on the Chattahoochee River, Alabama and George. Hydrilla is a non-native submersed aquatic plant that has the potential to spread throughout the lake. If not controlled, hydrilla could eventually cover up to 57% of the lake's total surface area of 45,181 acres, extending to depths as great as 20 feet. That level of plant growth would severely restrict all project purposes, including hydropower generation, navigation, recreation, and fish and wildlife.

The major objective of the improved hydrilla control activities would be to maintain the area of the lake covered by hydrilla to less than 2,400 acres within a three-year period. The preferred plan to achieve that level of control consists of the following components:

- Continue the existing herbicide treatment program to clear excessive hydrilla growths from Corps operations facilities and recreation areas and other high priority sites around the lake.
- Release triploid (i.e. sterile) grass carp in the lake to consume hydrilla. Since triploid grass carp are sterile, re-stocking at reduced levels would be required at 7-year intervals to assure that an appropriate number of fish are maintained in the lake.
- Encourage the establishment of desirable native aquatic plants to provide habitat for fish and wildlife.

The Corps, Mobile District is preparing an Environmental Assessment to analyze the anticipated environmental effects associated with the preferred plan and the alternatives considered to accomplish improved hydrilla control. Two meetings will be held to provide the public an opportunity to learn more about the proposed action and to offer comments for consideration. The meetings will be held at the following locations and times.

- March 19, 2007, 5 pm to 8 pm EDT at the Walter F. George Resource Managers Office in Fort Gaines, Georgia
- March 20, 2007, 5 pm to 8 pm CDT at the Eufaula Community Center in Eufaula, Alabama.

Please contact the Resource Site Office at (229) 768-2516 should you have any questions in advance of the meetings, or contact Ms. Katie Burge at (251)694-4109 or via e-mail at talmadge.k.burge@us.army.mil regarding the Environmental Assessment.

Sincerely,

Kenneth P. Bradley
Chief, Environment and Resources
Branch

Attachment 10
Stakeholders Mailing List
for
Walter F. George Lake Grass Carp Introduction
Environmental Assessment

Environmental Organizations:

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Mr. Jim Phillips
Chattahoochee Riverkeeper
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Abbeville, AL 36310

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Judge J. T. Harpe
Henry County Commission
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Attachment 11
Attendee Rosters and Comment Forms

Attendee Roster

March 19, 2007 Fort Gaines, Georgia Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☐ I would like to be notified of the availability of the Draft Environmental Assessment

Name: Pam Ward

Organization:

Address:

City, State, Zip code:

Phone:

E-mail:

☐ I would like to be notified of the availability of the Draft Environmental Assessment

Name: Raymond Morris

Organization: Riverside Tree

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Attendee Roster

March 19, 2007 Fort Gaines, Georgia Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☑ I would like to be notified of the availability of the Draft Draft Environmental Assessment

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City, State, Zip code: Fort Gaines, Ga. 39851
Phone: 229-883-6000 (Phone)
E-mail: TPellicano@PellicanoCompany.Com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Tom Hornek
Organization:
Address: 130 Griffith Dr.
City, State, Zip code: Ft. Gaines GA
Phone: 768-2017
E-mail: See Above

☑ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Richard Gilbert
Organization: Homeowner
Address: 140 Griffith Dr
City, State, Zip code: Fort Gaines Ga.
Phone: 768-2699 39851
E-mail:

Attendee Roster

March 19, 2007 Fort Gaines, Georgia Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☒ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: DAVID MARNHAM
Organization: N/A
Address: 1591 LAKEFRONT
City, State, Zip code: 36310
Phone: 334-805-3977
E-mail: BIG DOC MD @ HOT MAIL.COM.

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: BILL Koch
Organization:
Address:
City, State, Zip code:
Phone:
E-mail:

☒ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Pam Monfort
Organization:
Address: 132 Griffith Dr
City, State, Zip code: Ft Gaines 39851
Phone: 229 768 3393
E-mail: pmonfort@windstream.net

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Richard Rachel Gellert
Organization:
Address: 140 Griffith Dr
City, State, Zip code: Ft Gaines 39851
Phone: 768-2679
E-mail: Rack1942@Hot Mail

Attendee Roster

March 19, 2007 Fort Gaines, Georgia Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☒ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Bill Gleaton
Organization: President of Ft. Gaines Lion Club
Address: 146 Countryland Rd.
City, State, Zip code: Georgetown, GA 39854
Phone:
E-mail:

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Barbara Phillips
Organization:
Address: 32 East Lake Dr
City, State, Zip code: Georgetown GA 39854
Phone: 229-768-3232
E-mail:

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Roy Collick
Organization:
Address: 2 East Lake Dr.
City, State, Zip code: Georgetown GA 39854
Phone: 229 768 3628
E-mail:

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Ken Weathers
Organization: AL W&F
Address: 3520 Plaza Dr.
City, State, Zip code: Enterprise, AL 36330
Phone: (334) 347-9467
E-mail: ken.weathers@dcnr.alabama.gov

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Judy Johnson *County* Clay

Address 164 Whitfield Dr.

(Sandy Bottom)

City Ft. Gaines *State* Ga. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Please put grass carp in lake and continue spraying

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) HAL GLEATON *County* CLAY
Address 32 LAKE POINT DR
City FT. GAINES *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Cordination of ST. with bow fishing
what will that do to CARP?!

Chemicals

We have call game warden to
stop the night fishing as they were
shocking anything in the water-
Even to threating me with the bow.

Bass Club bringing in hydrilla:
Should be stopped

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Rockett Richard Gilbert *County* Clay
Address 140 Gridsith Dr.
(Randolph Branch)
City Fort Gaines *State* Ga. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Please put the carp and chemical as cut dock is infested with hydrilla and please do not allow any grow fishing and a no-wake zone would be nice; also Bass Devils should pay a hefty tax (2000) for contributing to the hydrilla problem.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Terry Marlow *County* Clay
Address 146 Whitsett Dr.
(Sandy Branch)
City Ft. Gaines *State* Ga. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Absolutely not in the grass carp area. please do not release outside bow fishing on the lake - Restrict areas that contain Hydrella as our area contains lots & lots of Hydrella

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Tony Pellicane County Clay
Address 165 Griffith Dr.
City Fort Gaines State Ga. Zipcode 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Introducing Grass Carp is more cost effective than chemical treatment with little environmental impact. I believe for the program to work some lake rules & regulations need to be applied

1.) Outlaw present bow fishing for Carp

2.) Fine anyone found guilty of intentionally putting Hydrilla into the lake ($10,000+)

3.) Fine anyone taking carp from the lake Protect the Carp so they can do their job

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Sylvia Dowding *County* Clay
Address 320 Jenny Lynn Lane
City Georgetown *State* GA *Zipcode* 39854

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

- Will the grass carp be protected from "Poachers" or nite fisherman that shock the fish
- Is the introduction of Hydrilla in the future going to be addressed

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Ray Collier *County* Clay

Address 2 Eastlake Dr.

City Georgetown *State* GA. *Zipcode* 39854

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Need to put Grass Carp in the Effected Areas, in large Numbers

Spray with herbicide to help control the spread.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- [x] Local Resident
- [ ] State Agency
- [ ] Local Agency
- [ ] Federal Agency
- [x] Elected Official
- [ ] Native America Tribe
- [ ] Business/Commercial Interest
- [ ] Environmental Organization
- [ ] Industry/Commercial
- [x] Nongovernmental Organization
- [ ] Academic Institution
- [ ] Other _____

II. Demographic Information

Name(optional) CLAUDE COOK *County* CLAY

Address P.O. BOX 205

City FORT GAINES *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Encourage lake front property owners to get permits to apply herbicides in their area

Continue the grass carp program and evaluate its effect

Continue herbicide program

Keep boaters aware of going from infected area to other parts of the lake

Open house meeting seemed to be very effective

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other Boating contrib.

II. Demographic Information

Name(optional) Bobby Phillips *County* _____

Address 314 Eufaula Dr

City Georgetown *State* GA. *Zipcode* 39854

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

1) Grass Carp.
2) Herbicide
3)

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) TOM HORNER *County* CLAY

Address 130 GRIFFITH DR.

City FT. GAINES *State* GA. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

SUGGEST USING GRASS CARP IN ADDITION TO CHEMICAL SPRAYING AS MONIES ALLOW. (I LIVE IN SANDY BRANCH AREA OF LAKE)

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Phil Monfort *County* Clay
Address 132 Griffith Dr.

City Ft. Gaines *State* Ga. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I support the introduction of the White Amur Carp to assist in the control of our Hydrilla problem.

My concern is the people that blow fish for carp. What affect this could have in the future

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) KEN PENUEL *County* CLAY

Address PO BOX 7

City Fort Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Please PROTECT The lake
KEEP HYDRILLA OUT!

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Donald Anthony *County* CLAY
Address 7 Oaky Knoll Rd.
City FORT GAINES *State* GA. *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

WE FEEL that Hydrilla control on W.F. G. + Seminole are essential. WE HAVE SEEN THE SUCCESS OF the SPRAY PROGRAM, but have been informed OF THE VERY high cost + budget controls. WE ARE ASKING that the CORPS. go with the GRASS CARP PROGRAM.

PLEASE consider ASKING ALA. + GA. to MAKE IT ILLEGAL for Bow + Arrow Fisherman to TAKE the GRASS CARP

See reverse side to continue

Email lebald@hughes.net

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Linda Anthony *County* Clay

Address 7 Pinky Knoll Rd

City Ft Gaines *State* Ga *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I am very concerned that hydrilla will overtake the lake in our area. I am in favor of the use of grass carp to control infestation, but hope there will be restriction on how fishers —

E-mail — lebe@hughes.net
GEBA12@hughes.NET

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ Elected Official
- ☐ Industry/Commercial
- ☐ State Agency
- ☐ Native America Tribe
- ☐ Nongovernmental Organization
- ☐ Local Agency
- ☐ Business/Commercial Interest
- ☐ Academic Institution
- ☐ Federal Agency
- ☐ Environmental Organization
- ☐ Other _____

II. Demographic Information

Name(optional) Dianne Hornet *County* Clay
Address 130 Griffith Dr

City Fort Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

We need help! I think we should continue to spray and to put carp fish and anything else that will help. I am very concerned and will spray around my dock.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☑ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☑ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) RAYMOND MORRIS *County* CLAY

Address ~~[illegible]~~ 90 POYA POINT

City FT GAINES *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

The hydrilla needs to be controlled on Walter F George, the growth of infested areas has been very rapid. ~~[illegible]~~ Grass Carp and Chemical control is good. Please appropriate enough funds to do the job efficiently.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) DR. DAVID MARKHAM *County* HENRY
Address 1591 LAKE FRONT DR.

City ABBEVILLE *State* AL *Zipcode* 36310
Phone 334-805-2977, 334-793-5085

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I am completely in agreement c̄ the Corps plan to control Hydrilla in Walter F. George. I would be willing to contribute money or do any other activity to assist the Corps in its efforts. Thank you very much for your help with this matter.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ Elected Official
- ☐ Industry/Commercial
- ☐ State Agency
- ☐ Native America Tribe
- ☐ Nongovernmental Organization
- ☐ Local Agency
- ☐ Business/Commercial Interest
- ☐ Academic Institution
- ☐ Federal Agency
- ☐ Environmental Organization
- ☐ Other _____

II. Demographic Information

Name(optional) Tony & Christine Jones *County* Clay

Address 31 Lake Point Dr.

City Ft Gaines *State* Ga *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Please put grass carp & protect them stop bow hunting & chemicals

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- [x] Local Resident
- [ ] State Agency
- [ ] Local Agency
- [ ] Federal Agency
- [ ] Elected Official
- [ ] Native America Tribe
- [ ] Business/Commercial Interest
- [ ] Environmental Organization
- [ ] Industry/Commercial
- [ ] Nongovernmental Organization
- [ ] Academic Institution
- [ ] Other _____

II. Demographic Information

Name(optional) PAM MONFORT *County* Clay
Address 132 Griffith Dr
(Sandy Branch)
City Ft Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Absolutely in favor of Grass Carp distributed in especially cove's in the lake

Concern about night bow-fishing & would like to see that banned through out the lake

We have witnessed the big boats who have large lights to shine out the fish, then they would "shoot" the fish &/or shoot them (bass, carp, gators, frogs, etc.)

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- [x] Local Resident
- [ ] State Agency
- [ ] Local Agency
- [ ] Federal Agency
- [ ] Elected Official
- [ ] Native America Tribe
- [ ] Business/Commercial Interest
- [ ] Environmental Organization
- [ ] Industry/Commercial
- [ ] Nongovernmental Organization
- [ ] Academic Institution
- [ ] Other _____

II. Demographic Information

Name(optional) Jerry Conley *County* Clay
Address 113 Griffith Dr
City Ft. Davis *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Put grass carp in the lake
Spray herbicide
Stop low-fishing to protect
the carp

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Monda Mathis *County* Clay

Address Credille's Mill

City Ft Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Put grass carp in the lake + continue to spray herbicide to kill it

Stop the bow-fishing completely - they would be killing the carp

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- [x] Local Resident
- [ ] State Agency
- [ ] Local Agency
- [ ] Federal Agency
- [ ] Elected Official
- [ ] Native America Tribe
- [ ] Business/Commercial Interest
- [ ] Environmental Organization
- [ ] Industry/Commercial
- [ ] Nongovernmental Organization
- [ ] Academic Institution
- [ ] Other _____

II. Demographic Information

Name(optional) Denver E. Short *County* Clay

Address 165 Griffith Drive

City Ft. Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Absoultely IN-Favor of grass carp to be put in the lake as well as to continue herbicide spraying as the infestation has already taken hold all around my dock this year (Mar. 2007)

Would like to see night bow-fishing banned completely & punishable to the fullest extent of the law - It is completely un-sportsman-like

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Polly Davis *County* Clay
Address 33 Lake Point Dr
City Ft Gaines *State* Ga *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

We would like GRASS CARP + Chemicals
No hunting Bow

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Carolyn Mleaton *County* Clay
Address 32 Lake Point Dr.
City Ft. Gaines *State* GA *Zipcode* 39851

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Carp in our area Sandy Branch without Bowfishing to destroy them.

We would also like to see chemicals in our area.

We have been in the dark observing them shock fish, Turtle, + Frogs + anything else. Needs to stop

Bass Clubs being in hydrilla stop them.

See reverse side to continue

Attendee Roster

March 20, 2007 Eufaula, Alabama Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Buddy + Gloria Buie
Organization: Homeowner
Address: 729 Doctors Point RD
City, State, Zip code: Abbeville 36310
Phone: 334-585-9126
E-mail: G.J Buie@mac.com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Lee & Delyna Zell
Organization:
Address: 2815 Argyle Rd
City, State, Zip code: B'ham AL 35213
Phone: 205-933-0158
E-mail: Delyna.Zell@LFG.com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Jim Howard
Organization: AL B.A.S.S. Federation Nation
Address: 501 Five Mile Rd.
City, State, Zip code: Eufaula AL 36027
Phone: 334-616-1918
E-mail: ALCONDIR@AOL.com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Blanche Faulk
Organization: Retired
Address: 359 Calhoun Dr.
City, State, Zip code: Abbeville AL 36310
Phone: 334-687-9180
E-mail:

Attendee Roster

March 20, 2007 Eufaula, Alabama Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: DANNY MOSS
Organization: US FISH + WILDLIFE SERVICE
Address: 367 HWY 165
City, State, Zip code: EUFAULA, AL 36027
Phone: 334-687-4065
E-mail: Daniel_Moss@fws.gov

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: RICK SILVIS
Organization: U.S FWS
Address: EUFAULA NWR
City, State, Zip code:
Phone: 687-4065
E-mail: Ricky-Silvis@FWS.GOV

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Ken Weathers
Organization: AL Wildlife + Freshwater Fisheries
Address: 3520 Plaza Drive
City, State, Zip code: Enterprise, AL 36330
Phone: (334) 347-9467
E-mail: Ken.Weathers@dcnr.alabama.gov

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Dalynn Zell
Organization:
Address: 1176 Lakeshore Drive
City, State, Zip code: Abbeville, AL 3
Phone: 334-585-2107
E-mail:

Attendee Roster

March 20, 2007 Eufaula, Alabama Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Fred T. Wilson

Organization: —

Address: Eufaula Independent

City, State, Zip code: Winter only

Phone: —

E-mail: —

☑ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Harry J. Goggins

Organization:

Address: 1936 Country Club Rd

City, State, Zip code: Eufaula 36027

Phone: 334-687-4558

E-mail: HGoggins@BellSouth.Net

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Jim Davidson

Organization: Property owner

Address: 107 Chowdown Drive

City, State, Zip code: Eufaula AL 36027

Phone: 334 687-5387

E-mail: jandjard@bellsouth.net

☑ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: David M. Dingwall

Organization:

Address: 715 N. Eufaula

City, State, Zip code: Eufaula, AL 36027

Phone: 334-616-0683

E-mail: davidlongwall@eufaula.rr.com

Attendee Roster

March 20, 2007 Eufaula, Alabama Public Meeting

Environmental Assessment: Introduction of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

(Please print clearly)

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Sheila A. Silvis
Organization: FWS
Address: PO Box 12
City, State, Zip code: Eufaula, AL 36027
Phone: 334/687.1774
E-mail: sheila-silvis@yahoo.com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: David Motley
Organization:
Address: 527 Hicks Lane
City, State, Zip code: Eufaula, AL. 36027
Phone: 334 687 9718
E-mail:

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: William B. Lanier
Organization: [illegible]
Address: 674 Lanier Mill Rd.
City, State, Zip code: Clio, AL 36017
Phone: (334) 397-4437
E-mail: W BernardL.com

☐ I would like to be notified of the availability of the Draft Draft Environmental Assessment

Name: Mary Beth & Dennis Fineout
Organization: Citizen
Address: 404 Woodlawn Dr.
City, State, Zip code: Eufaula, AL 36027
Phone: 334-687-1967
E-mail: dfineout@yahoo.com

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☒ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Jim Howard *County* Barbour

Address _____

_____

City _____ *State* _____ *Zipcode* _____

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Move as quickly as possible getting carp in the lake.

See reverse side to continue

Enfield

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) David Mottley *County* Barbour
Address 527 Hicks Lane

City Eufaula *State* AL *Zipcode* 36027

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

am in favor of grass carp release - could have been much cheaper cut grass in small lakes almost completely.

Would be good to put a color picture of hydrilla in local paper - Most people could have looked! to dont know what it looks like.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☑ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) William B. Eastburling *County* Barbour

Address 674 Eastburling Mill Rd.

City Clio *State* Al *Zipcode* 36017

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

We have produced the triploid grass carp since 1985. We have stocked ponds in many areas of the nation. It's a very desirable tool for the Corps to acquire land problems.

See reverse side to continue

Eufaula

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) DENNIS FINEOUT *County* BARBOUR

Address 404 WOODLAWN

City EUFAULA *State* AL *Zipcode* 36027

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

THANK YOU FOR PRESENTING THE SITUATION AND OPTIONS.

IF GRASS CARP RELEASED, MAKE IT ILLEGAL TO CATCH THEM; MAKES NO SENSE TO BUY THEM AND HAVE LOCAL FISHERMEN CATCH THEM, SOMEBODY WILL DO THIS. WE SUPPORT THIS IDEA.

DO NOT LOWER LAKE LEVEL; THIS WOULD SHUT DOWN ALL CAMPGROUNDS AND SUPPORTING BUSINESSES.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☒ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) [illegible] *County* Barbour

Address 715 N. Eufaula

City Eufaula *State* AL *Zipcode* 36027

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Totally support your program — we need to inform more people of the situation.

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☑ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) HARRY I GOODRINS *County* BARBOUR

Address 1936 COUNTRY CLUB ROAD

City EUFAULA *State* ALA *Zipcode* 36027

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I am highly in Favor of Putting Grass Carp in the Lake to Control The Hydrilla spread.

I Feel the General Public is not aware of the Hydrilla Rapid Growth Nor with the advent of the BASS Resort it will have on the economy of the Entire Lake Area -

I Suggest more Publicity Best Now??

See reverse side to continue

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) DeLynn Zell *County* Henry

Address 1176 Lakefront Dr

City ~~Eufaula~~ Abbeville *State* AL *Zipcode* 3

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Please do all possible as quickly as possible. Stock as many Carp as needed to control the hydrilla

See reverse side to continue

Eufaula

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☑ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Rick Silvis *County* Barbour

Address P.O. Box 912

City Eufaula *State* Al *Zipcode* 36027

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Excellent Public Forum; support use of weed carp.

See reverse side to continue

Eufaula

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
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- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Buck Earnest *County* Barbour

Address 1112 Doren Dr Eufaula

City _____ *State* _____ *Zipcode* _____

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I recommend the use of the carp but the proposed number seems to be low. The results should be closely monitored and additional fish stocked if warranted. This should not be the only arrow in the quiver. All other effective measures should be used as well. Keeping the Hydrilla at current levels would be a real success story. ~~Do~~ I don't believe the acreages could be reduced without a very costly program. Continued information to the public is important as well since public opinion can help the program.

See reverse side to continue

Eufaula

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☐ Local Resident
- ☐ Elected Official
- ☐ Industry/Commercial
- ☐ State Agency
- ☐ Native America Tribe
- ☐ Nongovernmental Organization
- ☐ Local Agency
- ☐ Business/Commercial Interest
- ☐ Academic Institution
- ☒ Federal Agency
- ☐ Environmental Organization
- ☒ Other _____

II. Demographic Information

Name(optional) Sheila Silvis *County* Barbour

Address POB 912

Eufaula, AL 36027

City _____ *State* _____ *Zipcode* _____

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I agree wholeheartedly with the introduction of the grass carp to help control the hydrilla problem @ Lake Eufaula. I disagree with chemical introduction especially into waterways. The fully reasonable action, in my opinion is to introduce the grass carp.

See reverse side to continue

Enfield

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Lee Zell *County* Madison Co

Address 2815 Argyle Rd

City B'ham *State* AL *Zipcode* 35213

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

We're in favor of veterasing Carp to protect our property. Do ALL Necessary to control the hydrilla

See reverse side to continue

Eufaula

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

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- ☐ Local Agency
- ☐ Federal Agency
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- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) _____ *County* _____

Address _____

_____

City _____ *State* _____ *Zipcode* _____

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Yes, we are in favor of releasing carp AS soon as possible!

Also do anything else necessary to preserve the recreational use of this lake.

See reverse side to continue

Enfank

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

- ☑ Local Resident
- ☐ State Agency
- ☐ Local Agency
- ☐ Federal Agency
- ☐ Elected Official
- ☐ Native America Tribe
- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Blanche Faulk *County* Henry
Address 259 Calhoun Dr.
Abbeville
City Abbeville *State* Al *Zipcode* 36310

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

I feel that anything that the Corps of Engineers can do to control hydrilla. I approve of it. I am a property owner on the lake and feel that if the hydrilla is not controlled, it will have a neg. effect on the community.

See reverse side to continue

Enfield

Comment Form

The U.S. Army Corps of Engineers, Mobile District, welcomes your input on the issues and concerns that should be addressed in the Environmental Assessment evaluating the proposal to improve hydrilla control at Walter F. George Lake. Please complete this form and submit it before you leave the Public Meeting.

I. Please check the affiliation that best represents your interest in Walter F. George Lake.

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- ☐ Local Agency
- ☐ Federal Agency
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- ☐ Business/Commercial Interest
- ☐ Environmental Organization
- ☐ Industry/Commercial
- ☐ Nongovernmental Organization
- ☐ Academic Institution
- ☐ Other _____

II. Demographic Information

Name(optional) Buddy Bwie *County* Henry
Address 729 Doctors Point RD

City Abbeville *State* AL *Zipcode* 36310

III. Please summarize your comments on the proposed action below. If you need additional space, attach an additional Comment Form.

Support Carp release proposal
& Any other measures to help
control Hydrilla

See reverse side to continue

APPENDIX B

Coordination of Draft Environmental Assessment

Gerald Anderson
106 Ridgewood Lane
Eufaula, AL 36027

May 7, 2007

Department of Army, US Army Corps of Engineers
Attn: CESAM-PD-EI
P.O. Box 2288
Mobile, AL 36628-0001

Re: Hydrilla Management

Gentlemen:

I am writing as a private citizen to express my concern over the Hydrilla infestation problem that is rapidly spreading in the Walter F. George Lake.

I have boated on Lake Seminole and have witnessed the terrible problems they are having there, even though serious attempts have been, and are being made, to control it. It is imperative that we do not let this happen to our lake.

I strongly support the plan of releasing sterile carp in areas of WFG which have been invaded by hydrilla. Fortunately, the growth has been somewhat limited here, but I feel we must act quickly to limit future growth or we will be in the same serious situation as Lake Seminole.

Recreational water sports and fishing on Lake Walter F. George are an important part of our local tourist economy, not to mention that further infestation could seriously damage our chances for future development of areas around the lake.

I thank you in advance for your assistance in expediting the start of the sterile carp release program.

Sincerely,

Gerald Anderson

-----Original Message-----
From: Keith Phillips
Sent: Friday, May 11, 2007 9:10 AM
To: CESAM-PD-EA SAM
Subject: Public Comment on Release of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake

Dear Sirs,

I am a resident of Eufaula, Alabama who lives on Walter F. George Lake. My family thoroughly enjoys being on the lake and everything it has to offer from gorgeous sunrises to catching bream with a six year old little boy.

I have had the opportunity to review the Draft Environmental Assessment related to the release of the carp for control of hydrilla. I am sending this email in strong support favoring the release of these carp into the lake. Based on the information in the report the necessary funding to continue battling the hydrilla via a chemical control method is not and most likely will not be available again. The plan outlined using the triploid carp appears to be the most cost effective and sensible method available with such limited funding.

In closing I wish to re-iterate my support of releasing the triploid carp into Walter F. George Lake for the purpose of controlling the ever growing problem of hydrilla.

Sincerely,

Keith Phillips

Suzanne Sweetser

From: Eubanks, Michael J SAM [Michael.J.Eubanks@sam.usace.army.mil]
Sent: Friday, May 04, 2007 11:37 AM
To: Glen Coffee; Suzanne Sweetser; Smallwood, William L SAM; Morgan, Donald M SAM
Cc: Burge, Talmadge K SAM
Subject: First Email Comment on Draft EA

Date: May 4, 2007

To: Department of Army, US Army Corp of Engineers

Attn. CESAM-PD-EI

P. O. Box 2288

Mobile, AL 36628-0001

From: Billy V. Houston

Executive Director

Tri River Waterways Development Association (TRWDA)

630 East Broad St.

Eufaula, AL. 36027

334-688-1000

E-mail: bhoustonacf@bellsouth.net

TRWDA was formed in 1960 to promote inland waterway commerce and navigation and sound economic development within communities adjacent to the ACF waterways. Its members draw primarily from state, county, and municipal governments, economic development entities, businesses, industries, and individuals in Southeast AL, Southwest Georgia, and Northwest FL.

TRWDA's members share a common desire to utilize and benefit from the federally authorized ACF navigation project and its effective development to improve the quality of life in the ACF Basin and the Southeast Region.

TRWDA's members see a serious threat to our waterway system on the ACF, by the growth and rapid spread of the dangerous and destructive invasive aquatic plant, Hydrilla in the Walter F. George Lake.

Thus we concur with the decision to try to limit the growth of this plant by releasing of triploid (sterile) grass carp on areas in Walter F. George Lake which have been invaded by this aquatic plant. I have been to three presentations given by ACF Operations Project Manager for ACF, Bill Smallwood, on this subject and am well versed as to benefit and possible harm this release of grass carp could have on our lake. Thus I feel very strongly that the potential benefit of containing and slowing the growth of hydrilla by use of a sterile grass carp is needed and needed immediately. If not applied in next few months, I am concerned the growth of hydrilla will have a more serious HARMFUL consequence for our lake for water quality, navigating the lake, recreation, water sports, fish and wild life conservation, developments on lake, and industrial water intakes.

Thank you for allowing TRWDA an opportunity to respond to this serious problem and hope that action will not be long. This problem needs controlling and needs it immediately. If further information is needed from TRWDA please call or I will be available to meet with other officials concerning this environmental assessment.

Billy V. Houston

Executive Director

TRWDA,

Noel Holcomb, Commissioner
Dan Forster, Director

Georgia Department of Natural Resources
Wildlife Resources Division

2070 U.S. Highway 278, S.E., Social Circle, Georgia 30025
(770) 918-6400

May 15, 2007

Commander Peter F. Taylor, Jr.
United States Army Corps of Engineers, Mobile District
Attention: PD-EI
Post Office Box 2288
Mobile, Alabama 36628-0001

Dear Commander Taylor:

Thank you for the opportunity to review the Environmental Assessment for Release of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake, Alabama and Georgia. We understand that hydrilla is an aggressive non-native plant with the potential to cause significant resource user effects. We support your proactive approach to develop a hydrilla management plan before plant coverage reaches critical levels. The following are our general comments on the draft Environmental Assessment (EA). Detailed comments are attached.

As recognized in Section 11.3 of the EA, the Georgia Department of Natural Resources (DNR), Wildlife Resources Division provided a letter on January 22, 2007, recommending that the Corps initiate a stakeholder process to develop support and public consensus over the issue of hydrilla control at Walter F. George Lake. We do not believe the current draft EA review process provides the appropriate stakeholder review opportunities by providing a 15-day comment period for a 195-page document. Although two public meetings were held, one in Georgia (the USACOE resource office) and one in Eufaula, AL, there was little opportunity for those outside the immediate area to attend. Both meetings were held on weekday afternoons and evenings when some people may not have been able to attend. We recommend using a stakeholder process similar to the one your agency used to develop the Lake Seminole, Spring Creek arm hydrilla control plan.

We agree with the plan that elimination of hydrilla should not be the project goal as this could preclude establishment of native aquatic vegetation too. Aquatic plants provide complex habitat in the reservoir and at intermediate to low levels is beneficial to the existing fishery and wildlife. We cannot support any individual option without proper and thorough public opportunity for input, but we understand the rationale behind the integrated approach. However, a drip system approach should be considered in the future if treatment methods advance so as to practically allow for selective hydrilla control in Walter F. George.

There are beneficial aspects of hydrilla for waterfowl use. Submerged aquatic vegetation is one extremely important type of food for wintering waterfowl in the southern United States (Montalbano et al. 1979, Johnson and Montalbano 1984, Benedict and Hepp 2000, Dick et al. 2004). Hydrilla appears to be quite beneficial to waterfowl (Gasaway et al. 1977, Montalbano et al. 1979,

Johnson and Montalbano 1984, Johnson and Montalbano 1989). Hydrilla was the most important food plant by volume and by frequency of occurrence in a central Florida study (Montalbano et al. 1979) and was the most preferred plant community by waterfowl in Fisheating Bay, Lake Okeechobee, Florida (Johnson and Montalbano 1984). In addition to those published reports, recent research at Lake Seminole has shown that hydrilla is the preferred habitat type by waterfowl (DNR Annual Reports, unpubl. data).

The loss of submerged aquatic vegetation, like hydrilla, has been shown to affect migratory waterfowl use and distribution. For example, targeted hydrilla control on Lake Wales, Florida, led to reduced ring-necked duck and canvasback use of the lake (Gasaway et al. 1977). In the DNR study at Lake Seminole, hydrilla control in the Spring Creek arm of Lake Seminole did not affect the number of wintering waterfowl on the reservoir, but it did impact their distribution. Fewer ducks used the Spring Creek arm of the reservoir after treatment. Instead, they seemed to have moved downstream into the Flint River area of the reservoir where hydrilla was still readily available. Pre-treatment, 23% of the observed ducks were in Spring Creek, but after hydrilla control began, only 10% of the observed ducks were in Spring Creek (DNR Annual Report, unpubl. data). Hydrilla is also an important waterfowl food, and reducing hydrilla will have a definite impact on waterfowl use, either in numbers of waterfowl present or in their distribution.

If the project moves forward as proposed, we believe that a 30-year time period is too long to await an evaluation where stakeholders may provide comment on the progress of vegetation management. The Corps recommends a 30-year period based on projections from six data points and a linear rate of expansion. A linear expansion is likely not realistic and six data points provide little confidence for vegetation progression. The Corps suggests a geometric rate of increase could potentially leave the reservoir covered in hydrilla at the 10-foot contour in as little as nine years. Therefore, we recommend the project be conducted for a period of nine years. At the conclusion of the period, stakeholder input will be required and the Corps will be given operational flexibility to adaptively manage hydrilla treatment.

The Georgia DNR will continue to work with the U.S.Corps of Engineers on the development of the best course of action for dealing with the expanding hydrilla problem. Our staff is always available to discuss these matters. If you have any questions, please contact Fisheries Management Section Regional Supervisor Rob Weller or Fisheries Biologist John Kilpatrick at our Albany Office (229-430-4256).

Sincerely,

Dan Forster

DF/kdr

Detailed Comments on the Environmental Assessment for Release of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake, Alabama and Georgia

Page 15, line 3. Depth is not the limiting factor, light penetration and substrate is more important.

Page 16, line 25. Six data points lack the statistical power accurately project to 30 years. We recommend changing the time line for the project analysis to nine years. A project reevaluation with the opportunity for public input can again be performed at that time.

Page 16, line 21-23. The proposed integrated plan falls far short of past annual expenditures. While we recognize the need for financial responsibility, we feel that cutting vegetation treatment expenditures by almost 90% (average of $280,000/year to $68,048/year) is extreme. We recommend a higher financial commitment to native vegetation establishment and research of the effects of grass carp introductions.

Page 18, line 35. Provide a rough estimate of the cost for an electric barrier at the lock, hydropower turbine intakes, and dam spillway areas.

Page 22, lines 27-. Also provide comment on fish habitat loss. Existing vegetation may be considered beneficial for fish habitat. Drawdown would also eliminate native and desirable vegetation.

Page 27, line 20. If dye studies should be conducted, who is going to conduct them, when will the studies be conducted, and who will do the research?

Page 30. Paragraph 2 suggests that native plants would primarily be encouraged by controlling the spread of hydrilla, where paragraph 3 states that “large portions of the lake having depths sufficient to support submersed aquatic plants are still devoid of vegetation”. Therefore, controlling the spread of hydrilla is not likely to encourage spread of native vegetation in the reservoir.

Page 30. Paragraph 2. The third component of the Integrated Plan “involves encouraging native aquatic plants to become established in areas of the lake having depths <10 feet”. We agree that wave energy, flow conditions, and periodic high turbidity levels may not be conducive to plant growth. At times and at different rates in different sections of the reservoir, conditions will not be conducive to hydrilla growth either. Furthermore, the entire 10-foot contour will likely not be inhabited by hydrilla, as the document suggests numerous times, due to flow and substrate characteristics of the reservoir.

Page 30. Paragraph 4 describes potential budgetary commitments for native plant promotion in the reservoir. In a 45,000-acre reservoir, $10,000 for three years ($0.22/acre), $5,000 to year 10 ($0.11/acre), and $2000 thereafter ($0.04/acre) is grossly inadequate to accomplish any significant improvements in native submerged aquatic vegetation. A definable and measurable goal should be set for where, how much, and what type of vegetation is desired. Most fisheries

managers would suggest a 10-30% coverage with submerged aquatic vegetation (SAV) to be desirable to fish populations. Additionally, suggested stocking rates of grass carp may lead to some consumption of native plants, especially during conditions unfavorable to hydrilla production (high flow, high turbidity, increased wave action, etc.).

Page 31, line 2. Reference what experience and research the document refers to.

Page 31, paragraph 3. Twelve fish per vegetated acre may prove adequate during ideal growth conditions of hydrilla but may be excessive during conditions not conducive to SAV production. Additionally, stocked grass carp may not randomly distribute.

Page 38, paragraph 1. Because of the stated potential for vegetation to increase to cover the 10-foot contour, the project should be reevaluated in 9 years (see previous comment). After 9 years, stakeholders should be allowed to reevaluate the effectiveness of the proposed vegetation management plan and the Corps will be afforded the flexibility to continue with previous management or explore other options.

Page 42, line 21. DNR also stocks Walter F. George with striped bass.

Page 43, paragraph 2. Food webs are complex and may be different in different systems. Maceina et al. (1992) found that, following grass carp introductions into Lake Conroe, Texas, transparency decreased, but numbers of cladocerans decreased while numbers of rotifers increased. The primary pelagic forage species, gizzard and threadfin shad, may experience a decline in pelagic habitat with increased SAV in Walter F. George. High levels of SAV that may reduce the numbers of gizzard and threadfin shad would also reduce the growth of hybrid striped bass, white bass, and striped bass in the reservoir. However, it will likely favor production and possibly growth of redear sunfish and bluegill and thus facilitate a diet shift for largemouth bass.

Page 43, line 20. We know of no direct link between water clarity and forage fish (clupeids) in Walter F. George reservoir.

Page 43, line 23. Spotted bass are in Lake Seminole, which has an abundance of SAV. If there is a shift in Walter F. George from a largemouth dominated community, it will be unclear whether or not hydrilla is to blame.

Page 43, line 31-32. At 14,600 acres covered, 32% of the reservoir would be vegetated. At the current density (about 40% coverage within hydrilla stands), about 13% of the reservoir would be fully vegetated. This would likely not reduce the largemouth population in the reservoir. It would more likely have a negative effect upon the pelagic community (*Morone* and *Dorosoma* spp).

Page 43. Grass carp will not stay confined to the seven county reach surrounding Walter F. George and may migrate both upstream and downstream, and in and out of tributaries of the Chattahoochee and Flint Rivers. Species potentially impacted by reductions in aquatic macrophytes include, to name a few, pygmy sunfishes, native centrarchids, and the redeye chub. There is a very low probability that grass carp migrating upstream may encounter and consume

the state endangered Spider lily.

Page 46, line 23. Define "good water clarity".

Page 46, lines 42-43. Provide reference for the statement "This shift would result in a smaller biomass of forage base due to the higher energy conversion factor of centrachids compared to shad".

Page 48, last paragraph. See previous comment on forage abundance. It would be more accurate to say there would be a loss of pelagic habitat in the reservoir. At 32% coverage (the 10-foot contour), shad would not be eliminated from the reservoir and would still provide an important nutrient source for bass, and would still be the primary forage for crappie, and *Morone* species. Overall shad biomass, however, would likely be reduced leading to a possible reduced biomass in crappie and *Morone* species.

Page 50, lines 26-27. We agree with this statement. However, for the same reason, there are areas within Walter F. George's 10-foot contour that may not experience hydrilla infestations.

Page 55, paragraph 2. There are potential negative effects of carp moving downstream to Lake Seminole: Using data from the U.S. Fish and Wildlife Service (2001), waterfowl hunting provides a good economic boost to the Lake Seminole area:

- We estimate that approximately 1,850 waterfowl hunters hunt on Lake Seminole and hunt waterfowl for an average of 8 days per hunter.

- Based on a GADNR statewide survey of small game hunters the average small game hunter spends about $50 per day. Using this per hunter expenditure, we can estimate that waterfowl hunters on Lake Seminole would spend about $740,000 per season.

Lake Seminole holds the largest inland concentration of wintering waterfowl in Georgia. The majority of the ducks at Lake Seminole are diving ducks, especially ring-necked ducks and canvasbacks. Aerial surveys show an average peak concentration of over 5,000 ducks on Lake Seminole during the winter. If the grass carp released at Lake W. F. George escaped into the Chattahoochee River and moved southward into Lake Seminole, the impacts could be significant. Decreases in the coverage of submerged aquatic vegetation (hydrilla and native species) would reduce the carrying capacity of the lake for waterfowl, and would reduce its attractiveness to waterfowl. Lake Seminole holds a relatively large portion of the canvasbacks wintering in the Atlantic Flyway. Between 2001 and 2005, Georgia had the fourth largest average canvasback harvest in the Atlantic Flyway, behind MD and VA (Chesapeake Bay) and New York (Long Island Sound) (USFWS harvest report 2006). These harvest figures show the relative importance of Lake Seminole for wintering canvasbacks.

Page 55, lines 22-23. It is not known that hydrilla *will* cover 14,600 acres.

Page 59, line 43. We agree that many people in the area practice subsistence fishing. In southwest Georgia, there is a paucity of opportunities that exist now for bank anglers.

There would be a strong community benefit for the creation and maintenance of one or several additional fishing piers. Savings realized from the integrated plan suggested could free monies to be used for creation of additional fishing opportunities.

Page 69, lines 25-39. The draft EA report indicates that grass carp prefer hydrilla, but lists muskgrass and pondweeds as their second and third choices. Pondweeds, muskgrass, and wild celery are well documented as important waterfowl food plants (Martin et al. 1951, Bartonek and Hickey 1982, Korschgen et al. 1988, Payne 1992). The reduction of submerged aquatic vegetation (both native and exotic) by the grass carp likely will have negative impacts on waterfowl habitat and waterfowl hunting opportunity within the lake. As the coverage of hydrilla in Lake W. F. George is reduced, the carp would have no other option than to select muskgrass and pondweeds, and reductions in submerged aquatic vegetation has been documented to effect waterfowl numbers and foraging activity (Jorde et al. 1995). Johnson and Montalbano (1989) state that close scrutiny and oversight of stocking programs are necessary to insure that grass carp are not introduced into aquatic systems providing important waterfowl habitat. Bellrose (1980) identified a major migration corridor extending southward along the Chattahoochee River that crosses both Lake W. F. George and Lake Seminole. These areas definitely provide important waterfowl habitat.

Page 70, paragraph 2. Lake Conroe used 74 fish per vegetated acre (30/acre). This proved detrimental to the fishery as it removed virtually all submerged aquatic vegetation from the reservoir.

Page 70, lines 13-19. Success or “favorable” in Santee Cooper may be a matter of opinion. Many anglers were upset with vegetation “management” and felt their input was not sought. Additionally, many anglers do not feel that elimination of hydrilla is a favorable objective. Additionally, once the hydrilla was removed from the lake, waterfowl use of the lake drastically declined (T. Strange, ret. SCDNR Waterfowl Biologist, pers. comm.). Georgia DNR wished the Corps would avoid the same mistake on Walter F. George and make a broad effort to seek public opinion, understanding, and possible consensus before proceeding with vegetation management.

Page 70, lines 21-28. Twenty to 22 fish per vegetated acre is likely too high to maintain existing SAV. Additionally, these rates may eliminate desirable native SAV, especially during years that do not favor the growth of hydrilla. If food becomes limiting, grass carp may be found to consume desirable native SAV. Results of grass carp release may be reversible, but consequences could last 5-6 years and substantial economic losses to local communities may occur. Potential damages to fishery stocks by removal of all vegetation could be realized for 6-8 years or more. For instance, largemouth bass recruitment may be detrimentally impacted by the removing 100% of SAV.

Page 70, line 38. Add Lake Seminole.

Page 71, line 1. Alligators are not likely to have a large impact on grass carp populations. Ospreys may predate on some, but are not likely to have a large impact either.

Page 71, lines 24-30. The “dilution” effect assumes equal distribution of escaped fish. In reality,

Lake Seminole represents more desirable habitat for grass carp than many areas of the Chattahoochee River and a disproportional number of fish could be expected to reside there.

Page 74, line 14-28. If stocked, we recommend a conservative and incremental approach to vegetation management via grass carp. Therefore, we believe that the rate of 10 fish per vegetated acre be used instead of the 15 fish per vegetated acre. Exceeding target vegetation control to the point of elimination or reduction in desired vegetation may be reversible in the long-term (over 30 year period), but the longevity of grass carp dictates that any negative effects may last for more than 6-8 years.

Page 76, lines 18-22. See previous comments. Largemouth bass could provide a benefit from increased hydrilla in the reservoir. The centrarchid forage base would likely increase, providing a diverse prey base for largemouth. As hydrilla stands occupy more of the reservoir, pelagic habitat for pelagic predators such as hybrid striped bass and pelagic prey such as gizzard and threadfin shad would be reduced, thereby potentially limiting their biomass.

Page 96. The importance of native vegetation establishment and encouragement needs to be mentioned here.

Page 98, section 11.2. The Georgia Department of Natural Resources Wildlife Resources Division (WRD) had recommended the United States Army Corps of Engineers initiate a stakeholder process to develop support and public consensus over the issue of hydrilla control prior to the implementation of an EA. Although stakeholder involvement is an integral process of an EA, we desired angling groups and stakeholders be made aware of the hydrilla problem and potential remedies prior to any formal process. Two public meetings, each of which was located at the reservoir on successive evenings, are inadequate to reach a large number of stakeholders. This was evident by only 32 people registering attendance. The angling constituency visiting Walter F. George is from a much larger geographical area, which represents important economic benefit to communities in the vicinity of the reservoir. Meeting announcements made available to only local media outlets did not give anglers from outside the immediate area the chance to comment on the hydrilla plan.

Page 100, lines 8-12. We support the recommendation that all grass carp to be released to be tagged and a telemetry study be conducted. This information will prove important for future adaptive management and could save time and money in the future.

Page 102, lines 27-28. Because it represents quality resources to fishermen and hunters, vegetation stands should be encouraged in areas not detrimental to homeowners. This also underlines the importance of establishment, maintenance, and encouragement of native vegetation stands.

Page A-2, 4th paragraph. A tagging / telemetry study could help to identify if bow fishing will be a concern. Most fish harvested by bow fishermen are large and are no longer consuming the amount of vegetation that medium-sized fish do.

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-----Original Message-----
From: David Markham [mailto:bigdocmd@hotmail.com]
Sent: Monday, May 07, 2007 11:11 AM
To: CESAM-PD-EA SAM
Subject: triploid carp

Please release the carp and also take any additional steps to control the hydrilla.

Thank you
David Markham,M.D.

The Eufaula Tribune

05/08/2007

Grass carp key to hydrilla control

By: Ed Trainor, rtrainor@eufaulatribune.com

The aggressive growth of hydrilla in Lake Eufuaula was the subject of Bill Smallwood's presentation to the Rotary Club of Eufaula last week.
Smallwood, U.S. Army Corps of Engineers project manager on Lake Eufaula, told Rotarians that the local hydrilla infestation has grown from just 100 acres in 2001 to between 2,400 and 2,800 acres today.

Advertisement

Called the perfect aquatic weed by researchers, Hydrilla is a submersed plant that can grow to the surface and form dense mats. Hydrilla stems are slender, branched and up to 25 feet long.

Hydrilla's small leaves are strap-like and pointed. They grow in whorls of four to eight around the stem. The leaf margins are distinctly saw-toothed. Hydrilla often has one or more sharp teeth along the length of the leaf mid-rib.

Hydrilla produces tiny white flowers on long stalks. It also produces 1/4 inch turions at the leaf axils and potato-like tubers attached to the roots in the mud.

Native to the warm inland waters of Asia, the plant was discovered in the United States in 1960.

A report from The Center for Aquatic Plants at the University of Florida published in 1996 states the following about hydrilla:

A highly specialized growth habit, physiological characteristics, and reproduction make this plant well adapted to life in submersed freshwater environments.

Consequently, hydrilla has spread rapidly through portions of the United States and become a serious weed. Where the plant occurs, it causes substantial economic hardships, interferes with various water uses, displaces native aquatic plant communities, and adversely impacts freshwater habitats. Management techniques have been developed, but sufficient funding is not available to stop the spread of the plant or implement optimum management programs.

Educational efforts to increase public and political awareness of problems associated with this weed and the need for adequate funding to manage it are necessary.

According to Smallwoood, a recently completed study of the Hydrilla problem in Lake Eufaula considered a number of alternatives to fight the spread of the weed. Smallwood told Rotarians that treatment with herbicides can be effective but costly with $300,00 to $400,000 already invested in this process.

He noted that mechanical harvesting of the weed (cutting it down) doesn't work because fragments that float away settle to the lake bottom and restart growth. The weed does have a natural enemy in the grass carp a fish that feeds on the plant and is capable of eating large quanities of the hydrilla.

Smallwood supports a plan to stock the grass carp and hopes to see the recommendation of stocking grass carp at the rate of 12 fish per acre, about 14,000 fish mainly in the north and south segments of Lake Eufuala. Smallwood said grass carp can grow to 80 lbs and have a lifespan of up to 10 years.

"They can eat up to their weight in Hydrilla every day," said Smallwood. He said fears that the lake would be overrun by grass carp are unfounded because the fish that will be stocked are made sterile to avoid unwanted reproduction of the species.

Smallwood said the integrated plan developed to address the hydrilla problem includes the grass carp, limited treatment with herbicides and support for native plants. "This is our time to keep the impact down," Smallwood said.

Details of the Corps of Engineeers proposal are available in a 197-page document that will be made public this week.

Smallwood encourages interested parties to become familiar with the proposal and offer their input when public hearings on the issue are convened.

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Opening Doors for Buyers and Sellers

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From: VanDyke, Jess [mailto:Jess.VanDyke@dep.state.fl.us]
Sent: Monday, May 14, 2007 4:40 PM
To: cesam-pd-ea@sam.usace.army.mil
Subject: Comments on EA for Hydrilla Control on WFG

"Close contact was maintained with Mr. VanDyke during development of the alternative methods of hydrilla control that were considered. In particular, Mr. VanDyke's advice and experience was sought in developing the Flow-Assisted Herbicide Delivery System Alternative." . . . *but did anyone listen*?

1. The EA exaggerates the negative impact of Aquathol on native plants:

"Endothall is **indiscriminate** in its killing effects on all species of submersed aquatic plants."

"Although the effectiveness of endothall as a contact herbicide is **almost absolute** within the areas treated . . . "

"By **killing essentially all submersed aquatic plants** within this portion of the lake . . ."

"The **elimination of essentially all submersed aquatic** vegetation within the 10,460acres treated shown on Figure 14 would be detrimental to both fishery and waterfowl resources."

My experience is that Aquathol can be used to selectively kill hydrilla from many native, submersed plants, e.g. naiad, coontail, Vallisneria, and Chara. These native plants are more abundant on the Wakulla River after seven treatments with Aquathol in the last five years.

2. The EA aims too high with the flow-assisted treatment size in order to make it seem impractical:

"It is estimated that 2,280 acres of hydrilla would be treated by this alternative, at a total annual cost of $1,202,000."

Yes, that is totally impractical, so we eliminate the option?

"The heaviest infestations are centered around the Cowikee Creek embayment near the Lakepoint Resort State Park."

Start small. If there is sufficient flow, try introducing Aquathol at the 431 bridge next to the marina at 2 ppm/48 hrs and see what happens. I think you'll be pleasantly surprised. If so, expand the process.

3.The EA downplays the impact of additional grass carp in the Apalachicola Bay System:

“The release of triploid grass carp into Walter F. George Lake and the escape of some of these fish to downstream areas will add to the numbers of grass carp in the waterways in the lower basin, including Apalachicola River and Apalachicola Bay that have escaped from prior releases made at other locations.”

“ . . . their effect on the submersed aquatic vegetation should be negligible.”

“ . . . the numbers of escaped fish would be “diluted” to the point that they would not create problems for downstream native vegetation.”

“ . . . densities shown in Table 11 would not pose a threat to the ecosystems or to the aquatic vegetation downstream of Walter F. George Dam.”

That is wishful thinking, given that the current number of grass carp downstream is unknown and submersed vegetation is already scarce in the Apalachicola Bay System. I can’t help but think of the Trinity River debacle. What happens when the hydrilla continues to expand in the face of the initial stocking? More grass carp will be added to WFG and the emergent vegetation of the Apalachicola Bay System will fade. Your dilution theory doesn’t work with powerful, schooling, riverine fish.

“Executive Order 11990 requires Federal agencies to take actions to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in managing Federal lands and facilities.”

Follow Executive Order 11990. I guess I can’t stop the use of uncontained grass carp upstream of one of America’s best preserved estuaries, but I can urge you to be cautious. You will be under political pressure to add grass carp until the hydrilla is virtually gone. If you succumb, the wetlands downstream will surely suffer. Jess

Jess M. Van Dyke
NW FL Regional Biologist
DEP/ Invasive Plant Mgt
3900 Commonwealth Blvd (MS710)
Tallahassee, FL 32399

W: 850/ 245-2831
F: 850/ 245-2834

From: VanDyke, Jess
Sent: Monday, April 23, 2007 2:56 PM
To: 'Morgan, Donald M SAM'
Cc: Smallwood, William L SAM; Eubanks, Michael J SAM; Dharmen SETARAM; Netherland, Michael D ERDC-EL-MS
Subject: RE: Flow Assisted Treatment WFG

Hi Don, Here are my comments: Overall, it seemed somewhat negative. At Wakulla Springs, I have been pleasantly surprised with an Aquathol Drip System, both by the efficacy on hydrilla and

by the increase in the abundance of native plants. In short, I think it's worth a try, esp. on a prototype basis, like Cowikee Creek.

Specifics comments:

1. "The flow-assisted delivery system would be employed twice each year, in May and August . . ." << I recommend an annual treatment in May. Treating in August can be tricky from a dissolved oxygen standpoint. The hydrilla will senesce in the fall, anyway, and visitation will decline in the cooler months. The major users in the fall/winter are likely to be duck hunters who wouldn't mind some hydrilla. >>

2. "However, the effectiveness of endothall . . . is almost absolute within the treatment areas, killing essentially all submersed aquatic plants . . ." << That is not my experience at Wakulla Springs. After 7 treatments, Naiad has become very abundant. Pondweed, though initially hard hit, recovers well after every treatment and has actually expanded. Chara and Vallisneria are widespread. Egeria has not taken off, as feared. Hydrilla is a problem every March in the upper river but not after we treat it. River-wide, hydrilla is fading. The entire river looks great when most people are using it. The fish & wildlife have not been negatively impacted. Please note the abundant native plants in the attached images taken a week ago. We treated on 3/26-28. >>

3. "Since this method is not conducive for use in most locations in the lower lake . . . , existing hydrilla populations would grow unabated by this alternative." << I think you'll be surprised by the impacts on hydrilla downstream. We only treated the upper half of Merritts Mill Pond and controlled hydrilla in the entire lake. Likewise, we initially sought to treat only the upper three miles of the Wakulla River within the state park but got 9 miles of control. >>

I know we are dealing with dramatically different scales but hope these comments are useful. I'll be glad to give a PowerPoint presentation on the Wakulla Springs drip treatments to interested parties some time, if you would like. Please let me know how I can help you further. Jess

Jess M. Van Dyke
NW FL Regional Biologist
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Tallahassee, FL 32399

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----- Original Message -----
From: Jernigan, Joe <Joe.Jernigan@dcnr.alabama.gov>
To: Eubanks, Michael J SAM
Cc: Burge, Talmadge K SAM; Rider, Steve <Steve.Rider@dcnr.alabama.gov>; Cook, Stan <Stan.Cook@dcnr.alabama.gov>; Weathers, Ken <Ken.Weathers@dcnr.alabama.gov>
Sent: Thu May 17 19:24:23 2007
Subject: RE: Walter F. George New Release

Mike:

Thank you for allowing me to supplement Stan and Ken earlier comments for the State of Alabama Wildlife and Freshwater Fisheries Division concerning the proposed grass carp introduction into W.F. George Reservoir (WFG).

Personally, I find it troubling that in the introduction of section 3.1 of the EA it states that the lake has experienced "typical" ecological succession of aquatic plants yet the Corps was not adequately prepared (funded, planning) to deal with this "typical" situation.

I want it to be known that I am no fan of hydrilla and applaud the Corps for its attempts to control this exotic submerged aquatic vegetation
(SAV) on WFG. However, I firmly believe that if the Corps is going to release 13,000 triploid grass carp in a 45,000 acre reservoir the results will be disappointing.

The stated goals of the proposed action in Section 4 are to reduce hydrilla by 400 acres and enhance the native plant community of the reservoir while keeping herbicide costs in line. Your "recommended" plan states that native plants will re-establish themselves in areas where hydrilla has been removed. This WILL NOT HAPPEN WITH LARGE NUMBERS OF GRASS CARP CRUISING THROUGHOUT THE SYSTEM UNLESS THOSE PLANTS ARE PROTECTED!

The State of Alabama requests that if the Corps uses the "recommended" plan of action for the control of hydrilla that they must set up protected "nursery" areas of native plants to make up for the loss of valuable SAV habitat that will occur with the introduction of grass carp. Yes, even hydrilla is considered "valuable" fish habitat in small quantities.

The Corps stated objective is to reduce hydrilla by 400 acres and maintain SAV in approximately <5% of the reservoir, fine. But for every acre of valuable SAV habitat lost the Corps should be prepared to return protected native plants to the reservoir. Therefore, the projected costs for planting and maintaining native SAV habitat are too low.
Luckily, the Corps has the foremost expert of establishing native SAV on staff with Dr. Michael Smart. Rather than me getting into great detail as to protocols for this aspect of the work, I propose that the Corps utilize their own experts as to the best course of action to meet the State of Alabama's request. However, I will tell you that Sagittaria sp. (not an SAV) and sago pondweed (will not handle the

heat) will not be acceptable native plants for use as stated at the bottom of page 75.

My next question is what happens if this grass carp stocking doesn't keep the hydrilla expansion in check? What happens then? Do you increase the numbers of grass carp stocked in your supplemental stockings until you reach a threshold number? Do you give up? Chemical options like drip treatments? I would like to know what the plan is.

Thanks again for the opportunity to supplement the comments for the State of Alabama Wildlife and Freshwater Fisheries Division.

Sincerely,

Joe Jernigan
Aquatic Plant Management Supervisor
Alabama Wildlife and Freshwater Fisheries P.O. Box 247 Daphne, Alabama 36526
(251) 626-5153
(251) 621-1489 fax

STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
WILDLIFE AND FRESHWATER FISHERIES DIVISION
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BOB RILEY
GOVERNOR

M. BARNETT LAWLEY
COMMISSIONER

M. N.
'CORKY'
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DIRECTOR

FRED R.
HARDERS
ASST.
DIRECTOR

The mission of the Wildlife and Freshwater Fisheries Division is to manage, protect, conserve, and enhance the wildlife and aquatic resources of Alabama for the sustainable benefit of the people of Alabama.

May 17, 2007

Commander Peter F. Taylor, Jr.
United States Army Corps of Engineers
Attention: PD-EI
Post Office Box 2288
Mobile, Alabama 36628-0001

Dear Commander Taylor,

Thank you for the opportunity to comment on the Environmental Assessment for Release of Triploid Grass Carp for Hydrilla Management in Walter F. George Lake, Alabama and Georgia. After review of the Environmental Assessment and attending the two public meetings on the proposals, I have the following comments and concerns.

As you are aware, the public meetings were poorly attended, with a total of 32 people for both of the meetings. From the comments received and the discussions I had with the attendants, just about everyone attending the meetings were in favor of stocking triploid grass carp for hydrilla control, and most were in favor of integrating this with chemical control. My concern is whether or not the meetings and agendas were publicized properly for anglers to have a chance to attend and voice their opinion. During the meetings I talked with Jim Howard and one other gentleman who said they routinely fish in Lake Eufaula. Most of the other attendants were property owners, professions associated with aquatic plant management, and state or federal agency staff. I recommend that additional meetings be held with local fishing organizations and anglers to obtain a better understanding of their opinions and to reduce misconceptions

It is evident that the hydrilla infestation has escalated over the last few years and the Corps of Engineers (COE) will experience difficulty in managing this aquatic plant with only chemical applications. The integrated plan of stocking 10 to 15 grass carp per hydrilla vegetated acre in conjunction with selective herbicide treatments is the most practical option available. However, the stocking rates are a matter of debate. Please see Dr. Mike Maceina's comments regarding the danger of total elimination of submerged aquatic vegetation by stocking rates of 20 to 22 grass carp per acre as stated in the "Release of Triploid Grass Carp Only" option outlined on page 27, lines 30 – 37. Reservoir studies have documented that up to 30 % coverage by aquatic vegetation can be very beneficial for sport fish populations. Alabama Wildlife and Freshwater Fisheries Division (AWFF) would oppose a stocking rate that could possibly eliminate all aquatic vegetation. We recommend that the COE conduct an extensive survey to determine a stocking rate that will not risk elimination of aquatic vegetation. Also, prior to a release of grass carp that the COE will obtain a permit from AWFF in order to comply with any

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Alabama laws and/or regulations that control the stocking of aquatic wildlife into the waters of Alabama.

AWFF recommends that an evaluation period be conducted every five years. At the conclusion of each five year evaluation, a public meeting would be held to present findings, solicit input and apply adaptive management principles for decisions relating to future aquatic plant management plans in Walter F. George Lake.

Finally, I would like to report that due to an incorrect email address, I did not receive the draft environmental assessment in a timely manner and therefore our comments are limited and possibly incomplete. Please verify that your contact information for me is correct for future communications.

Sincerely,

Ken Weathers
Supervising Fisheries Biologist
ALWFF – Fisheries Section
District VI,
3520 Plaza Drive
Enterprise, AL 36330
334-347-9467 office
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The Department of Conservation and Natural Resources does not discriminate on the basis of race, color, religion, age, gender, national origin, or disability in its hiring or employment practices nor in admission to, access to, or operations of its programs, services, or activities.

-----Original Message-----
From: Eubanks, Michael J SAM
Sent: Friday, May 11, 2007 8:51 AM
To: Morgan, Donald M SAM; Smallwood, William L SAM; Burge, Talmadge K SAM; gcoffee@thompsonengineering.com; Suzanne Sweetser
Subject: Email Comment from Kenneth Penuel, Clay County Economic Development Council

Sir:

The vitality and health of Lake Walter F. George is the lifeblood of our town of Fort Gaines and Clay County Georgia. The visitation to Lake Walter F.
George is our largest attraction and "industry".

We would be devastated to have the same thing happen to Lake Walter F. George that has happened to Lake Seminole.

We support the use of any Corps approved means necessary to control this weed that could mean our demise.

Kenneth M. Penuel

Chairman

Clay County Economic Development Council

Ken Penuel P.O. Box 7 Fort Gaines, Georgia 39851

kpenuel@alltel.net

229.768.2410

-----Original Message-----
From: Michael Maceina [mailto:maceimj@auburn.edu]
Sent: Monday, May 07, 2007 3:43 PM
To: Eubanks, Michael J SAM
Cc: Ken Weathers; Chris Horton; Michael Holley; Nick Nichols; Stan Cook; Chuck Coomer; Mike Spencer; Rob Weller; Morgan, Donald M SAM
Subject: comments on Corps stocking of grass carp

May 7, 2007

Mike Eubanks:

Thanks for giving me the opportunity to review the Corps of Engineers* (COE) document entitled *Environmental Assessment (EA) for the release of triploid grass carp for hydrilla management in Lake Walter F.
George*. I found the report generally well written. I understand the COE financial constraints coupled with the possibility that hydrilla could cover 30% of the surface area of the reservoir (about 15,000 acres) and this poses a dilemma. The costs estimates for various hydrilla management activities seem right on target. Below are some of my specifics comments.

Page 27 lines 30-32 - A stocking rate of 20-22 fish/acre of hydrilla has a moderate possibility of eliminating all hydrilla and other desirable submersed aquatic vegetation species (SAVs). In Lake Baldwin Florida (200 acres), a stocking rate of 12 grass carp/acre hydrilla completely eliminated hydrilla and all SAVs in less than two years (Canfield et al. 1983).
The EA
should provide a Table that review stocking rates of diploid and triploid stocking rates for Florida and SE USA and the results of these stockings. I believe if efficient and fish do not migrate from hydrilla infested areas, 22 grass carp/vegetated
acre will eliminate all SAVs in Lake George. If during a few years, wet conditions prevail, and water becomes turbid during spring and early summer, hydrilla (and other SAVs) will decrease naturally and accelerate grass carp SAV elimination.

Page 30 - This is interesting as the EA states that native and desirable SAVs will be planted in Lake George. With this high a stocking rate of grass carp and maintenance stocking proposed, I doubt native SAVs can be established without the construction of large and expensive barriers to keep grass carp out. The amount of money to be spent planting native SAVs is low and will likely proved futile given the stocking rate of grass carp.

Page 42-43 - The EA statement that the minimum length limit change from 16 to 14 for largemouth bass was an attempt to reduce density to improve growth rates - is not correct. I led the analysis for evaluating the largemouth bass length limit change (as well as LMB virus research on the reservoir), and with exploitation less than 10%, any change in the length limit would have no effect on largemouth bass density. The length limit was changed to increase success and catch

rates of tournament anglers with the hopes that more tournaments would use the reservoir and help boast the local economy. A decline in growth rates and the effects of LMB virus with lower adult survival rates also influenced the decision to change the length limit.

Page 43 lines 31-32 - The EA statement *Should hydrilla spread to occupy the 14,600 acres of the lake with depths <10 feet, this shift in the forage base may occur. This could result in a smaller overall largemouth bass population in the lake*; is totally unfounded and not true. The presence of SAV and/or hydrilla will likely diversify the forage base so bass are less dependent on cyclic production of shad and higher SAV levels may not only increase the forage base for bass but also stabilize bass recruitment in Lake George.
Maceina (1996) found that in larger Florida lakes, intermediate levels of SAV (including
hydrilla) increased the probability of higher adult bass densities and biomass. A moderate possibility exists that low levels of hydrilla may even enhance largemouth bass population metrics and the associated fishery and this should have been recognized.

Page 48 lines 34-46 - These statement are unfounded and not true. Primary production in systems remain generally unchanged whether dominated by SAV or plankton. The food web dynamics simply change. Any statement concerning efficiency of primary production food conversion and cascading effects in the food web are unfounded without documentation. At total SAV coverage of less than 30%, deleterious effects of excessive SAV may not be observed. Consensus of fish biologists is that 15-30% SAV coverage increases the probability of stable centrarchid recruitment and trophic web resources in large systems such as Lake George. The EA provides a misleading statement concerning largemouth bass growth comparisons between Lakes Seminole (SAV dominated) and Lake George. I found (Maceina et al. 2003) that growth rates in 2003 were identical in both these reservoirs. So this argument in the EA is false and related statements are wrong.

Page 70 lines 6-12 - The stocking rate for grass carp for Lake Conroe is wrong. Thirty not 60- fish/vegetated acre were stocked (I was there and see Maceina et al. 1992).

Page 70 line 21 - I disagree (see past comments). Stocking 22 grass carp/vegetated acre does run the risk of complete SAV elimination. This
stocking rate has eliminated SAV in other water bodies.

Page 93 lines 25-26 - Grass carp longevity is much greater that 10 years (conduct a literature review).

Given the right environmental conditions (high spring early summer flows and
turbidity) and a stocking rate of 22 grass carp/vegetated acre, a moderate to moderately strong risk of complete SAV elimination exists at least for a few years in Lake George. I see the COE wishes to spend less that $100,000 per year on hydrilla control in Lake George.
If appropriations were made to use herbicides and $500,000 were available each year, then lake wide management costs would only be $11/acre!!!

Could the COE follow the TVA plan to controlling excessive SAVs in Lake Guntersville? Attempts to establish native SAVs will likely be futile in Lake George unless much more funding is allocated, but still may be unsuccessful. Unfortunately, hydrilla may be the only successful SAV that can inhabit Lake George, and low levels of hydrilla can provide some benefits to fish populations and the fishery.

Feel free to share my comments (MJM).

References

Canfield, Maceina and Shireman. 1983. Effects of hydrilla and grass carp on water quality in a Florida lake. Water Resources Bulletin 19:773-778.

Maceina 1996. Largemouth bass abundance and aquatic vegetation in Florida lakes: An alternative interpretation. Journal of Aquatic Plant Management 34:43-48.

Maceina, Cichra, Betsill, Bettoli. 1992. Limnological changes in a large reservoir following vegetation removal by grass carp. Journal of Freshwater Ecology 7:81-95.

Maceina, Grizzle, Slipke, and Holley. 2003. Largemouth bass population and virus assessment on Wheeler Reservoir (Study 48). Alabama Department of Conservation and Natural Resources, Federal Aid in Fish Restoration, F-40, Final Report, Montgomery, 115 pages.

Submitted by:

Dr. Michael Maceina
Professor
Department of Fisheries
Auburn University, AL 36849
email:maceimj@auburn.edu

From: Burge, Talmadge K SAM [mailto:Talmadge.K.Burge@sam.usace.army.mil]
Sent: Monday, April 30, 2007 4:32 PM
To: Buddy and Gloria Buie; Danny Moss; David M Ongemach; David Markham; Dianne Hornek; Donald Anthony; Harry Goggans; Jim Gardon; Jim Howard; Ken Penuel; Ken Weathers; Lee & Delynn Zell; Mary Beth & Dennis Fineout; Pam Monfort; Richard and Rachel Gelbert; Rick Silvis; Shelia Silvis; Tony Pellicano; Sandy_Abbott@fws.gov; troy_littrell@fws.gov; rob.weller@dnr.state.ga.us; joe.jernigan@dcnr.alabama.gov; alcondir@aol.com; jess.vandyke@dep.state.fl.us; john_killpatrick@dnr.state.ga.us; bisterfeld.ted@epa.gov; ted_hendrickx@dnr.state.ga.us; dekozlowskis@dnr.sc.gov; scook@dcnr.state.al.us; sandy_tucker@fws.gov; jerry_ziewitz@fws.gov
Cc: Smallwood, William L SAM; Morgan, Donald M SAM; Eubanks, Michael J SAM; Glen Coffee
Subject: Walter F. George New Release

NEWS RELEASE

CORPS OF ENGINEERS DRAFT ENVIRONMENTAL ASSESSMENT FOR THE RELEASE OF TRIPLOID GRASS CARP FOR HYDRILLA MANAGEMENT AT WALTER F. GEORGE LAKE, ALABAMA-GEORGIA

The U.S. Army Corps of Engineers is conducting an Environmental Assessment for the management of hydrilla on Walter F. George Lake. This action is addressed in a Draft Environmental Assessment, prepared pursuit to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulatory guidance in 40 CFR 1500-1508, and the USACE regulatory guidance in 33 CFR 230. The Draft Environmental Assessment document is available for public review and comments and has been posted on the Mobile District public access website at the following location:

http://www.sam.usace.army.mil/pd/Pd1.htm

Additional copies of the Draft Environmental Assessment have been placed for review at the USACE Walter F. George Lake Project Office, located at Fort Gaines, Georgia.

EVALUATION: Upon completion of the 15-day public coordination period set forth in this notice, the environmental assessment will be finalized and the final determination of the NEPA documentation requirements made. If the determination is to finalize the environmental assessment and prepare a Finding of No Significant Impact, these documents will be placed on the file in the Mobile District Office for further reference.

The decision whether to proceed with the proposed action will be based on the evaluation of the probable impact, including cumulative impacts of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits that may be reasonably expected to accrue for the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the

cumulative effects thereof: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood plain values, land use, navigation, recreation, energy needs, safety, consideration of property ownership, and in general, the needs and welfare of the people.

COORDINATION: The USACE, Mobile District is soliciting comments from the general public, federal, state and local agencies and officials, Indian tribes, and other interest parties in order to consider and evaluate the impacts of the proposed activity. The USACE, Mobile District will use any comments received to determine whether or not to proceed with the proposed action. You are requested to communicate the information contained in this notice to other parties who may have an interest in the proposed action.

CORRESPONDENCE: Comments on the Draft Environmental Assessment should be directed to Commander, U.S. Army Corps of Engineers, Mobile District, ATTN: PD-EI, PO Box 2288, Mobile, Alabama 36628-0001 or via email cesam-pd-ea@sam.usace.army.mil . Comments should be received no later than **15 May 2007**.

Katie Burge
Environmental Biologist
U.S. Army Corps of Engineers
CESAM-PD-EI
P.O. Box 2288
Mobile, AL 36628

251-694-4109 (Voice)
251-694-3815 (Fax)
talmadge.k.burge@sam.usace.army.mil

Commenter	Title/Organization	Section	Page	Line No.	Comment (Identical copy as written by the commenter)	Response	Action Required
Billy V. Houston	Executive Director/Tri River Waterways Development				TRWDA was formed in 1960 to promote inland waterway commerce and navigation and sound economic development within communities adjacent to the ACF waterways. Its members draw primarily from state, county, and municipal governments, economic development entities, businesses, industries, and individuals in Southeast AL, Southwest Georgia, and Northwest FL.TRWDA's members share a common desire to utilize and benefit from the federally authorized ACF navigation project and its effective development to improve the quality of life in the ACF Basin and the Southeast Region.TRWDA's members see a serious threat to our waterway system on the ACF, by the growth and rapid spread of the dangerous and destructive invasive aquatic plant, Hydrilla in the Walter F. George Lake.Thus we concur with the decision to try to limit the growth of this plant by releasing of triploid (sterile) grass carp on areas in Walter F. George Lake which have been invaded by this aquatic plant. I have been to three presentations given by ACF Operations Project Manager for ACF, Bill Smallwood, on this subject and am well versed as to benefit and possible harm this release of grass carp could have	Comment noted.	None
Dr. Michael Maceina	Professor, Department of Fisheries	5	27	30-32	stocking rate of 20-22 fish/acre of hydrilla has a moderate possibility of eliminating all hydrilla and other desirable submersed aquatic vegetation species (SAVs). In Lake Baldwin Florida (200 acres), a stocking rate of 12 grass carp/acre hydrilla completely eliminated hydrilla and all SAVs in less than two years (Canfield et al. 1983). The EA should provide a Table that review stocking rates of diploid and triploid stocking rates for Florida and SE USA and the results of these stockings. I believe if efficient and fish do not migrate from hydrilla infested areas, 22 grass carp/vegetated acre will eliminate all SAVs in Lake George. If during a few years, wet conditions prevail, and water becomes turbid during spring and early summer, hydrilla (and other SAVs) will decrease naturally and accelerate grass carp SAV elimination.	The 20-22 fish stocking rate refers to the alternative of using triploid grass carp alone to control hydrilla, not the recommended plan which would use a stocking rate of 12 fish per vegetated acre. Subsequent maintenance stocking that is anticipated to occur at 5 to 7 year intervals will use adaptive management to determine the stocking rates based on the results of the annual Aquatic Plant Surveys.	None
Dr. Michael Maceina	Professor, Department of Fisheries	5	30		This is interesting as the EA states that native and desirable SAVs will be planted in Lake George. With this high a stocking rate of grass carp and maintenance stocking proposed, I doubt native SAVs can be established without the construction of large and expensive barriers to keep grass carp out. The amount of money to be spent planting native SAVs is low and will likely proved futile given the stocking rate of grass carp.	This relates to a confusion in the stocking rate of the recommended plan which was clarified in the response to comment 2 above. Further, discussion entitled "Implementation of the Integrated Plan" points out that the recommended plan will be implemented in a flexible manner and will adjust subsequent maintenance stocking rates either up or down to assure the desired hydrilla control is achieved and that desirable SAVs are not harmed.	None
Dr. Michael Maceina	Professor, Department of Fisheries	6	42-43		The EA statement that the minimum length limit change from 16 to 14 for largemouth bass was an attempt to reduce density to improve growth rates - is not correct. I led the analysis for evaluating the largemouth bass length limit change (as well as LMB virus research on the reservoir), and with exploitation less than 10%, any change in the length limit would have no effect on largemouth bass density. The length limit was changed to increase success and catch rates of tournament anglers with the hopes that more tournaments would use the reservoir and help boast the local economy. A decline in growth rates and the effects of LMB virus with lower adult survival rates also influenced the decision to change the length limit.	The referenced discussion in the EA is based upon information obtained from a discussion with District Fisheries Biologist Ken Weathers of the Alabama Department of Conservation and Natural Resources, Wildlife and Fisheries Division. The discussion is consistent with the commenter's views in that by allowing anglers to keep smaller bass, the remaining bass would achieve a higher growth rate and improved condition and less susceptible to the largemouth bass LMB virus.	None
Dr. Michael Maceina	Professor, Department of Fisheries	6	43	31--32	The EA statement should hydrilla spread to occupy the 14,600 acres of the lake with depths <10 feet, this shift in the forage base may occur. This could result in a smaller overall largemouth bass population in the lake*; is totally unfounded and not true. The presence of SAV and/or hydrilla will likely diversify the forage base so bass are less dependent on cyclic production of shad and higher SAV levels may not only increase the forage base for bass but also stabilize bass recruitment in Lake George. Maceina(1996) found that in larger Florida lakes, intermediate levels of SAV (including hydrilla) increased the probability of higher adult bass densities and biomass. A moderate possibility exists that low levels of hydrilla may even enhance largemouth bass population metrics and the associated fishery and this should have been recognized.	Concur with the commenter's opinion that low levels of hydrilla would enhance largemouth populations, particularly in an older man-made reservoir where structure is very limited to non-existent. The objective statement under the discussion of the proposed action (see Section 4.0) has been revised to clarify that 2,400 acres of hydrilla would be maintained within the lake until an equivalent acreage of native submersed aquatic plants could be established. The issue addressed in the discussion deals with an increase in hydrilla dominated vegetation that would cover over 32% of the lake. The possible shift from a shad-based forage system to one dominated by centrachids is the reverse of the observations made at Lake Conroe, Texas, which occurred in	text revised.
Dr. Michael Maceina	Professor, Department of Fisheries		48	34--46	These statements are unfounded and not true. Primary production in systems remain generally unchanged whether dominated by SAV or plankton. The food web dynamics simply change. Any statement concerning efficiency of primary production food conversion and cascading effects in the food web are unfounded without documentation. At total SAV coverage of less than 30%, deleterious effects of excessive SAV may not be observed. Consensus of fish biologists is that 15-30% SAV coverage increases the probability of stable centrarchid recruitment and trophic web resources in large systems such as Lake George. The EA provides a misleading statement concerning largemouth bass growth comparisons between Lakes Seminole (SAV dominated) and Lake George. I found (Maceina et al. 2003) that growth rates in 2003 were identical in both these reservoirs. So this argument in the EA is false and related statements are wrong.	The comment is consistent with the point being made in the discussion. That is, excessive growths of hydrilla are projected to result in a change the food web dynamics since the macrophytic SAV would reduce available nutrients to support phytoplankton which in turn would reduce the numbers of fish (i.e., threadfin shad) that depend directly upon zooplankton communities. The discussion does not say there would be a change in primary production, only that an increase in hydrilla primary production would occur at the expense of a decrease in planktonic primary production, and that a largescale shift to macrophytic primary production could result in a change in the structure and make-up of the lake's fish community. The discussion deals with a	None
Dr. Michael Maceina	Professor, Department of Fisheries		70	6--12	The stocking rate for grass carp for Lake Conroe is wrong. Thirty not 60- fish/vegetated acre were stocked (I was there and see Maceina et al. 1992).	Concur with comment. Error has been corrected. However, the conclusions reached in the discussion remain unchanged.	Text corrected.
Dr. Michael Maceina	Professor, Department of Fisheries		70	21	I disagree (see past comments). Stocking 22 grass carp/vegetated acre does run the risk of complete SAV elimination. This stocking rate has eliminated SAV in other water bodies.	Disagreement with the conclusion reached in the discussion noted. However, the 20-22 fish per vegetated acre is not recommended. The recommended plan would involve a stocking rate of only 12 fish per vegetated acre which is not expected to totally eliminate all SAV from Walter F. George Lake.	None
Dr. Michael Maceina	Professor, Department of Fisheries		93	25--26	Grass carp longevity is much greater that 10 years (conduct a literature review).	While it is true that diploid grass carp can achieve a much greater life span, the literature considered for this EA indicated that triploid grass carp have an expected life of around 10 years. It is because of their shorter life span and similar eating behavior compared to diploid grass carp that triploid carp have been widely accepted as a preferred biological control of aquatic plants, especially hydrilla.	None
Dr. Michael Maceina	Professor, Department of Fisheries				Given the right environmental conditions (high spring early summer flows and turbidity) and a stocking rate of 22 grass carp/vegetated acre, a moderate to moderately strong risk of complete SAV elimination exists at least for a few years in Lake George. I see the COE wishes to spend less that $100,000 per year on hydrilla control in Lake George. If appropriations were made to use herbicides and $500,000 were available each year, then lake wide management costs would only be $11/acre!!!	The recommended plan would stock only 12 triploid grass carp per vegetated acre. Implementation of all three components of the recommended plan is projected to result in an average annual cost of $68,048 over the 30-year period of analysis. Averaging this cost over the entire surface area of the lake results in a cost of $1.51/acre which is one tenth of the cost identified in the comment. As discussed in Section 5.2, experience and policy guidance indicate that it is highly unlikely that budgetary constraints would make	None
Dr. Michael Maceina	Professor, Department of Fisheries				Could the COE follow the TVA plan to controlling excessive SAVs in Lake Guntersville? Attempts to establish native SAVs will likely be futile in Lake George unless much more funding is allocated, but still may be unsuccessful. Unfortunately, hydrilla may be the only successful SAV that can inhabit Lake George, and low levels of hydrilla can provide some benefits to fish populations and the fishery.	The difficulty in establishing native SAVs in Walter F. George Lake is recognized. However, it is unlikely additional funding for that purpose can be provided. The objective statement under the discussion of the proposed action (see Section 4.0) has been revised to clarify that 2,400 acres of hydrilla would be maintained within the lake until an equivalent acreage of native submersed aquatic plants could be established.	Text revised.
David Markham,M.D.					Please release the carp and also take any additional steps to control the hydrilla.	Comment noted.	None

Gerald Anderson					I am writing as a private citizen to express my concern over the Hydrilla infestation problem that is rapidly spreading in the Walter F. George Lake. I have boated on Lake Seminole and have witnessed the terrible problems they are having there, even though serious attempts have been, and are being made, to control it. It is imperative that we do not let this happen to our lake. I strongly support the plan of releasing sterile carp in areas of WFG which have been invaded by hydrilla. Fortunately, the growth has been somewhat limited here, but I feel we must act quickly to limit future growth or we will be in the same serious situation as Lake Seminole. Recreational water sports and fishing on Lake Walter F. George are an important part of our local tourist economy, not to mention that further infestation could serioously damage our chances for future development of areas around the lake. I thank you in advance for your assistance in expediting the start of the sterile carp release program.	Comment noted.	None
Kenneth M. Penuel	Chairman, Clay County Economic Development Council				The vitality and health of Lake Walter F. George is the lifeblood of our town of Fort Gaines and Clay County Georgia. The visitation to Lake Walter F. George is our largest attraction and "industry". We would be devastated to have the same thing happen to Lake Walter F. George that has happened to Lake Seminole. We support the use of any Corps approved means necessary to control this weed that could mean our demise.	Comment noted.	None
Anonymous					I am a resident of Eufaula, Alabama who lives on Walter F. George Lake. My family thoroughly enjoys being on the lake and everything it has to offer from gorgeous sunrises to catching bream with a six year old little boy. I have had the opportunity to review the Draft Environmental Assessment related to the release of the carp for control of hydrilla. I am sending this email in strong support favoring the release of these carp into the lake. Based on the information in the report the necessary funding to continue battling the hydrilla via a chemical control method is not and most likely will not be available again. The plan outlined using the triploid carp appears to be the most cost effective and sensible method available with such limited funding. In closing I wish to re-iterate my support of releasing the triploid carp into Walter F. George Lake for the purpose of controlling the ever growing problem of hydrilla.	Comment noted.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division	3.3	15	3	Depth is not the limiting factor, light penetration and substrate is more important.	The points raised are noted and the text has been revised as suggested.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		16	25	Six data points lack the statistical power accurately project to 30 years. We recommend changing the time line for the project analysis to nine years. A project reevaluation with the opportunity for public input can again be performed at that time.	The limitations and hazards of projecting biological trends over 30 years are fully realized by the Corps. Selection of 30 years as the period of analysis does not imply that the effectiveness of the recommended plan would not be evaluated until the end of that period of time. Instead, evaluations on the extent of hydrilla and the effectiveness of the aquatic plant management program will be conducted annually and will be based in large part upon the results of the annual Aquatic Plant Surveys performed on the lake. In addition, more detailed evaluations will be performed prior to each maintenance re-stocking effort to assure that an appropriate stocking rate is used. The Corps will continue to coordinate the findings and conclusions of these various evaluations with the respective state fish and wildlife agencies in an attempt to reach a common understanding and a consensus of opinion on the implementation of each phase of the aquatic plant management program.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		16	21-23	The proposed integrated plan falls far short of past annual expenditures. While we recognize the need for financial responsibility, we feel that cutting vegetation treatment expenditures by almost 90% (average of $280,000/year to $68,048/year) is extreme. We recommend a higher financial commitment to native vegetation establishment and research of the effects of grass carp introductions.	As discussed under the No Action Alternative in Section 5.2, it is unlikely that funds in the amount identified in the comment can be reliably budgeted for the aquatic plant management program. More importantly, as discussed in Section 3.3, the most impressive expansion of hydrilla occurred during the period in which the most funds were expended on chemical control. Based on the experience gained to date, buying more chemicals does not appear to be the most effective or efficient method to control hydrilla. Instead, more thoughtful strategies are needed to provide the desired level of control at a substantially reduced level of cost. We believe the recommended plan meets these needs.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		18	35	Provide a rough estimate of the cost for an electric barrier at the lock, hydropower turbine intakes, and dam spillway areas.	The discussion in Section 5.1 (Alternatives Considered and Eliminated) explains why the option of confining grass carp in Walter F. George Lake was not evaluated as a viable alternative.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		22	27	Also provide comment on fish habitat loss. Existing vegetation may be considered beneficial for fish habitat. Drawdown would also eliminate native and desirable vegetation.	The discussion on the Drawdown Alternative has been expanded to address the points raised in the comment.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		27	20	If dye studies should be conducted, who is going to conduct them, when will the studies be conducted, and who will do the research?	Since the Flow Assisted Herbicide Delivery System has not been selected for implementation, dye studies will not be conducted.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		30	para2	Paragraph 2 suggests that native plants would primarily be encouraged by controlling the spread of hydrilla, where paragraph 3 states that "large portions of the lake having depths sufficient to support submersed aquatic plants are still devoid of vegetation". Therefore, controlling the spread of hydrilla is not likely to encourage spread of native vegetation in the reservoir.	The Corps realizes that large scale establishment of native SAV in WFG Lake will be difficult. In those areas devoid of all SAVs, the Corps may choose to perform plantings of native SAVs as outlined in the Integrated Plan discussion. There are many factors influencing the presence/absence of native SAVs in Walter F. George Lake. It is possible that efforts to overcome some of those factors may not be successful in all areas over the long-term.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		30		The third component of the Integrated Plan "involves encouraging native aquatic plants to become established in areas of the lake having depths <10 feet". We agree that wave energy, flow conditions, and periodic high turbidity levels may not be conducive to plant growth. At times and at different rates in different sections of the reservoir, conditions will not be conducive to hydrilla growth either. Furthermore, the entire 10-foot contour will likely not be inhabited by hydrilla, as the document suggests numerous times, due to flow and substrate characteristics of the reservoir.	Comment noted. Also see response to related Comment Number 23 above.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		30		Paragraph 4 describes potential budgetary commitments for native plant promotion in the reservoir. In a 45,000-acre reservoir, $10,000 for three years ($0.22/acre), $5,000 to year 10 ($0.11/acre), and $2000 thereafter ($0.04/acre) is grossly inadequate to accomplish any significant improvements in native submerged aquatic vegetation. A definable and measurable goal should be set for where, how much, and what type of vegetation is desired. Most fisheries managers would suggest a 10-30% coverage with submerged aquatic vegetation (SAV) to be desirable to fish populations. Additionally, suggested stocking rates of grass carp may lead to some consumption of native plants, especially during conditions unfavorable to hydrilla production (high flow, high turbidity, increased wave action, etc.).	See responses to related Comment Numbers 23 and 24 above. In recognition of the importance of SAV as aquatic habitat for the fish and waterfowl communities, the Corps does not intend to eliminate all hydrilla from the lake since there are no guarantees that native SAV species can be successfully established on a large-scale basis. The proposed action includes the objective of maintaining up to 2,400 acres of hydrilla dominated vegetation while controlling its expansion throughout the lake. The target acreage for retention approaches 10-30% suggested SAV coverage. Implementation of the aquatic plant management program will continue to be coordinated with the respective state fish and wildlife agencies and the views of those agencies.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		31	2	Reference what experience and research the document refers to.	See references section for papers that deal with hydrilla control and management. The referenced literature and discussions with professionals were considered in aggregate in developing the recommended plan.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		31	para3	Twelve fish per vegetated acre may prove adequate during ideal growth conditions of hydrilla but may be excessive during conditions not conducive to SAV production. Additionally, stocked grass carp may not randomly distribute.	See response to Comment Number 18 above. It is recognized that grass carp will tend to concentrate in dense growths of aquatic plants where the most abundant food supplies are available.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		38	para1	Because of the stated potential for vegetation to increase to cover the 10-foot contour, the project should be reevaluated in 9 years (see previous comment). After 9 years, stakeholders should be allowed to reevaluate the effectiveness of the proposed vegetation management plan and the Corps will be afforded the flexibility to continue with previous management or explore other options.	See response to related Comment Number 17 above.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		42	21	DNR also stocks Walter F. George with striped bass.	The text has been modified to also state that the Georgia DNR also stocks the lake with striped bass.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		43	para2	Food webs are complex and may be different in different systems. Maceina et al. (1992) found that, following grass carp introductions into Lake Conroe, Texas, transparency decreased, but numbers of cladocerans decreased while numbers of rotifers increased. The primary pelagic forage species, gizzard and threadfin shad, may experience a decline in pelagic habitat with increased SAV in Walter F. George. High levels of SAV that may reduce the numbers of gizzard and threadfin shad would also reduce the growth of hybrid striped bass, white bass, and striped bass in the reservoir. However, it will likely favor production and possibly growth of redear sunfish and bluegill and thus facilitate a diet shift for largemouth bass.	The points raised in the comment are addressed in the paragraph following the one about which the comment is directed. The text has been expanded to also identify white bass, striped bass, and hybrid striped bass as being affected by declines in shad numbers.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		43	20	We know of no direct link between water clarity and forage fish (clupeids) in Walter F. George reservoir.	The statement represents a hypothetical impact that could occur to shad as the water becomes more clear within heavily vegetated areas due to the filtering effect of the hydrilla plants and loss of suspended biological organisms that serves as food consumed by threadfin shad.	Text revised to insert "could".
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		43	23	Spotted bass are in Lake Seminole, which has an abundance of SAV. If there is a shift in Walter F. George from a largemouth dominated community, it will be unclear whether or not hydrilla is to blame.	The text has been modified to delete the discussion about spotted bass since no scientific evidence has yet been produced to document why spotted bass populations in Walter F. George Lake has increased.	Text revised.

Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		43	31--32	At 14,600 acres covered, 32% of the reservoir would be vegetated. At the current density (about 40% coverage within hydrilla stands), about 13% of the reservoir would be fully vegetated. This would likely not reduce the largemouth population in the reservoir. It would more likely have a negative effect upon the pelagic community (*Morone* and *Dorosoma* spp).	Should all 14,600 acres of the lake having depths <10 feet become covered with hydrilla, it is likely the density of plants within that acreage would be much greater than 40% and could eventually approach 100% in the absence of an effective aquatic plant management program.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		43		Grass carp will not stay confined to the seven county reach surrounding Walter F. George and may migrate both upstream and downstream, and in and out of tributaries of the Chattahoochee and Flint Rivers. Species potentially impacted by reductions in aquatic macrophytes include, to name a few, pygmy sunfishes, native centrarchids, and the redeye chub. There is a very low probability that grass carp migrating upstream may encounter and consume the state endangered Spider lily.	The potential for triploid grass carp to escape from Walter F. George Lake is discussed in Section 7.2. The potential for escaped grass carp to feed upon the state listed endangered spider lily has been added to Section 7.3	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		46	23	Define "good water clarity"	The quote extracted from the 1978-1979 report is not defined. However, the statement was made in the context that the lake had low turbidity levels.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		46	42--43	Provide reference for the statement "This shift would result in a smaller biomass of forage base due to the higher energy conversion factor of centrachids compared to shad".	There is no specific reference for this statement. It is made based on ecological principals which state that the higher a group of organisms are in energy trophic status, the smaller the amount of biomass that can be supported within the system in which they occur. For example, the trophic status of threadfin shad is lower than centrarchids.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		48	last para	See previous comment on forage abundance. It would be more accurate to say there would be a loss of pelagic habitat in the reservoir. At 32% coverage (the 10-foot contour), shad would not be eliminated from the reservoir and would still provide an important nutrient source for bass, and would still be the primary forage for crappie, and *Morone* species. Overall shad biomass, however, would likely be reduced leading to a possible reduced biomass in crappie and *Morone* species.	The referenced discussion does not state that threadfin shad will be eliminated from the reservoir, only that its numbers could be diminished which is consistent with the point being made in the comment. The list of affected species has been expanded to include the *Morone* species.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		50	26--27	We agree with this statement. However, for the same reason, there are areas within Walter F. George's 10-foot contour that may not experience hydrilla infestations.	Comment noted.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		55	para2	There are potential negative effects of carp moving downstream to Lake Seminole: Using data from the U.S. Fish and Wildlife Service (2001), waterfowl hunting provides a good economic boost to the Lake Seminole area: we estimate that approximately 1,850 waterfowl hunters hunt on Lake Seminole and hunt waterfowl for an average of 8 days per hunter. Based on a GADNR statewide survey of small game hunters the average small game hunter spends about $50 per day. Using this per hunter expenditure, we can estimate that waterfowl hunters on Lake Seminole would spend about $740,000 per season. Lake Seminole holds the largest inland concentration of wintering waterfowl in Georgia. The majority of the ducks at Lake Seminole are diving ducks, especially ring-necked ducks and canvasbacks. Aerial surveys show an average peak concentration of over 5,000 ducks on Lake Seminole during the winter. If the grass carp released at Lake W. F. George escaped into the Chattahoochee River and moved southward into Lake Seminole, the impacts could be significant. Decreases in the coverage of submerged aquatic vegetation (hydrilla and native species) would reduce the carrying capac	The referenced paragraph does not address the affects of escaped grass carp from Walter F. George Lake. The effects of grass carp escapes are addressed in Section 7.3 where it is concluded that the "dilution" of escaped fish would result in minimal numbers of fish at any location resulting in insignificant effects on SAV occurring in downstream water bodies. Section 7.3 also concludes that waterfowl would not be significantly affected by the proposed action.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		55	22-23	It is not known that hydrilla *will* cover 14,600 acres.	Agree. At numerous locations in the text, the spread of hydrilla to cover all 14,600 acres with water depths <10 feet is qualified to state that level of coverage is a conservative worst case condition, with language often included indicating that there is some uncertainty as to whether that will occur. Nevertheless, the text has been modified to again clarify the uncertainty that level of coverage will occur.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		59	43	We agree that many people in the area practice subsistence fishing. In southwest Georgia, there is a paucity of opportunities that exist now for bank anglers. There would be a strong community benefit for the creation and maintenance of one or several additional fishing piers. Savings realized from the integrated plan suggested could free monies to be used for creation of additional fishing opportunities.	Comment noted. The potential to construct fishing piers should be addressed in another vehicle.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		69	25-39	The draft EA report indicates that grass carp prefer hydrilla, but lists muskgrass and pondweeds as their second and third choices. Pondweeds, muskgrass, and wild celery are well documented as important waterfowl food plants (Martin et al. 1951, Bartonek and Hickey 1982, Korschgen et al. 1988, Payne 1992). The reduction of submerged aquatic vegetation (both native and exotic) by the grass carp likely will have negative impacts on waterfowl habitat and waterfowl hunting opportunity within the lake. As the coverage of hydrilla in Lake W. F. George is reduced, the carp would have no other option than to select muskgrass and pondweeds, and reductions in submerged aquatic vegetation has been documented to effect waterfowl numbers and foraging activity (Jorde et al. 1995). Johnson and Montalbano (1989) state that close scrutiny and oversight of stocking programs are necessary to insure that grass carp are not introduced into aquatic systems providing important waterfowl habitat. Bellrose (1980) identified a major migration corridor extending southward along the Chattahoochee River that crosses both Lake W. F. George and Lake Seminole. These areas definitely provide impo	In recognition of the important role of SAVs in aquatic environments, a major objective of the proposed action is to maintain 2,400 acres of hydrilla dominated submersed vegetation (see Section 4.). The relatively low stocking rate of 12 fish per vegetated acre should not significantly reduce the present quantities of native SAVs in Walter F. George Lake, thus waterfowl habitat should not be adversely affected. Subsequent maintenance stocking rates will be determined after careful consideration of the effectiveness of grass carp in achieving a desired level of hydrilla control. Nevertheless, the text has been expanded to more clearly point out that waterfowl could be adversely effected if an excessive number of grass carp are stocked.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		70	para2	Lake Conroe used 74 fish per vegetated acre (30/acre). This proved detrimental to the fishery as it removed virtually all submerged aquatic vegetation from the reservoir.	Please see Dr. Maceina's above Comment Number 8 in which he pointed out that the stocking rate for Lake Conroe was 30 fish per vegetated acre. After verifying that number, the text was revised accordingly.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		70	13-19	Success or "favorable" in Santee Cooper may be a matter of opinion. Many anglers were upset with vegetation "management" and felt their input was not sought. Additionally, many anglers do not feel that elimination of hydrilla is a favorable objective. Additionally, once the hydrilla was removed from the lake, waterfowl use of the lake drastically declined (T. Strange, ret. SCDNR Waterfowl Biologist, pers. comm.). Georgia DNR wished the Corps would avoid the same mistake on Walter F. George and make a broad effort to seek public opinion, understanding, and possible consensus before proceeding with vegetation management.	The proposed action would not eliminate all hydrilla from Walter F. George Lake. In fact, an objective of the action is to maintain 2,400 acres of he lake in hydrilla. The Corps has made attempts to both inform and seek input from the public and agencies on the aquatic plant management program. For this EA alone, two public meetings were held, news releases issued, and the Draft EA was made available for comment.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		70	21-28	Twenty to 22 fish per vegetated acre is likely too high to maintain existing SAV. Additionally, these rates may eliminate desirable native SAV, especially during years that do not favor the growth of hydrilla. If food becomes limiting, grass carp may be found to consume desirable native SAV. Results of grass carp release may be reversible, but consequences could last 5-6 years and substantial economic losses to local communities may occur. Potential damages to fishery stocks by removal of all vegetation could be realized for 6-8 years or more. For instance, largemouth bass recruitment may be detrimentally impacted by the removing 100% of SAV.	Concur with comment, that is why the recommended plan includes a stocking density of only 12 fish per vegetated acre. The 20-22 fish per vegetated acre refers to an alternative that was not selected for implementation.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		70	38	Add Lake Seminole	Text revised as suggested	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		71	1	Alligators are not likely to have a large impact on grass carp populations. Ospreys may predate on some, but are not likely to have a large impact either.	Alligators and osprey were suggested as possible causes of these mortalities. Any predation by ospreys will probably limited to the first year of release when the grass carp are still relatively small. Alligators are mentioned because after the fish reach a mature size alligators may prove to be the only source of predation on grass carp.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		71	24-30	The "dilution" effect assumes equal distribution of escaped fish. In reality, Lake Seminole represents more desirable habitat for grass carp than many areas of the Chattahoochee River and a disproportional number of fish could be expected to reside there.	The potential for grass carp to move into Lake Seminole was considered in the evaluations and is included in the calculations that resulted in the figures shown in Table 10. Additional text has been added to point out that a number of any escaped fish may tend to concentrate in Lake Seminole.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		74	14-28	If stocked, we recommend a conservative and incremental approach to vegetation management via grass carp. Therefore, we believe that the rate of 10 fish per vegetated acre be used instead of the 15 fish per vegetated acre. Exceeding target vegetation control to the point of elimination or reduction in desired vegetation may be reversible in the long-term (over 30 year period), but the longevity of grass carp dictates that any negative effects may last for more than 6-8 years.	The recommended plan would stock only 12 triploid grass carp per vegetated acre. Please see the discussion in Section 5.2 entitled "Implementation of the Integrated Plan" which points out that adaptive management strategies will be employed during subsequent maintenance stocking efforts to assure that the desire level of hydrilla control is achieved without removing all submersed aquatic vegetation in the lake.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		76	18-22	See previous comments. Largemouth bass could provide a benefit from increased hydrilla in the reservoir. The centrarchid forage base would likely increase, providing a diverse prey base for largemouth. As hydrilla stands occupy more of the reservoir, pelagic habitat for pelagic predators such as hybrid striped bass and pelagic prey such as gizzard and threadfin shad would be reduced, thereby potentially limiting their biomass.	The discussion is Sections 6.3 (page 43, lines 13-22 of the draft EA) and 7.3 reflect the views expressed by this comment.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		96		The importance of native vegetation establishment and encouragement needs to be mentioned here.	The text has been revised as suggested.	Text revised.
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division	11.2	98		The Georgia Department of Natural Resources Wildlife Resources Division (WRD) had recommended the United States Army Corps of Engineers initiate a stakeholder process to develop support and public consensus over the issue of hydrilla control prior to the implementation of an EA. Although stakeholder involvement is an integral process of an EA, we desired angling groups and stakeholders be made aware of the hydrilla problem and potential remedies prior to any formal process. Two public meetings, each of which was located at the reservoir on successive evenings, are inadequate to reach a large number of stakeholders. This was evident by only 32 people registering attendance. The angling constituency visiting Walter F. George is from a much larger geographical area, which represents important economic benefit to communities in the vicinity of the reservoir. Meeting announcements made available to only local media outlets did not give anglers from outside the immediate area the chance to comment on the hydrilla plan.	We believe the efforts made to inform and solicit input from the public has been adequate. Actions to involve the public and agencies represents a continuum of efforts that began well before the EA was initiated. Preparation of the EA has occurred over a four-month period in which considerable publicity was generated. The two public meetings were well advertised and covered and the notices that were sent to stakeholders included various fishing interests. The Coordination efforts are summarized in Section 11.0.	None

Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		100	8--12	We support the recommendation that all grass carp to be released to be tagged and a telemetry study be conducted. This information will prove important for future adaptive management and could save time and money in the future.	The Corps has considered this recommendation and has decided that the information that would be obtained from the capture of any escaped fish would not justify the additional costs that would be required to install the tags.	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		102	27--28	Because it represents quality resources to fishermen and hunters, vegetation stands should be encouraged in areas not detrimental to homeowners. This also underlines the importance of establishment, maintenance, and encouragement of native vegetation stands.	Comment noted. It is likely the 2,400 acres of hydrilla dominated vegetation that would be maintained under the proposed action will probably be located in areas where it presently exists (i.e. Cowikee Creek, Eufaula National Wildlife Refuge and along the east bank upstream of the dam).	None
Dan Forster	Director, Georgia Department of Natural Resources Wildlife Resources Division		A-2	para4	A tagging / telemetry study could help to identify if bow fishing will be a concern. Most fish harvested by bow fishermen are large and are no longer consuming the amount of vegetation that medium-sized fish do.	The Corps will not tag or conduct a telemetry survey. However, should either state fishery agency elect to monitor the harvest of grass carp by bow fisherman, the Corps would provide such support as could be within existing funding and manpower constraints.	None
Jess M. Van Dyke	NW Florida Regional Biologist, DEP/ Invasive Plant Mgt				The EA exaggerates the negative impact of Aquathol on native plants: "Endothall is **indiscriminate** in its killing effects on all species of submersed aquatic plants." "Although the effectiveness of endothall as a contact herbicide is **almost absolute** within the areas treated . . . " "By **killing essentially all submersed aquatic plants** within this portion of the lake . . ." "The **elimination of essentially all submersed aquatic** vegetation within the 10,460acres treated shown on Figure 14 would be detrimental to both fishery and waterfowl resources." My experience is that Aquathol can be used to selectively kill hydrilla from many native, submersed plants, e.g. naiad, coontail, Vallisneria, and Chara. These native plants are more abundant on the Wakulla River after seven treatments with Aquathol in the last five years.	Comment noted. There are indications that low doses of endothall and cool weather treatment would allow the natives to revegetate faster than hydrilla (personal comment Jess Van Dyke). There are no indications that endothall would have the same effect during warm weather.	
Jess M. Van Dyke	NW Florida Regional Biologist, DEP/ Invasive Plant Mgt				The EA aims too high with the flow-assisted treatment size in order to make it seem impractical: "It is estimated that 2,280 acres of hydrilla would be treated by this alternative, at a total annual cost of $1,202,000." Yes, that is totally impractical, so we eliminate the option? "The heaviest infestations are centered around the Cowikee Creek embayment near the Lakepoint Resort State Park." Start small. If there is sufficient flow, try introducing Aquathol at the 431 bridge next to the marina at 2 ppm/48 hrs and see what happens. I think you'll be pleasantly surprised. If so, expand the process.	Response to comment #56. Comment noted. The EA was changed to reflect past experiences with Egeria on Walter F. George Lake.	
Jess M. Van Dyke	NW Florida Regional Biologist, DEP/ Invasive Plant Mgt				The EA downplays the impact of additional grass carp in the Apalachicola Bay System: "The release of triploid grass carp into Walter F. George Lake and the escape of some of these fish to downstream areas will add to the numbers of grass carp in the waterways in the lower basin, including Apalachicola River and Apalachicola Bay that have escaped from prior releases made at other locations." " . . . their effect on the submersed aquatic vegetation should be negligible." " . . . the numbers of escaped fish would be "diluted" to the point that they would not create problems for downstream native vegetation." " . . . densities shown in Table 11 would not pose a threat to the ecosystems or to the aquatic vegetation downstream of Walter F. George Dam." That is wishful thinking, given that the current number of grass carp downstream is unknown and submersed vegetation is already scarce in the Apalachicola Bay System. I can't help but think of the Trinity River debacle. What happens when the hydrilla continues to expand in the face of the initial stocking? More grass carp will be added to WFG and the emergent vegetation of the Apalachicola Bay System will fade. Your dilution theory doesn't work with powerful, sch	The analysis presented in Section 7.3 points that the numbers of grass carp that would escape from Walter F. George Lake and make their way into the Apalachicola River and Bay would be insignificant if evenly distributed within all suitable water bodies. While we believe it is certainly likely that grass carp may already be present in these areas as a result of prior releases in the watershed, we are unaware of any information to indicate that grass carp are harming native submersed aquatic plants in either the river or the freshwater portions of the bay estuary. We would be receptive to modifying the EA's conclusions should such information be made available.	None