SPRING CREEK PARK
PROPOSED MASTER PLAN
SEMINOLE COUNTY, GEORGIA

DRAFT

August 16, 2011

Prepared for:

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Submitted to:

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1.0 INTRODUCTION

This Environmental Assessment (EA) details the potential impacts that could result from proposed renovations to Spring Creek Park (SCP), formerly Reynold's Landing, on Lake Seminole, Seminole County, Georgia. The purpose of this EA is to evaluate whether the proposed activities are likely to cause significant impacts to the environment. Such impacts would require a more detailed study on possible impacts, mitigation, and alternative courses of action.

1.1 LOCATION

The 108-acre project site is a U. S. Army Corps of Engineers (COE) owned parcel located in rural Seminole County, Georgia. The geographic coordinates for the site are latitude 30° 48' 20.24" N and longitude 84 ° 48' 36.40" W. This site is bordered by Spring Creek Drive to the north and east, Reynold's Landing Road to the west, and Lake Seminole to the south. The project area is located approximately 16 miles south of Donalsonville, Georgia, and approximately 15 miles southwest of Bainbridge, Georgia. A location map depicting the project boundary is provided as **Figure 1**. A United States Geological Survey (USGS) Topographic Quadrangle map is provided as **Figure 2**.

1.2 PROPOSED ACTIONS

The park is currently leased by COE to Seminole County, Georgia and provides recreational day-use services. Per the existing Master Development Plan (MDP), approved in 1989, these services include a single lane boat launch, a 40-space asphalt parking area, 9 picnic tables, 1 picnic shelter and a single restroom facility; see **Figure 3**. The proposed MDP aims to supplement these recreational amenities with upgraded or additional infrastructure needed to allow SCP to support major bass fishing tournaments. These upgrades are displayed in **Figure 4** and include:

- **Phase 1**
  - quadruple-lane boat launch;
  - 91-space asphalt parking area and 150-space grass/turf overflow parking area;
  - entrance and exit signage;
  - fishing tournament weigh-in areas (primary and secondary);
  - day-use docks;
  - 35 RV camping spaces;
- **Phase 2**
  - 1,135-foot wooden boardwalk;
  - 4 overlook decks;
  - Hiking/interpretive trails;
- **Phase 3**
  - 30x50-foot pavilion;
  - Children's play area (Totlot);
  - Public restroom facility;
  - RV pump-out holding tank to accommodate 40 RV sites;
  - Park host site;
  - Fishing tournament weigh-in pavilion;
  - 24 primitive camping sites;
  - Hiking/interpretive trail addition;
- **Phase 4**
  - 3 picnic pavilions
  - 2 public restroom facilities
  - 4 RV camping spaces

Figure 1 - Location Map

Spring Creek Park
Seminole County, Georgia

IMAGE:
USGS Quadrangle
Renoldsville

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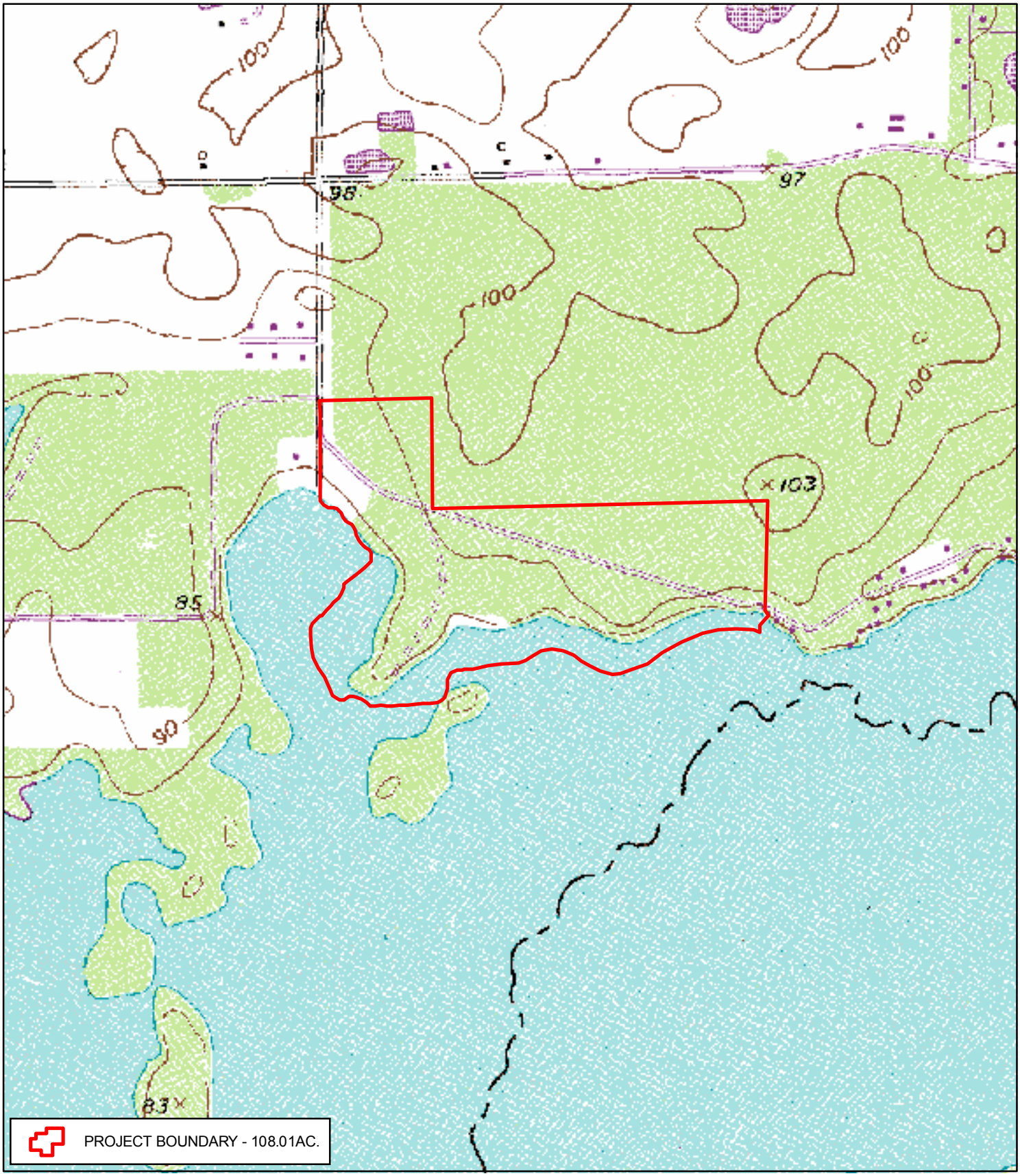

Figure 2 - USGS Quadrangle Map

Spring Creek Park
Seminole County, Georgia

IMAGE:
USGS Quadrangle
Renoldsville

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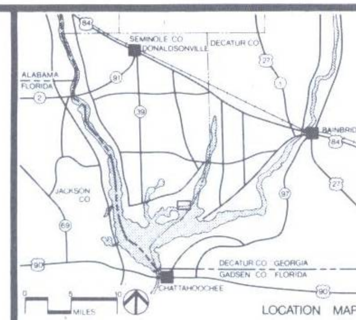

LOCATION MAP

LEGEND

ATTENDENT STATION	BATH HOUSE or WASH HOUSE
CAMPSITE	BEACH
CABIN	BOAT RAMP
DUMPING STATION	MARINA
PARKING	FISHING
COMFORT STATION	PLAY AREA
PICNIC SITE	AMPHITHEATER
SHELTER	HIKING TRAIL

EXISTING DEVELOPMENT TO REMAIN

DEVELOPED AND/OR OPERATED BY OTHERS

CONCEPTUAL PLAN

100 0 200 400
Scale in feet

NORTH

Lake Seminole

Apalachicola River Basin
Florida and Georgia

U.S. Army Engineers District, Mobile
Corps of Engineers
Mobile, Alabama

SPRING CREEK PARK

Date OCTOBER 1989

HELEN JOHNSON ROAD

REYNOLDS LANDING ROAD

CYPRESS POND ROAD

SPRING CREEK DRIVE

PROPOSED ASPHALT PARKING (91 SPACES) (PHASE 1)

EXISTING ASPHALT DRIVE

PROPOSED ENTRANCE SIGN (PHASE 1)

PROPOSED PRIMARY WEIGH-IN AREA (PHASE 1)

PROPOSED EXIT SIGN (PHASE 1)

EXISTING ASPHALT PARKING AREA

PROPOSED QUADRUPLE RAMP (PHASE 1)

PROPOSED 30'x50' PAVILION (PHASE 3)

PROPOSED DAY-USE DOCKS (PHASE 1)

PROPOSED SECONDARY WEIGH-IN AREA (PHASE 1)

PROPOSED BOARDWALK (PHASE 2)

PROPOSED OVERLOOK DECK (PHASE 2)

PROPOSED GRASS/TURF PARKING AREA (PHASE 1)

150 OVERFLOW PARKING SPACES (GRASS/TURF) SURFACE

PROPOSED RV CAMPING SPACES (35) (PHASE 1)

PROPOSED RESTROOM (PHASE 3)

PROPOSED WEIGH-IN AREA PAVILION (PHASE 3)

PROPOSED PARK HOST SITE (PHASE 3)

PROPOSED RV 'BUMP-OUT' HOLDING TANK (PHASE 3)

EXISTING RESTROOM

PROPOSED TOTLOT (PHASE 3)

PROPOSED INTERPRETIVE TRAIL (PHASE 2)

PROPOSED TRAIL (PHASE 2)

PROPOSED TRAIL (PHASE 3)

EXISTING DIRT ROAD

EXISTING ASPHALT ROADWAY

100' SETBACK

PROPOSED OVERLOOK DECK (PHASE 2)

PROPOSED BOARDWALK (PHASE 2)

25' STREAM BANK BUFFER

100' SETBACK

PROPOSED RESTROOM (PHASE 4)

EXISTING VEHICULAR PATH

PROPOSED PRIMITIVE CAMPING SITES (typ.) (PHASE 3)

PROPOSED RESTROOM (PHASE 4)

PROPOSED OVERLOOK DECK (PHASE 2)

PROPOSED RV CAMPING SPACES (4) (PHASE 4)

PROPOSED OVERLOOK DECK (PHASE 2)

100' SETBACK

25' STREAM BANK BUFFER

JURISDICTIONAL WETLAND LINE

25' STREAM BANK BUFFER

PROPOSED PAVILION (PHASE 4)

EXISTING PAVILION (to remain)

PROPOSED PAVILION (PHASE 4)

LEASE BOUNDARY

SPRING CREEK

SPRING CREEK DRIVE

LEGEND

- EXISTING DIRT ROAD
- PROPOSED ASPHALT SURFACE
- PROPOSED TRAIL
- PROPOSED CAMPSITE
- USACE / SEMINOLE COUNTY LEASE BOUNDARY
- WATER'S EDGE (INTERPOLATED FROM AERIAL PHOTOGRAPHY)

NORTH

200 0 100 200

1 inch = 200 Feet

August 2, 2010 (6:43:10 EST)
G:\PROJECTS\7269-001 REYNOLDS LANDING\CAD\CONCEPTMASTERPLAN.DWG

NO.	DATE	DESCRIPTION
		REVISIONS

DESIGNED BY: J.C.P.
DRAWN BY: M.I.C.
CHECKED BY: E.K.G.
SCALE: 1" = 200'

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PROJECT NAME: SPRING CREEK PARK

SHEET TITLE: CONCEPTUAL MASTER PLAN

SEAL: Echo Kidd Gates, P.E. License Number PE031576 GSWC Cert. No.: 0000055948

PROJECT NUMBER: 7269-001
DATE: 05/05/2010
SHEET NUMBER: C1.1

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

In 2007, Georgia Governor Sonny Perdue announced the *GoFish Georgia* Initiative (*GoFish* or Initiative). This Initiative is a statewide program aimed at boosting economic stimulus in rural communities by promoting sportfishing tourism across the state. SCP is among 18 fishing access points throughout Georgia selected for the Initiative. A *GoFish* ramp has previously been approved on the Flint River arm of Lake Seminole in Bainbridge (Decatur County); this is about 20 miles by lake from SCP. Fishing tournament organizers, especially moderate-sized tournaments not needing the maximum hotel capacity available in Bainbridge, find the mid-lake site at SCP very appealing. A 2010 survey conducted by the Georgia Department of Transportation (GDOT) showed that average monthly visitation at SCP ranged as high as 10,400 vehicles during summer season when fishing tournaments are prevalent. This underscores the value of providing enhanced recreational infrastructure. Improvements for tournament fishing include improving the bathroom facilities, adding dock space, and creating a suitable space for fish weigh-in and spectators.

1.4 AUTHORITY

Title 16 of the *United States Code* (USC), Section 406(d), approved December 22, 1944, as amended by Section 4 of the Flood Control Act of 1946, Section 209 of the Flood Control Act of 1954 and Section 207 of the Flood Control Act of 1962, authorizes the Secretary of the Army to lease lands at Water Resources Development projects if those leases are in the best interest of the general public. Additionally, federal actions, *i. e.*, leasing of land, require the preparation of *National Environmental Policy Act* (NEPA; 1969) documentation in order to evaluate the potential environmental impacts of the proposed action. A copy of the 1976 Final Environmental Impact Statement for the construction of Jim Woodruff Lock & Dam is provided as **Appendix A**.

2.0 ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.1 GENERAL ENVIRONMENTAL SETTING

The study area is located within the Dougherty Plain of the Atlantic Costal Plain Physiographic Province. The Dougherty Plain is characterized by low relief and contains numerous wetland systems. Elevations are highest at 100 feet in the northern portion of the project area and gradually decrease to approximately 80 feet along the shoreline. The Natural Resources Conservation Service (NRCS) soils manual was utilized to determine the approximate extent of the soils units known to exist within the project boundaries. The specific limits of mapped soil units within the study area are detailed on **Figure 5**. A complete list of soil types is provided in **Table 1**.

Table 1. Summary of Soils found On-Site.

Soil Unit	Soil Description	Hydric Soil
TzB	Troup Sand, 0-5 % slopes	No
Oh	Ocilla Loamy Sand	Yes
LMB	Lucy Loamy Sand, 0-5% slopes	No

Land use and ecological communities are grouped into four categories, as described by Wharton (2005). The limits of each community are depicted on **Figure 6**. These included pine flatwoods, wetland forest mixed, freshwater marsh, and roads (impervious surface). Impervious surface is currently limited to approximately five acres and is comprised of the existing boat launch, the associated 30-space parking area, and less than half a mile of asphalt road.

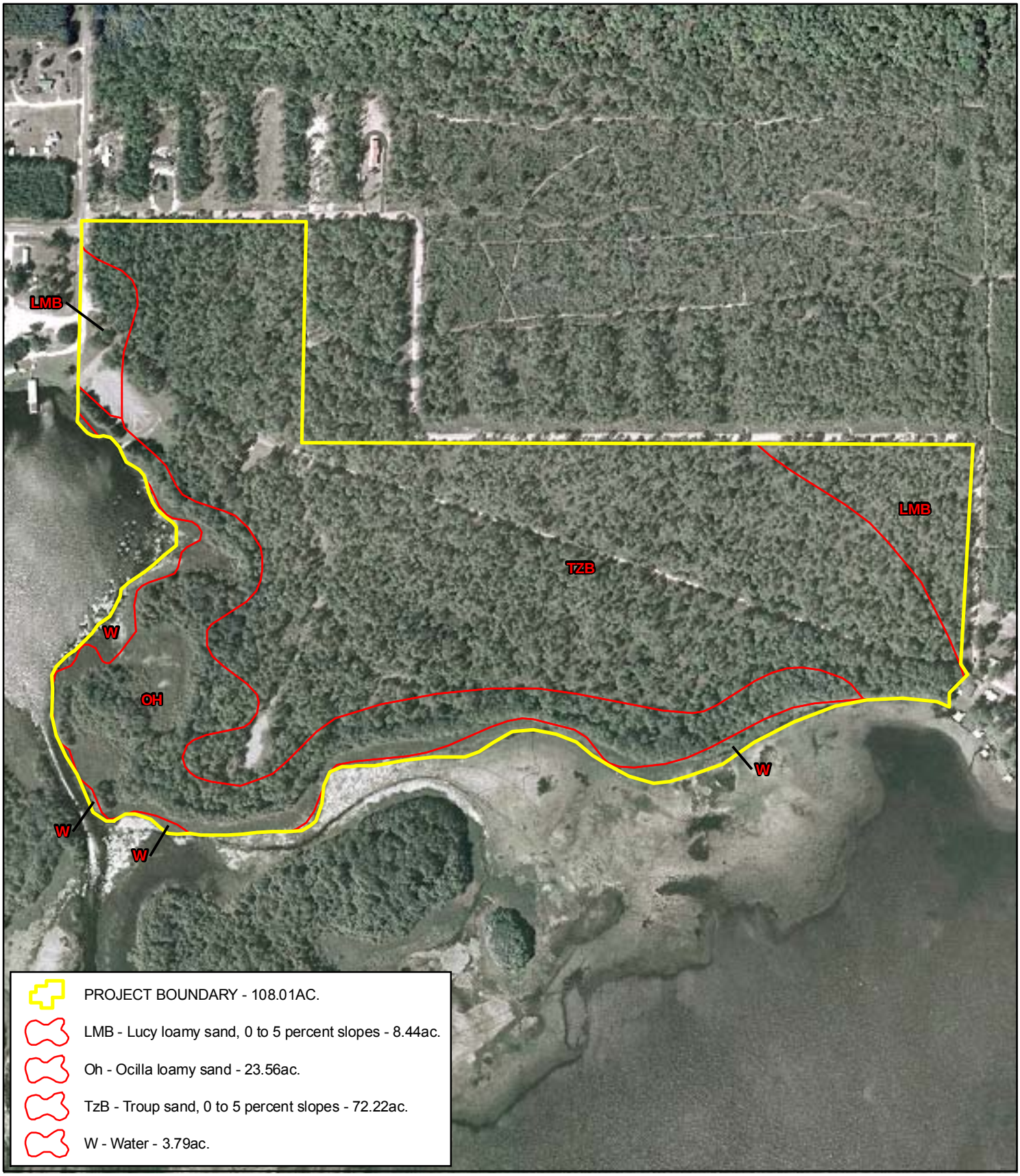

Figure 5 - NRCS Soils Map

Spring Creek Park
Seminole County, Georgia

Image: 2007 NC

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Figure 6 - Ecological Communities Map

Spring Creek Park
Seminole County, Georgia

Image: 2007 NC

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Upland land use mostly consists of managed pine flatwoods; see **Appendix B, Photograph 1**. This community is best characterized by having a mature longleaf pine (*Pinus palustris*) canopy. Sub-canopy composition is primarily laurel oak (*Quercus hemisphaerica*) and longleaf pine recruits. Wiregrass (*Aristida stricta*) dominates the forest floor. The presence of live oaks (*Q. virginiana*), both mature and recruitment, gradually increases in the eastern portions of the parcel but remained sub-dominant to longleaf pine; see **Appendix B, Photograph 2**. Upland nuisance and/or exotic vegetation are present in isolated patches and include cogon grass (*Imperata cylindrica*), kudzu (*Pueraria montana*), and japanese climbing fern (*Lygodium japonicum*).

Mixed wetland forest serves as the riparian transition between Lake Seminole and the upland pine flatwoods; see **Appendix B, Photograph 3**. As such, the vegetative composition ranges from obligate vegetation near water's edge to a mixture of facultative and upland vegetation upgradient. Common tree species included bald cypress (*Taxodium distichum*), sweetbay (*Magnolia virginiana*), red bay (*Persea borbonia*), black tupelo (*Nyssa sylvatica* var. *biflora*), and red maple (*Acer rubrum*). Common shrub species include wax myrtle (*Myrica cerifera*), black willow (*Salix nigra*), salt bush (*Baccharis halimifolia*), and gallberry (*Ilex glabra*). Herbaceous and groundcover species include dogfennel (*Eupatorium capillifolium*), goldenrod (*Solidago* sp.), highbush blackberry (*Rubus argutus*), blue maidencane (*Amphicarpum mulenbergianum*), bushy bluestem (*Andropogon glomeratus*), broomsedge bluestem (*Andropogon virginicus*), coinwort (*Centella asiatica*), manyflower marsh pennywort (*Hydrocotyle umellata*), redroot (*Lachnanthes caroliniana*), laurel greenbriar (*Smilax laurifolia*), and St. John's wort (*Hypericum fasciculatum*).

Freshwater marsh habitat is common along the littoral zone of Lake Seminole; see **Appendix B, Photographs 4-5**. Generally these communities exist within 8-10 feet of the bank where water depth is sufficiently shallow to support emergent plant growth. Emergent species, such as cattail (*Typha latifolia*), pickerel weed (*Pontederia cordata*), giant cutgrass (*Zizaniopsis milicea*), water paspalum (*Paspalum repens*), and various rushes (*Juncus* spp.) and sedges (*Carex* spp.) are common along the shoreline particularly in the vicinity of the existing boat ramp. Submersed aquatic vegetation is also abundant and is composed mostly of coontail (*Ceratophyllum demersum*), fanwort (*Cabomba caroliniana*), and bladderwort (*Utricularia* spp.). Aquatic nuisance and/or exotic species, both submerged and emergent, are also present and include alligator weed (*Alternanthera philoxeroides*), water primrose (*Ludwigia* spp.), and hydrilla (*Hydrilla verticillata*).

2.2 SIGNIFICANT RESOURCES DESCRIPTION

2.2.1 Water Quality

The project site drains into the Spring Creek embayment of Lake Seminole. Lake Seminole supports its designated use according to the 2010 Integrated 305(b) list for Georgia waters. Water quality variables routinely measured by the Georgia Environmental Protection Division (GAEPD) include dissolved oxygen, temperature, pH, specific conductance, Secchi disk transparency, chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity. There are no perennial or intermittent watercourses, manmade ditches, or canals within the project area, and all surface water discharge occurs as overland flow where it conveys downgradient into Lake Seminole.

2.2.2 Fishery Resources

At least 79 fish species are known to occur in Lake Seminole (COE 2010). Popular sport fish include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), striped bass (*Morone saxatilis*), hybrid bass (*Morone saxatilis* x *M. chrysops*), spotted bass (*Micropterus punctulatus*), crappie (*Pomoxis* spp.), catfish (*Ictalurus* spp. & *Pylodictus olivaris*), bluegill (*Lepomis macrochirus*),

and sunfish (*Lepomis* spp.). Lake Seminole is considered one of the top fishing destinations in Georgia and consistently ranks in the top fifth percentile of angler success during bass tournaments. The Georgia Bass Federation 2009 Tournament Creel Report ranked Lake Seminole, from among 13 popular Georgia reservoirs, as first in the number of five-pound bass harvested through tournaments and second in average largest bass through tournaments (Quertermus 2009). This report included data from 500 statewide bass fishing tournaments; 40 of which occurred at Lake Seminole.

2.2.3 Wildlife Resources

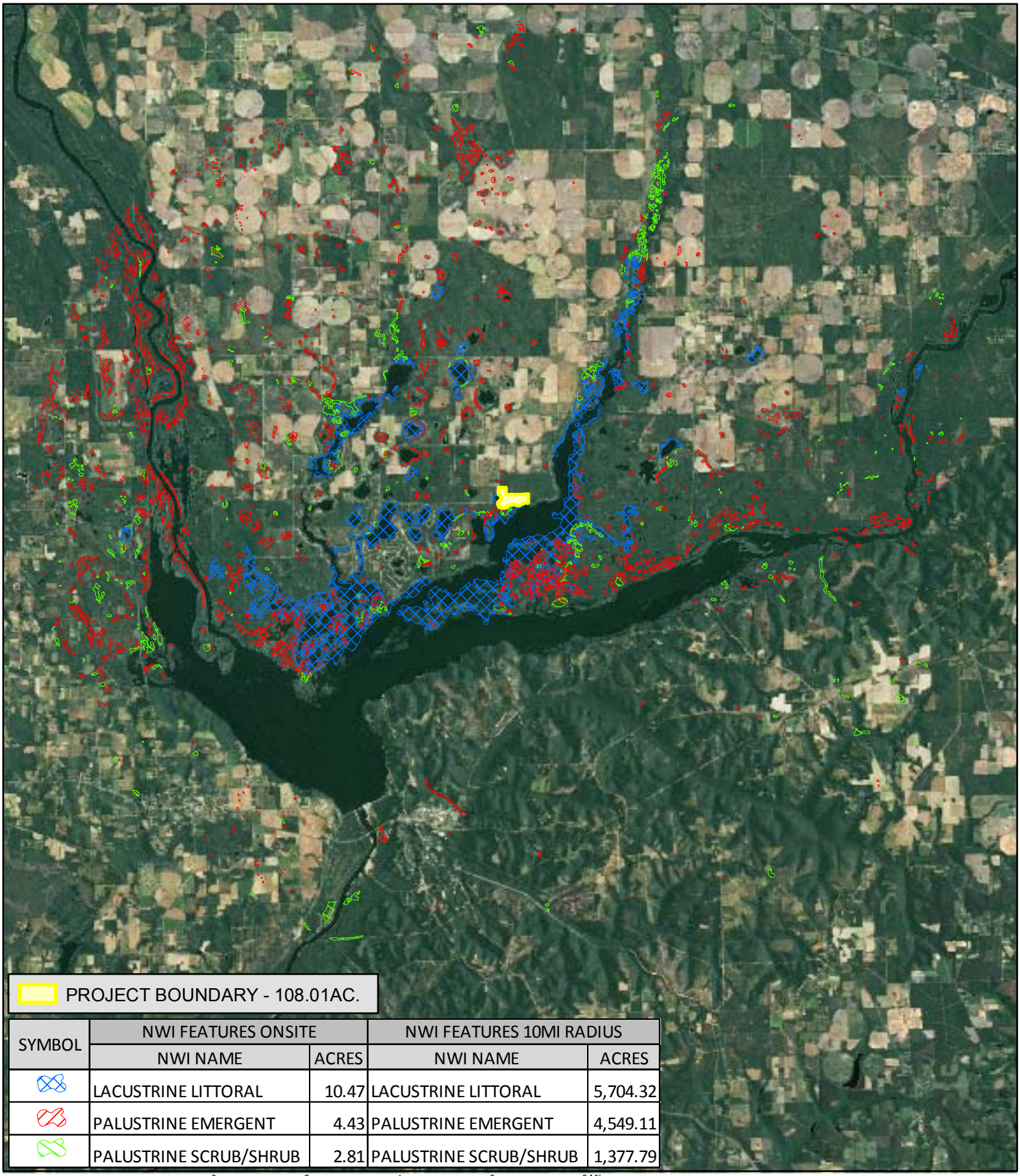
An environmental assessment was conducted by ENTRIX, Inc. (ENTRIX) ecologists on March 6, 2008. Wildlife observations included direct (visual) and/or indirect (call, sign) evidence of a myriad of game and nongame species. Upland game species that occur within the project area include wild turkey (*Meleagris gallopavo silvvestris*), whitetail deer (*Odocoileus virginianus*), mourning dove (*Zenaida macroura*), gray squirrel (*Sciurus carolinensis*), and cottontail rabbit (*Sylvilagus floridanus*). A myriad of wading birds would be expected to utilize the park, including great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), great egret (*Ardea alba*), *etc*. Waterfowl, including the mallard (*Anas plathyrhynchos*), blue winged teal (*Anas discors*), American coot (*Fulica americana*), and wood duck (*Aix sponsa*), to name a few, would also be expected to occur during the winter migratory season.

Songbirds recorded during the March 2008 survey included the typical array of cosmopolitan species, such as the northern mockingbird (*Mimus polyglottos*), bluejay (*Cyanocitta cristata*), northern cardinal (*Cardinalis cardinalis*), Carolina chickadee (*Poecile carolinensis*), eastern towhee (*Pipilo erythrophthalmus*), and red-bellied woodpecker (*Melanerpes carolinus*), as well as migratory species such as the yellow-rumped warbler (*Dendroica coronata*), pine warbler (*Dendroica pinus*), cedar waxwing (*Bombycilla cedrorum*), northern parula (*Parula americana*), American robin (*Turdus migratorius*), and white-throated sparrow (*Zonotrichia albicollis*).

2.2.4 Wetlands

Wetlands are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3). COE regulates impacts to wetlands under Section 404 of the *Clean Water Act* (CWA). GAEPD regulates impacts to riparian habitat in accordance with the *Erosion and Sedimentation Act*, 1975, as amended, O.C.G.A. 12-7-6(b)(15).

According to the National Wetlands Inventory Program (NWI), administered by the U. S. Fish and Wildlife Service (FWS), approximately 15% of the SCP project area exists as wetlands, the most prominent type consisting as Lacustrine Littoral, or freshwater marsh; see **Figure 7**. This wetland type is relatively common throughout the region and comprises more than 5,700 acres in and around Lake Seminole. Other NWI mapped wetlands within SCP include Palustrine Emergent and Palustrine Shrub/Scrub, which together account for 6% of the SCP project area. These wetland types are also common regionally and comprise more than 4,500 acres and 1,300 acres, respectively, within a 10-mile radius of SCP. It is important to note that NWI maps present only a ‘broad-brushed’ wetland inventory and a more formal survey is necessary to accurately document the types and extent of wetlands available. Such a survey was conducted by ENTRIX, Inc. during July 2010, as according to the COE *Wetlands Delineation Manual* (1987), and concluded that approximately 22% of the SCP project area consists of these wetland types. Overall, the proposed activities, which include the boat launch renovation, mooring docks, and wooden boardwalk/overlook decks, would impact approximately 0.22 acres of jurisdictional wetlands.



SYMBOL	NWI FEATURES ONSITE		NWI FEATURES 10MI RADIUS	
	NWI NAME	ACRES	NWI NAME	ACRES
	LACUSTRINE LITTORAL	10.47	LACUSTRINE LITTORAL	5,704.32
	PALUSTRINE EMERGENT	4.43	PALUSTRINE EMERGENT	4,549.11
	PALUSTRINE SCRUB/SHRUB	2.81	PALUSTRINE SCRUB/SHRUB	1,377.79

0 2 4 6 8 Miles

0 3 6 9 12 Kilometers

Figure 7 - National Wetlands Inventory Map

Spring Creek Park
Lake Seminole, Georgia

IMAGE: ESRI 15M

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Date: 10/27/2010 Rev. Date: PM: MAB GIS Analyst: JPB Map Document: NWI.mxd Project Number: GGI1-310-Y040 PDF Document: FIGURE6_NWI.pdf Plot Size: 8.5 x 11

2.2.5 Endangered Species

The Endangered Species Act (ESA) was signed into law in 1973 to protect rare, threatened, and endangered wildlife in the United States. Section 7a(2) of ESA requires COE, in consultation with FWS, to insure that actions at the SCP lease do not jeopardize the continued existence of threatened and endangered species or result in the destruction or adverse modification of the species' critical habitat. Critical habitat areas are identified as essential to the conservation of federally listed species. There are no critical habitats designated within or abutting the SCP lease. Section 7 consultation with FWS West Georgia Field Sub-Office has been coordinated by e-mail dated August 12, 2011 and states a determination that the proposed actions are not expected to significantly impact fish and wildlife resources under FWS jurisdiction; see **Appendix C**.

GADNR has provided a list of known occurrences of natural communities, plants, and animals of highest priority conservation status on or near SPC; see **Appendix D**. These species are summarized in **Table 2**. Two of the species listed in **Table 2**, the gopher tortoise (*Gopherus polyphemus*) and bald eagle (*Haliaeetus leucocephalus*), were observed during the 2008 environmental assessment; see **Figure 8**. The gopher tortoise, considered Threatened by GADNR, was found in abundance throughout the project site. The conservation status of this species within the eastern portion of its range, including Seminole County, Georgia, is currently under review by FWS. This species is federally listed as threatened throughout the western half of its range, which includes portions of Alabama, Mississippi, and Louisiana.

Table 2. Federal/State Listed Species Known to Occur/Potentially Occur near SCP, Seminole County, Georgia.

Scientific Name	Common Name	Status (Fed/GA)	Rank (GA)	Habitat in Georgia
Elimia albanyensis	Black-crest Elimia	N/N	SH	Slackwater habitats in medium-sized rivers
Drymarchon couperi	Eastern Indigo Snake	T/T	S3	Sandhills; pine flatwoods; dry hammocks; summer habitat includes floodplains and bottomlands
Gopherus polyphemus	Gopher Tortoise	N/T	S2	Sandhills; dry hammocks; longleaf pine-turkey oak woods; old fields
Graptemys barbouri	Barbour's Map Turtle	N/T	S2	Rivers & large creeks of Apalachicola River drainage
Utterbackia peggyae	Florida floater	N/N	S2	Large rivers to small streams in slackwater habitats
Hamiota subangulata	Shinyrayed Pocketbook	E/E	S2	Sandy/rocky medium-sized rivers & creeks
Ameiurs serracanthus	Spotted Bullhead	N/N	S2	Large streams and rivers with moderate current and rock-sand substrate
Haliaeetus leucocephalus	Bald Eagle	N/T	S2	Edges of lakes & large rivers; seacoasts
Picoides borealis	Red-cockaded Woodpecker	E/E	S2	Open pine woods; pine savannas
Carex decomposita	Cypress-knee Sedge	N/N	S2?	Swamps and lake margins on floating logs
Physostegia leptophylla	Narrowleaf Obedient Plant	N/N	S2S3	disjunct in wet savannas of extreme SW Georgia

N-Not listed. **E**-Listed as endangered. **T**-Listed as threatened. **SH**-Species and ecosystems are designated with as such (possibly extinct or extirpated) if they are known only from historical records but there is a chance they may still exist.; **S1**-Critically imperiled in state because of extreme rarity (5 or fewer occurrences); **S2**-Imperiled in state because of rarity (6 to 20 occurrences); **S3**-Rare or uncommon in state (on the order of 21 to 100 occurrences); **?**-Denotes questionable rank; best guess given whenever possible (*e.g.* **S3?**).

A juvenile bald eagle was observed in flight only. No bald eagle nests were detected onsite. Although the bald eagle has been removed from the federal list of endangered and threatened species, it remains protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The species is also considered threatened by GADNR. The nearest nest, according to the

Figure 8 - Listed Species Survey

Spring Creek Park
Seminole County, Georgia

Image: 2007 NC

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GADNR Wildlife Resources Division, was located offsite approximately 0.9 miles southwest of the SCP boat launch. This nest was not occupied by eagles during the 2006-2007 nesting season.

Preferred habitat for several other species listed in **Table 2** is abundant throughout the upland pine flatwoods. Specifically, these include the red-cockaded woodpecker (RCW; *Picoides borealis*), wood stork (*Mycteria americana*), and eastern indigo snake (*Dymarchon couperi*) none of which were observed during the 2008 environmental assessment. RCW inhabits open, mature pine forests with sparse midstory vegetation and excavates its cavities exclusively in old growth (over 60 years of age) pine trees. The nearest known population is located within the Silver Lake Wildlife Management Area two miles east of the SCP lease (GADNR 2010). The proposed activities are not anticipated to affect this population. Wood storks are colonial wading birds that prefer seasonally inundated, open-canopied wetlands for foraging and cypress-gum swamps for nesting. No nesting colonies of wood storks or other wading birds were detected on the SCP lease.

ESA, along with the *Wildflower Preservation Act*, 1973, also requires Georgia Department of Natural Resources (GADNR) to designate and protect all plant and animal species indigenous to the state that are determined to be Endangered, Threatened, Rare, Unusual, or in Danger of Extinction. Protected species in Georgia are assigned state ranks of rarity based on biological and geographical factors. The following acts are prohibited in the State of Georgia for protected wildlife species:

1. Any activities which are intended to harass, capture, kill, or otherwise directly cause death of any protected animal species are prohibited, except as specifically authorized by law or by regulation as adopted by the Board of Natural Resources.

2. The sale or purchase of any protected animal species or parts thereof is prohibited and the possession of any such species or parts thereof is prohibited unless the possession is authorized by a scientific collecting, wildlife exhibition, or other permit or license issued by the Department.

3. The destruction of the habitat of any protected animal species on public lands is prohibited.

Additionally, the following acts are prohibited in the State of Georgia for protected plant species:

1. No person within this State shall cut, dig, pull up, or otherwise remove any protected plant species from public land unless such person has secured an appropriate permit from the Department.

2. No person within this State shall sell or offer for sale, for any purpose, any protected plant species unless such species was grown on private land and is being sold by the landowner or with the permission of the landowner.

3. No person within this State shall transport, carry, or otherwise convey any protected plant species from the land of another unless each shipment thereof has affixed a tag supplied by the Department showing that the person so transporting, carrying, or conveying such protected species has removed such specimen(s) from the private lands of another person with the permission of such other person and has a written document in his possession evidencing such permission, and further evidencing that such specimen has not been sold.

2.2.6 Historic and Archeological Resources

A cultural resource letter was issued by the Georgia Historic Preservation Division on February 14, 2011 stating that "no archaeological resources or structures … will be affected by the proposed undertaking, as defined in 36 CFR Part 800.4(d)(1)." A copy of this letter is provided as **Appendix E**.

2.3 NAVIGATION

Lake Seminole has a federally maintained navigation channel. The proposed actions occur neither within, nor have any direct effect on, this channel. Recreational boat traffic is common through the inlet connecting SCP with Lake Seminole.

2.4 RECREATION

Currently the park provides a single lane boat launch and array of associated infrastructure sufficient to accommodate moderate recreational use, *e. g*., mooring platform, 30-space asphalt parking area, and a single restroom facility; see **Appendix B, Photograph 6**. Additionally, immediately west of the project area is SCP Resort which features two dining establishments, motel style lodging, RV camping facilities, and approximately twenty covered boat slips. This is a privately-owned establishment and exists independent of the SCP lease.

2.5 SOCIOECONOMIC RESOURCES

The 2008 population estimate for Seminole County, Georgia was 9,091 persons. This estimate reflects a 3% decrease from the previous decade (UGA 2010). The labor force during December 2009 was 3,996 with a corresponding unemployment rate of 10.2% (GDOL 2010). Unemployment rates in Seminole County peaked during February 2009 at 11.5%. The unemployment rate is calculated by the U. S. Bureau of Labor Statistics (BLS) as the number of local, jobless residents who are actively seeking a job, divided by the number of residents who are in the work force. Median household income during 2008 was $28,676 and 23.1% of all persons ranked at or below the poverty level. The majority of Seminole County is rural with 103,543 acres dedicated to farming. As of 2007 there were 182 farms county-wide. This number reflects a nearly 12% decline over the previous five years.

2.6 ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898, February 11, 1994, requires addressing, as appropriate, disproportionately high and adverse human health or environmental effects of Federal action on minority and low income populations. As of 2008, approximately 23% of Seminole County residents survived below the national poverty level. This is nearly 10% higher than when averaged across Georgia (U. S Census Bureau, USCB, 2010).

2.7 PROTECTION OF CHILDREN

EO 13045, April 21, 1997, requires, to the extent permitted by law and mission, identifying and assessing environmental health and safety risks to children posed by the proposed action. According to USCB as of 2009 approximately 31% of the population of Seminole County, Georgia was younger than 18 years of age with nearly 7% under 5 years of age.

2.8 HAZARDOUS AND TOXIC MATERIALS

The project site occurs in a rural setting with no neighboring industry. There are no known hazardous wastes, hazardous materials, solid wastes, or petroleum products supported, generated, or received by the project site. Further, no evidence of hazardous substances, e.g. elicit dump sites, oiled sediments, abandoned containers or storage tanks, was observed during an environmental assessment conducted by ENTRIX ecologists during March 2008. The project area is rural and the nearest industry is located greater than 15 miles away.

3.0 DESCRIPTION OF THE RECOMMENDED PLAN

Currently the park provides a single lane boat launch and typical array of associated infrastructure to accommodate moderate recreational use, *e. g*., asphalt parking area, picnic areas, and a single restroom facility. The MDP proposes a four-lane boat launch to replace the existing launch as well as a suite of constructed and/or renovated support facilities. These upgrades are displayed in **Figure 4** and include a 91-space asphalt parking area, a 150-space turf overflow parking area, day-use docks, four wooden pavilions and four overlook decks connected by a wooden boardwalk, three restroom facilities, RV pump-out/holding tank, two separate areas for RV camping (one having four sites and the other having 35), 24 primitive campsites, and a series of interpretive hiking trails.

4.0 ENVIRONMENTAL IMPACT OF THE RECOMMENDED PLAN

4.1 BIOLOGICAL AND PHYSICAL IMPACTS

The upgrade of recreational facilities at SCP will result in limited, unavoidable adverse effects associated with the loss of upland forest habitat for the parking areas, the replacement of shoreline emergent habitat for proposed launch/dock facilities, and increased human use including noise and traffic from vehicle and boating usage.

4.1.1 Land Use Changes

The preferred MDP aims to enhance recreational opportunities at SCP and its implementation will be consistent with the existing land use in the immediate and surrounding areas, which includes the existing day-use infrastructure, *e.g*., boat launch, parking and picnic areas, as well as the neighboring SCP Resort. Competition of services between SCP Resort and the proposed MDP, *i. e*., camping/lodging, are expected to be offset by the complementary effect of increased traffic on the remaining services provided by the resort, *e. g.*, dining, merchandise sales, equipment rentals, *etc*.

4.1.2 Historic and Archeological Resources

A cultural resource letter was issued by the Georgia Historic Preservation Division on February 14, 2011 stating that "no archaeological resources or structures … will be affected by the proposed undertaking, as defined in 36 CFR Part 800.4(d)(1)." A copy of this letter is provided as **Appendix E.** In the unlikely event that an inadvertent discovery of previously unknown cultural resources or potential human remains are uncovered during construction, all work would cease, the discovery would be protected, and the Mobile District project manager, as well as the Georgia State Archaeologist would be immediately contacted.

4.1.3 Endangered and Threatened Species

Section 7 consultation with FWS West Georgia Field Sub-Office has been coordinated by e-mail dated August 12, 2011 and states a determination that the proposed actions are not expected to significantly impact fish and wildlife resources under FWS jurisdiction; see **Appendix C**. Additionally, GADNR provided a letter dated July 12, 2011 listing known occurrences of sensitive species near SPC along with best management recommendations for avoiding negative impacts to sensitive habitats, flora, or fauna; see **Appendix D**.

Preferred habitat for several state and/or federally protected species listed in **Table 2** is abundant throughout the upland pine flatwoods. Specifically, these include the red-cockaded woodpecker (RCW; *Picoides borealis*), and eastern indigo snake (*Dymarchon couperi*) none of which were observed during the 2008 environmental assessment. RCW inhabits open, mature pine forests with sparse midstory vegetation and excavates its cavities exclusively in old growth (over 60 years of age) pine trees. The proposed activities are not expected to adversely affect RCW foraging or nesting success as the nearest known population is located within the Silver Lake Wildlife Management Area two miles east of the SCP lease (GADNR 2010). The eastern indigo snake occupies a wide range of habitat types including pine flatwoods, scrubby flatwoods, scrub and sandhill, hammocks, wetlands, coastal dunes, and human-altered habitats (FWS 2008). Below-ground refugia include the burrows of gopher tortoises (*Gopherus polyphemus*), nine-banded armadillos (*Dasypus novemcinctus*), and rodents, as well as hollow logs, stump holes, and other crevices (Hyslop 2007). The proposed activities may affect, but are not likely to adversely affect, indigo snakes or their habitat since the majority of gopher tortoise burrows on site will be unaffected and any excavated tortoises will be relocated to appropriate habitat elsewhere on site.

The Shiny-rayed pocketbook mussel (*Hamiota subangulata)* is endemic to the Flint River Basin and is known to occur within Seminole County, Georgia. This species is thought to have been extirpated from larger rivers but has been found in medium sized creeks where it inhabits a range of substrate types, typically in slow to moderate current (Williams *et. al*. 2008). Fish hosts for this species are believed to include spotted and largemouth bass (*Micropterus* spp.), bluegill sunfish (*Lepomis macrochirus*), and eastern mosquitofish (*Gambusia holbrooki*) (O'Brien & Brim Box 1999). It is possible, yet unlikely, that the shiny-rayed pocketbook mussel would occur within the SCP boat basin, specifically within proximity to the existing boat launch where construction is proposed to occur. The Florida floater (*Utterbackia peggyae*) occupies similar habitat as *H. subangulata* and is not expected to occur within the SCP boat basin. The proposed activities are not expected to adversely affect either mussel species.

Results from the March 2008 environmental assessment conducted by ENTRIX indicated numerous active and inactive gopher tortoise burrows occurring within the footprint of the proposed asphalt and turf parking areas. Mr. John Jensen, GADNR Herpetologist, and Ms. Brooke Smith, GADNR Special Use Permit Coordinator, were contacted by phone on May 19, 2009 to determine what measures would be required to authorize tortoise relocations from the proposed footprint to alternate locations on site occurring in appropriate habitat. It was concluded that a scientific collector's permit specific to the event would need to be obtained by Seminole County prior to handling. It was also agreed that relocation methods would be consistent with those described in the Florida Fish and Wildlife Conservation Commission (FFWCC), *Gopher Tortoise Management Plan* (FFWCC 2007)[1]. A standard methodology has not yet been developed for the State of Georgia. Pursuant to the FFWCC plan, active and inactive burrows located within 25 feet of construction activities would be excavated and individuals relocated to suitable on-site habitat. Silt fencing would be erected around the construction footprint to prevent

[1] http://myfwc.com/media/214304/GT_Mgmt_Plan.pdf

relocated tortoises from regaining access. This fencing would remain in place until such time as construction activities are complete. All occurring burrows affected by construction activities would be video-scoped for the presence of indigo snakes prior to excavation. Indigo snakes, if found, would be relocated to an alternate on-site burrow where construction activities were not planned to occur. The alternate burrow(s) would first be video-scoped to ensure against over-crowding or competition with other snakes prior to relocation.

Potential impacts to sensitive species not observed, but for which suitable habitat exists, might occur as a result of the proposed construction activities. Specifically these include construction of the asphalt parking areas, boat launch, and full-amenity camping areas; effects associated with the construction and/or use of interpretive trails and back-country campsites are expected to be ephemeral and inconsequential. Construction noise and vibration could disturb snakes and birds where it exceeds ambient conditions. Although construction personnel will be advised to avoid indigo snakes, the operation of equipment in brushy, grassy, or otherwise vegetated areas may disturb snakes that are not readily visible. Adherence to FWS *Standard Protection Measures for the Eastern Indigo Snake* (FWS 2004) will help abate the potential for mortality, injury, or harassment of indigo snakes from construction and operation activities within the action area. Further, standard construction conditions will require the education of contractors and equipment operators, posting of speed limit signs on all roadways during project construction and operation, on-site signs explaining penalties of intentionally running over snakes, and instructions that construction will cease if indigo snakes are observed.

4.1.4 Recreation

Recreation opportunities will be expanded, as a result of the proposed actions, to accommodate regional sportfishing tournaments, camping and hiking enthusiasts, and RV motorists. There were 40 small-to-mid-sized (<100 applicants) fishing tournaments reported on Lake Seminole during 2009 (Quertermus 2009). Collectively these tournaments generated substantial revenue in the local economy; a single major bass fishing tournament can have a $4-5 million economic impact on the local community (GADNR 2009). Current recreation infrastructure is sufficient to accommodate only moderate sportfishing traffic; see **Section 4.1.16**.

4.1.5 Air Quality

The proposed upgrades are not likely to adversely affect ambient air quality. There may be temporary and insignificant impacts to air quality during construction, *e. g.*, particulates and emissions from the construction equipment; however, these effects are expected to subside upon completion of the work. Seminole County is considered an attainment area for ozone and 24-Hour Fine Particle per Section 107 of the Clean Air Act.

4.1.6 Water Quality

Minor changes in water quality may result during construction of the parking areas, boat launch, mooring platform, and wetland boardwalk segments. These potential impacts will be minimized by implementation of GAEPD Sediment and Erosion Control Best Management Practices (BMP). It is expected that stringent BMP will be employed during the proposed project and will include a combination of structural and nonstructural methods to ensure minimization of sediment and nutrient runoff into Lake Seminole. Structural BMP include silt fences, sedimentation ponds, erosion control blankets, and temporary or permanent seeding. Nonstructural BMP include picking up trash and debris, sweeping up impervious areas, maintaining equipment, and training on-site staff on erosion and sediment control

practices (EPA 2010). Further, natural vegetation and grading techniques, *e. g.*, vegetated swales, buffer strips, rain gardens, will help ensure that the project area does not serve as a conduit for storm water or pollutants into Lake Seminole during or after construction. Finally, restrooms and associated water system facilities will incorporate the environmentally friendly water and septic technologies deemed appropriate for site conditions. Seeding and sod will be used to stabilize all disturbed areas following construction.

4.1.7 Wetlands

Construction of parking areas, picnic pavilions, restroom facilities, and camping areas has been designed to avoid impacts to open waters and/or wetland areas (jurisdictional areas). The proposed boat launch, mooring dock, and wetland boardwalk/overlooks, by their very nature, must occur within jurisdictional areas; however, these upgrades have been designed to minimize impacts to less than 0.25 acre of jurisdictional area; see **Figure 4**. Proposed renovations to the existing boat launch will encroach upon approximately 0.04 acre of jurisdictional area. The proposed mooring dock, including wet slips, will encroach upon approximately 0.01 acre of jurisdictional area. Approximately 1,142 linear feet of the proposed wooden boardwalk, including four overlook decks, would encroach upon approximately 0.17 acre of jurisdictional wetlands.

The proposed boat launch upgrade and boardwalk construction can be authorized by Nationwide Permits #36 (Boat Ramp) and #42 (Recreational) respectively. A Pre-Construction Notification (PCN) would be submitted by Seminole County to COE regarding the proposed impacts to jurisdictional areas. Additionally a GAEPD Streambank Buffer Variance would be requested by Seminole County for impacts occurring within a 25-foot buffer of the streambank or in this case shoreline. PCN and Streambank Buffer Variance application would be submitted by Seminole County upon completion of construction design specifications.

4.1.8 Floodplain Impacts

Approximately half of the project area is within designated Federal Emergency Management Agency (FEMA) 100-year floodplain; see **Figure 9**. Due to the nature of the project, *i. e.*, water-dependent recreation, there are no practicable alternatives to avoid use of the floodplain areas. Much of the proposed work, however, such as the paved and non-paved parking areas are designed to occur outside of the floodplain and should have no depreciable effect on flood storage, nor should they contribute to flooding elsewhere.

4.1.9 Noise Impacts

Noise may be a limited adverse environmental factor to consider for the proposed construction. Noise from the operation of construction equipment may have limited adverse impacts to the surrounding environment. Such impacts would cease following the completion of construction activities. The proposed activities may also increase noise as a result of increased recreational traffic: motorized boat; vehicular; and pedestrian. However, any noise impacts from such use would be consistent with noise levels already present at the project site and surrounding areas.

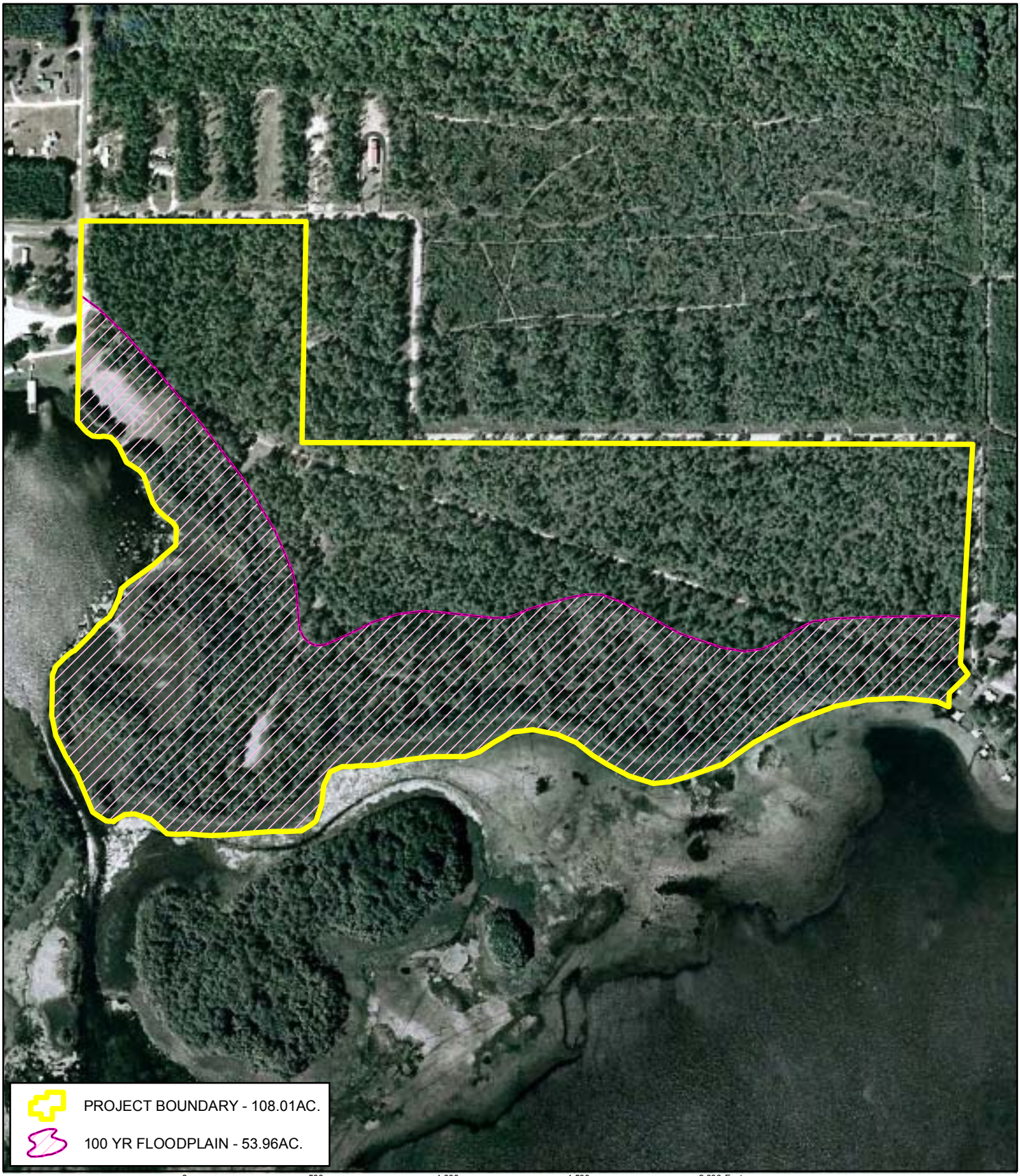

Figure 9 - FEMA 100YR Floodplain Map

Spring Creek Park
Seminole County, Georgia

Image: 2007 NC

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Coordinate System: NAD 1983 SPGWF

Date: 04/06/09 Rev. Date: 08/04/10 PM: MAB GIS Analyst: JPB Map Document: FEMA.mxd Project Number: GGI1-310-Y040 PDF Document: FEMA.pdf Plot Size: 8.5 x 11

4.1.10 Aesthetics

Short-term construction would negatively affect aesthetics; however, the proposed upgrades are consistent with existing recreational infrastructure, as well as adjacent developments, *i. e*., SCP Resort, and any permanent adverse impacts are not anticipated.

4.1.11 Socioeconomic Resources

The proposed actions are part of the Initiative, which is a Georgia-wide initiative aimed at boosting economic development across the state by enhancing boating and fishing tourism. Large boating access areas, as proposed for SCP, are capable of supporting large tournament events as well as normal boating and fishing activities. The economic effect of angler spending statewide is approximately $1.5 billion and large bass fishing tournaments have been known to generate millions of dollars into a local economy (GADNR 2010).

The introduction of such commerce, combined with increased recreational opportunities (camping, hiking, boating, *etc.*), will bolster growth and prosperity of the local community and in doing so facilitate a better quality of life for area residents.

4.1.12 Environmental Justice

EO 12898, February 11, 1994, requires addressing, as appropriate, disproportionately high and adverse human health or environmental effects of Federal action on minority and low income populations. EO 13045, April 21, 1997, requires, to the extent permitted by law and mission, identifying and assessing environmental health and safety risks to children posed by the proposed action. The proposed MDP does not create disproportionately high or adverse human health or environmental impacts on minority or low-income populations of the surrounding community. Rather, a key objective of the Initiative is to provide economic stimulus in rural communities.

4.1.13 Protection of Children

Potential safety hazards for children, occurring as a result of the proposed action, have been identified: injury during construction; water related hazards associated with the proposed docks; roadway incidents associated with increased traffic; and natural environmental risks, *e. g.*, poison ivy along the proposed trail. Appropriate measures shall be taken to ensure the construction area will not be accessible to children. Such measures shall include, but may not be limited to, erecting temporary fencing to cordon off hazard prone construction areas. Along the boat launch/docking area appropriate signage will be placed to remind guardians of water-related hazards such as drowning, alligators, boat traffic, *etc*. Also, permanent fencing will be erected at the proposed children's play area—Tot-Lot—to prevent unattended children from wandering into high traffic areas. Finally, potential environmental hazards along the proposed trail, such as poison ivy, that would otherwise be inaccessible will be removed, abated, or signaled with appropriate signage.

4.1.14 Prime and Unique Farmland

As required by section 1541(b) of the *Farmland Protection Policy Act* (7 U.S.C. 4202[a,b]) federal agencies are required to identify prime and unique farmlands and account for, if applicable, any adverse effects. Prime farmland describes lands offering the optimal combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique farmland describes land,

other than prime farmland, that is used for the production of specific high value food and fiber crops. Based on NRCS soil survey review and site reconnaissance no portion of the project site meets the criteria to be classified as either prime farmlands or unique agricultural lands.

4.1.15 Hazardous and Toxic Materials

The proposed actions, including construction of parking areas, boat launch facilities, camping and hiking areas, and picnic pavilions, are not anticipated to result in hazardous or toxic material input to the environment.

4.1.16 Cumulative Impacts

The proposed recreation-based activities are consistent with the current and recent use of the park. Foreseeable cumulative impacts to shared resources include an increase in recreational use of the adjacent recreational areas and sediment and noise impacts from proposed and any nearby future development in surrounding areas. City and county land development regulations, COE restrictions on the type of development on public lands, and sedimentation controls during development would likely minimize the cumulative environmental impacts of proposed and future developments on and around the proposed lease area.

4.1.17 Traffic

The purpose of the project is to increase recreational usage, and therefore, successful implementation of the MDP will result in increased vehicular and pedestrian traffic to/from and throughout the site. Road infrastructure is sufficient to handle increased traffic. **Figure 10** displays monthly vehicle entry data during a four-year period. Average monthly visitation was nearly 3,400 vehicles; however, monthly visitation ranged as high as 10,400 vehicles during a Spring 2010 fishing tournament.

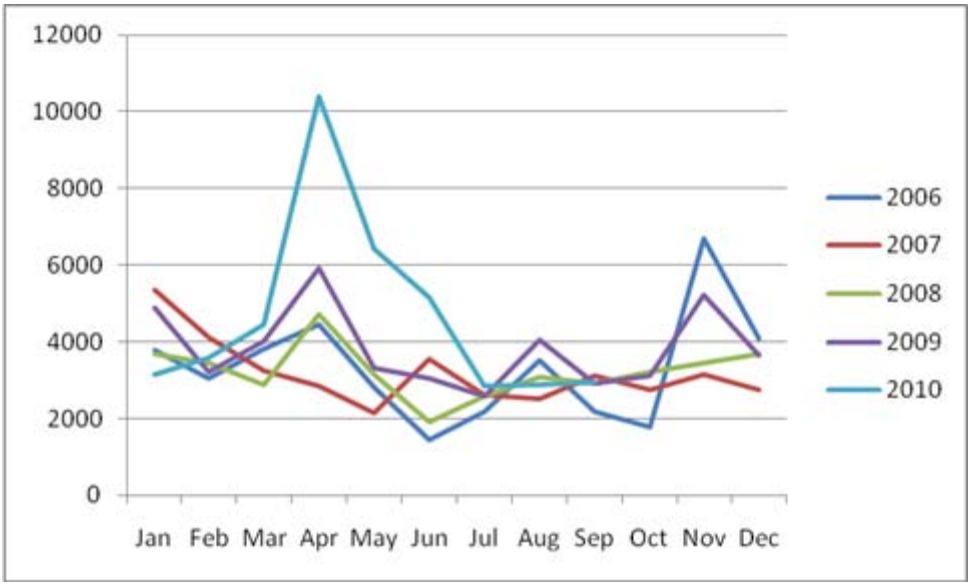

Figure 10. Vehicular entry data for Spring Creek Park (2006-2010); provided by Georgia Department of Transportation.

Vehicular traffic will be limited to the parking areas, existing roads, and RV campsites. Pedestrian traffic will be routed along established walking corridors, *e. g.*, sidewalks, proposed wooden boardwalk, and

proposed nature trails. Motorized boat traffic will increase within the immediate basin and throughout Lake Seminole as a whole. Increased boat traffic to and from the Spring Creek launch area will be channeled through a single throughway. Safety hazards associated with this traffic flow, such as speed reduction and navigation around blindspots, will be adequately addressed through appropriate signage and established *No Wake* zones.

Associated infrastructure is adequate for the expansion of the park. Electric utility is provided by Three Notch Electric, Donalsonville, Georgia. Telephone service is provided by Windstream's overhead line to the area. Their services include telephone, high-speed internet, and digital television.

4.2 CONTROL OF EXOTIC/INVASIVE VEGETATION

Soil disturbance occurring during proposed construction activities may encourage the proliferation and/or establishment of exotic/invasive plant species such as cogon grass (*Imperata cylindrica*), Nepalese browntop (*Microstegium vimineum*), Japanese climbing fern (*Lygodium janponicum*), kudzu (*Pueraria montana* var. *lobata*), and Chinese privet (*Ligustrum sinense*). A survey for exotic coverage shall be completed following completion of each phase of the proposed MDP. Any areas of infestation would be GPS-located and chemical and/or mechanical treatment techniques would be incorporated to control the establishment and spread of such species. Herbaceous vegetation, grasses, climbing ferns and woody vegetation less than 3 feet tall would be treated with herbicides using foliar application techniques. Other woody vegetation would be cut in place and stump-treated with a triclopyr compound such as Garlone 3A™.

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

Irreversible or irretrievable commitments of resources involved in the proposed action have been considered. They are unanticipated at this time as all activities proposed could be revised should the need arise.

6.0 ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Adverse environmental effects which cannot be avoided should the proposed Master Plan be implemented are the use of approximately 10 acres of upland pine flatwoods and less than 1 acre of jurisdictional wetland areas; see **Section 4.1.7**. Use of these habitats will have short-term unavoidable impacts to flora/fauna that would be managed and/or mitigated through the inclusion of habitat /species management plans and activity-specific permitting mechanisms.

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

The proposed project represents a long-term use of the environment with minimal and acceptable effects. The proposed development would enhance long-term productivity by providing recreational opportunities, thereby bolstering growth and prosperity of the local community, and in doing so facilitating a better quality of life for area residents. Temporary construction impacts, increased human use, and loss of wildlife habitat will be offset by services and facilities to benefit recreational users and

the local economy. The proposed development will be compatible with other recreation developments in the area and region.

8.0 ALTERNATIVES TO THE RECOMMEDED PLAN

Two primary alternatives were considered, *i. e.*, the No-Action Alternative and the Proposed MDP Alternative, as described in **Section 1.2**. Under the No-Action Alternative, the existing park would remain the same, and no development would occur. The major advantages to this alternative would be the lack of soil and vegetative disturbance occurring within the construction footprint. The major disadvantages are: 1) the no-action alternative does not meet the project objectives; 2) the land would be subject to misuse, e.g., vandalism, dumping, etc..., which potentially would continue to degrade wildlife habitat and water quality; and 3) the economic stimulus created by increased sportfishing tourism, including the revenue collected during tournament angling events, would not be realized. Alternative locations for the proposed actions were considered, including nearby public launch facilities, e.g., Seminole State Park; however, the purpose of the proposed actions are to increase overall recreational opportunities on Lake Seminole.

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APPENDIX

A

Eubanks

STATEMENT OF FINDINGS

Lake Seminole and Jim Woodruff Lock and Dam
Alabama, Florida, and Georgia
Operation and Maintenance

As District Engineer, Mobile District, Corps of Engineers, it is my duty as the responsible Federal official to prepare the Environmental Statement for the continued operation and maintenance of the existing Lake Seminole and Jim Woodruff Lock and Dam located in Houston County, Alabama, Jackson and Gadsden Counties, Florida, and Seminole and Decatur Counties, Georgia. I have reviewed and evaluated, in the overall public interest, the stated views of other interested agencies and the concerned public, and those contained in the environmental statement describing the effects of the operation and maintenance activities.

In evaluation, I have studied and analyzed the plan for the continued operation and maintenance of Lake Seminole and Jim Woodruff Lock and Dam. The project provides navigation, power, recreation, regulation of stream flow, and fish and wildlife conservation. I have considered the engineering problems, the social and economic factors involved, and the environmental consequences of continuing operation of the project. Operation and maintenance of the project will provide social and economic benefits to the people of the project area.

The environmental statement has been prepared and coordinated with the appropriate Federal and state agencies and with citizens' groups and interested parties in compliance with the spirit and intent of the National Environmental Policy Act of 1969. As indicated in the statement, some adverse environmental effects occur as a result of the operation and maintenance of the project. These adverse effects are offset by the benefits derived from operation of the project.

Based on the above criteria and evaluation, I find that the adverse effects of the project are substantially outweighed by other considerations of social and economic benefits; that the recommended action is consonant with national policy, statutes and administrative directives; and that the total public interest would best be served by continuation of the existing project.

27 Jan 76
Date

Signed _____
DRAKE WILSON
Colonel, CE
District Engineer

Statement of Findings - Lake Seminole and Jim Woodruff Lock and Dam
Alabama, Florida, and Georgia - Operation and Maintenance

I have reviewed the Statement of Findings and concur with the recommendations of the District Engineer.

2 March 1976
Date

CARROLL N. LeTELLIER
Major General, USA
Division Engineer

I concur in the preceding Statement of Findings.

10 April 1976
Date

ERNEST GRAVES
Major General, USA
Director of Civil Works

FINAL

ENVIRONMENTAL STATEMENT

LAKE SEMINOLE AND JIM WOODRUFF LOCK AND DAM
ALABAMA, FLORIDA, AND GEORGIA
OPERATION AND MAINTENANCE

Prepared by
MOBILE DISTRICT CORPS OF ENGINEERS
With Data Prepared Under Contract by
Auburn University
Auburn, Alabama
February 1976

DRAFT
ENVIRONMENTAL STATEMENT
LAKE SEMINOLE AND JIM WOODRUFF LOCK AND DAM
OPERATION AND MAINTENANCE

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SUMMARY

LAKE SEMINOLE AND JIM WOODRUFF LOCK AND DAM,
ALABAMA, FLORIDA AND GEORGIA, OPERATION AND MAINTENANCE

( ) DRAFT (X) FINAL ENVIRONMENTAL STATEMENT

RESPONSIBLE OFFICE: District Engineer, U. S. Army Engineer District, P. O. Box 2288, Mobile, Alabama 36628, 205-690-2511.

1. NAME OF ACTION: (X) ADMINISTRATIVE ( ) LEGISLATIVE

2. DESCRIPTION OF ACTION: The proposed work analyzed in this environmental statement consists of the operation and maintenance of the powerhouse, lock, dam, and reservoir, including associated buildings, water quality monitors, access roads, public use areas, and boat channels. The construction of new recreational areas is also covered by this environmental statement.

3. (A) ENVIRONMENTAL IMPACTS: The proposed action provides electric power, aids navigation, provides recreational opportunities, regulates stream flow, and enhances fish and wildlife habitat. Lake Seminole provides ideal habitat for both the growth of aquatic plants and mosquito populations. The effect of control measures for aquatic plants and mosquitoes in Lake Seminole poses minor adverse environmental problems. However, the need for control of aquatic plants is a problem in itself. A small temporary increase in turbidity results from periodic maintenance dredging operations in the reservoir. The continued operation and maintenance of project facilities will prevent the natural floristic and faunistic conditions from developing extensively in these areas.

(B) ADVERSE ENVIRONMENTAL EFFECTS: Provides ideal habitat for the continued growth of aquatic plants and mosquitoes; creates minor problems resulting from the use of chemical pesticides to control nuisance aquatic plants and mosquito populations; loss of fish food organisms due to fluctuating pool levels; interfers with the spawning migrations of anadromous and catadromous fish species; aggravates the pollution control problems of the Apalachicola-Chattahoochee-Flint Basin due to increased barge traffic and associated industrial activities; creates temporary turbid conditions during dredging operations; and enhances the chances of death by accidental drowning and other water-related accidents.

4. ALTERNATIVES TO THE PROPOSED ACTION: Discontinue operation and maintenance with the existing structures and facilities remaining in place; discontinue operation of the powerhouse resulting in a more stable recreational pool; and eliminate the dam thereby returning the stream to a free-flowing state.

5. COMMENTS RECEIVED:

Government Agencies:
- Department of the Interior
- Department of Commerce
- Department of HUD
  - Regional Office, Atlanta, GA
  - Birmingham Area Office, Birmingham, AL
  - Atlanta Area Office, Atlanta, GA
- Department of Transportation
  - Coast Guard Headquarters, Washington, DC
  - Federal Aviation Administration, Atlanta, GA
- Environmental Protection Agency
  - Regional Office, Atlanta, GA
- Department of Agriculture
  - Soil Conservation Service, Auburn, AL
  - Soil Conservation Service, Gainesville, FL
  - Soil Conservation Service, Athens, GA
- Federal Power Commission
- Alabama Development Office, State Clearinghouse, Montgomery, AL
- Alabama Regional Planning and Development Commission, Dothan, AL
- Florida Bureau of Intergovernmental Relations, Tallahassee, FL
  - Department of Administration, Tallahassee, FL
  - Florida Game and Fresh Water Fish Commission, Tallahassee, FL
  - Department of Natural Resources, Tallahassee, FL
  - Department of Environmental Regulation, Tallahassee, FL
  - Northwest Florida Water Management District, Tallahassee, FL
  - Public Service Commission, Tallahassee, FL
  - Department of Commerce, Tallahassee, FL
  - Department of Transportation, Tallahassee, FL
  - Department of State, Tallahassee, FL
- State of Georgia, Clearinghouse Administrator, Atlanta, GA

Others: Dr. Daniel B. Ward, University of Florida, University of Florida, Gainesville, FL
Dr. Carey B. Oakley, University of Alabama, University, AL

6. DRAFT STATEMENT TO CEQ: 17 July 1975

FINAL STATEMENT TO CEQ: 16 APR 1976

FINAL
ENVIRONMENTAL STATEMENT

LAKE SEMINOLE AND JIM WOODRUFF LOCK AND DAM
ALABAMA, FLORIDA, AND GEORGIA
OPERATION AND MAINTENANCE

1.01 Project Description. Jim Woodruff Lock and Dam (L&D) is located at mile 107.6 on the Apalachicola River about 1,000 feet downstream from the point where the Chattahoochee and Flint Rivers unite to form the Apalachicola River. It is about 3,200 feet upstream from the U. S. Highway 90 bridge and 1.6 miles northwest of the town of Chattahoochee, Florida. The dam crosses the Georgia-Florida state line on the left bank; about 1,500 feet of the overflow dike is in Decatur County, Georgia, the remainder of the structure being in Gadsden County, Florida, on the left bank and Jackson County, Florida, on the right bank. The location of the project is shown on Plate 1.

1.02 Jim Woodruff L&D is a multi-purpose project created primarily to aid navigation in the Apalachicola River below the dam and in the Chattahoochee and Flint Rivers above the dam and to generate electric power. Secondary benefits include public recreation, regulation of stream flow, and fish and wildlife conservation. The project consists of a dam with its axis about normal to the river channel; an 82 by 450-foot single-lift lock; a 30,000-kw power plant and appurtenances; and a reservoir extending up the Chattahoochee River to George W. Andrews L&D and up the Flint River beyond Bainbridge, providing a 9-foot depth for navigation from Jim Woodruff L&D to those points. The principal features of the structure from right to left bank are: a conventional concrete gravity-type fixed-crest spillway, a navigation lock, a concrete gated spillway, a powerhouse with intake section constituting part of the dam, and an earth overflow dike with the switchyard on the end next to the powerhouse. Overall length of the structure including the lock and powerhouse sections is approximately 6,150 feet. Sections and a plan of the lock and dam and appurtenant works are shown on Plate 2.

1.03 Lake Seminole, the lake formed by Jim Woodruff L&D has a total storage capacity of 367,320 acre-feet at normal operating pool elevation of 77.0 feet. At this elevation, the lake covers 37,500 acres and extends 47 miles up the Flint River (18 miles above Bainbridge) and 46.7 miles up the Chattahoochee River to George W. Andrews L&D. Pertinent data for the project are included in Table 1.

1.04 The Corps of Engineers has developed the east and west bank of the damsite area. The Resources Manager's office with observation parking on the upper level, and roads, parking areas, a boat launching ramp and picnic and sanitary facilities on the lower level is located on the east side; while an access road, parking area and an overlook with benches have been constructed on the west side. Major development by state and local agencies has been accomplished in the Seminole State Park in Georgia, the Three Rivers State Park in Florida, and the Chattahoochee and Bainbridge Municipal Park areas.

Table 1

JIM WOODRUFF LOCK AND DAM
APALACHICOLA RIVER, FLORIDA

PERTINENT DATA

GENERAL

Dam site, river miles above mouth of Apalachicola River	107.6
Total drainage area above Jim Woodruff Lock and Dam, square miles	17,230

STREAM FLOW

Period of continuous record	1929-1971
Average annual flow for period of record, cfs	21,311
Minimum monthly flow for period of record (Oct. 1954), cfs	5,340
Minimum 7-day flow for period of record, cfs	5,150
Minimum mean daily flow of record, cfs	
Inflow (Oct. 27, 1968), regulated	2,760
Outflow (Sept. 10, 1957), regulated	4,540
Maximum monthly flow for period of record, (Mar. 1929), cfs	172,000
Maximum flow during period of record, (Mar. 20, 1929), cfs	293,000
Discharge at bankfull, cfs	77,000

FLOOD DATA (DAM IN PLACE)

Maximum flood of record (March-April 1929)	
Regulated peak outflow, cfs	285,500
Regulated peak headwater, feet above msl	82.34
Peak tailwater elevation, feet above msl	80.40
Spillway design flood	
Peak inflow to full reservoir, cfs	781,100
Regulated peak outflow, cfs	690,700
Regulated peak headwater, feet above msl	96.73
Peak tailwater elevation, feet above msl	96.10
Standard project flood	
Peak inflow to full reservoir, cfs	411,900
Regulated peak outflow, cfs	377,900
Regulated peak headwater, feet above msl	86.39
Peak tailwater elevation, feet above msl	84.95
Total rainfall, inches, spillway design flood	
Chattahoochee basin	14.2
Flint basin	13.4
Entire basin above dam	13.8

PERTINENT DATA (Cont'd)

RESERVOIR

Normal pool elevation, feet above msl	77.0
Area at pool elevation 77.0, acres	37,500
Area acquired in fee simple, acres	60,072
Area acquired by easement with right to inundate, acres	6,516
Area in river bed, acres	4,000
Total area within taking line, acres	70,588
Total volume at elevation 77.0, acre-feet	367,320
Length at elevation 77.0, river miles	
Flint River	47
Chattahoochee River to George W. Andrews Lock and Dam	46.7

LOCK

Nominal size of chamber, feet	82 x 450
Distance center to center of gate pintles, feet	505
Maximum lift, feet	33
Elevation of upper miter sill, feet above msl	54.0
Elevation of lower miter sill, feet above msl	30.0
Elevation of top of lock walls, feet above msl	82.0
Elevation of top of guide walls, feet above msl	82.0
Elevation of top of guard walls, feet above msl	82.0

GATED SPILLWAY

Total length, including end pier, feet	766
Net length, feet	640
Elevation of crest, feet above msl	48.0
Number of piers including end pier	16
Width of piers, feet	
End pier	6
Other piers	8
Height of piers above spillway crest, feet	59
Type of gates	Vertical lift (split leaf)
Number of gates	16
Length of gates, feet	40
Height of gates, feet	30.5

FIXED-CREST SPILLWAY

Total length, feet	1,634
Net length, feet	1,584
Elevation of crest, feet above msl	79.0
Elevation of bucket, feet above msl	69.39

EARTH OVERFLOW DIKE

Total length (crest elevation 85.0), feet	2,130
Total length of transition (elev. 85.0 to elev. 107.0), feet	690

PERTINENT DATA (Cont'd)

POWER PLANT

Number of units	3
Spacing of units, feet	65
Installed capacity (name plate rating), kw	30,000
Overload capacity at normal operating pool, kw	36,000
Turbine discharge at normal pool (elev. 77.0), cfs	
1 unit operating	5,500
2 units operating	12,000
3 units operating	18,300
Tailwater elevations, feet above msl	
Minimum of record (discharge = 6,270 cfs)(Oct. 30. 1968)	41.50
1 unit operating	41.5
2 units operating	45.3
3 units operating	48.4
Net head, full load, feet	30.5
Minimum head for generation	9
Percent of time minimum head equalled or exceeded	99.2
Powerhouse	
Length, feet	258.7
Width, feet	122.0
Type of construction	Reinforced concrete
Type of turbines	Movable-blade propeller
Capacity of turbines at 75 rpm and rated head (26.5'), hp	14,000

1.05 There are 6 boat dock concessions operating under lease from the Corps of Engineers and 4 concessions operating under sub-lease agreement from state and local agencies. In addition, there are 26 public use access areas around the reservoir, which provide launching ramps, parking areas, picnic and sanitary facilities, plus tent and trailer camping in some of the areas. The location of these recreational areas is shown on Plate 3. Appendix A contains the number of acres at each site; the 1974 state of development; and a listing of the facilities available at each site.

1.06 Areas suitable for game management located in Florida were licensed to the Florida Game and Fish Commission; likewise, suitable areas in Georgia were licensed to the Georgia Game and Fish Commission. These agencies are now managing licensed areas for fish and wildlife purposes. Management operations include planting of food crops for game and waterfowl, controlled burning for improvement of quail range, and controlled hunting.

1.07 Examples of the type of work which will be accomplished during the operation and maintenance of Lake Seminole and Jim Woodruff Lock and Dam is as follows: maintenance of existing facilities; construction of new facilities; implementation of programs pertaining to the conservation, development, and utilization of the project's resources for the safe and

maximum enjoyment of the public (such as maintaining channels, removal of debris, etc.); performance of a mosquito control program; collection and utilization of visitation data; and participation with Federal and State agencies on fish and wildlife management activities. As stated earlier these actions are only examples of the myriad of activities required to operate and maintain the existing project.

1.08 The B/C ratio for the Jim Woodruff project is 1.8, which is computed from the U. S. Army Corps of Engineers Project Data Sheet published September 1974. The complete document is available in the U. S. Army Engineer District Office in Mobile, Alabama.

2.01 Environmental Setting of the Project. Lake Seminole is created by the Jim Woodruff Lock and Dam (L&D) which impounds the lower portion of the Flint and Chattahoochee Rivers. The dam is located approximately 0.2 mile below the confluence of the Flint and Chattahoochee Rivers on the Apalachicola River at river mile 107.6. Lake Seminole extends up the Chattahoochee River to river mile 46.7, the Flint River to river mile 47, Spring Creek to river mile 16, and Fish Pond Drain to river mile 10.

2.02 Portions of the Lake Seminole impoundment lie within the states of Georgia and Florida with segments of the boundary between southwestern Georgia, northern Florida, and southeastern Alabama running through the lake itself. Lake Seminole borders or lies within Seminole and Decatur Counties in Georgia, Jackson and Gadsden Counties in Florida, and Houston County in Alabama. Jim Woodruff L&D is 1.6 miles northwest of Chattahoochee, Florida; 25 miles east of Marianna, Florida; 50 miles southeast of Dothan, Alabama; 24 miles south of Donalsonville, Georgia; and 22 miles southwest of Bainbridge, Georgia. The location of the project is shown on Plate 2.

2.03 Jim Woodruff L&D provides a normal reservoir pool at elevation 77 mean sea level (m.s.l.). Pertinent data on the construction of the dam and lock structures are presented in the Project Description Section (Section No. 1) of this environmental statement. The dam terminates against a low wooded hill on the east and an exposed limestone ledge on the west. Project features include a power plant and public use areas along with the necessary roads, parking facilities, utilities, landscaping and buildings to accomplish the purpose of the areas, and service areas necessary for constructing support facilities and maintaining and operating the dam and appurtenances for project water control.

2.04 Jim Woodruff L&D was completed in 1957. It was the first of three locks and dams to be constructed in order to provide a channel maintained by the Corps with a depth of 9 feet and a minimum width of 100 feet from the Gulf Intracoastal Waterway via the Apalachicola and the Chattahoochee Rivers to Columbus, Georgia, and the Flint River to Bainbridge, Georgia.

2.05 Jim Woodruff L&D is part of a plan for development of the Apalachicola-Chattahoochee-Flint Basin. The other Corps of Engineers projects in the basin include George W. Andrews L&D, Walter F. George L&D, and Lake Sidney Lanier which are completed; the partially completed West Point Dam on the Chattahoochee River; and three authorized multi-purpose projects on the

Flint River: Lazer Creek Lake, Spewrell Bluff Lake, and Lower Auchumpkee Creek Lake. Seven private power dams and three other dams (one of which is no longer operational) also exist above Lake Seminole. The entire Apalachicola-Chattahoochee-Flint drainage basin and its associated water resource developments are shown in Plate 1.

2.06 The Lake Seminole impoundment formed by the dam has a water surface area of 37,500 acres at pool elevation 77 and a shoreline of more than 250 miles. It has two primary arms that extend up the Chattahoochee and Flint Rivers and two secondary arms that extend up Spring Creek and Fish Pond Drain between the two river arms. The lower five miles of the reservoir are broad and shallow with a maximum depth of about 40 feet in the old river channel immediately above the dam. A large portion of Lake Seminole has a depth of 10 to 15 feet or less with an average of 9.8 feet. The maximum expanse of open water from west to east is about 11.5 miles and from south to north about 4.5 miles. The project is operated at a relatively constant level at elevation 77 for navigation with some fluctuation expected during flood periods and power production operation. The reservoir does not have any storage for flood control. The maximum drawdown does not normally exceed one-half foot. This drawdown occurs every weekend when upstream projects do not generate power while Jim Woodruff Dam releases water to maintain the downstream navigation channel. Pertinent reservoir data are summarized in Table 2. Table 3 indicates the reservoir areas which occur in Georgia and Florida at normal pool elevation 77 feet m.s.l.

TABLE 2

Pertinent Reservoir Data for Lake Seminole

Maximum power pool, elevation 77.5 feet m.s.l. (acres)	38,900
Average power pool, elevation 77 feet m.s.l. (acres)	37,500
Minimum power pool, elevation 76 feet m.s.l. (acres)	34,840
Fee-owned land (above elevation 77) (acres)	22,036
Flowage easement (above elevation 77) (acres)	10,351
Total project area (acres)	59,536
Storage capacity, maximum power pool (acre-feet)	386,400
Storage capacity, average power pool (acre-feet)	367,320
Storage capacity, minimum power pool (acre-feet)	331,150
Shoreline length (elevation 77 feet m.s.l.) (miles)	250

TABLE 3

Portions of Lake Seminole which Occur in Alabama, Florida and Georgia

Area	Water area at Elev. 77 (acres)	Land area above Elev. 77 (acres)
Decatur County, Georgia	13,243	8,468
Seminole County, Georgia	11,737	5,838
Jackson County, Florida	9,728	7,730
Flint River Bed, Georgia	1,534	-
*Chattahoochee River Bed, Alabama, Florida and Georgia	1,258	-
Total	37,500	22,036

*The west bank of the Chattahoochee River is the boundary line between the States of Alabama and Georgia.

2.07 Completed in 1957, the Jim Woodruff project was authorized for navigation and hydroelectric power production. In addition, the project augments low-flow conditions downstream which increase the waste assimilation capacity of the Apalachicola River, benefits fish and wildlife in the reservoir and provides recreational opportunities for millions of people to enjoy each year. Several game management areas on Federal lands and adjoining privately owned andmanaged areas provide many hunting opportunities for both large and small game. The project areas are administered and controlled so as to maintain intrinsic values of a recreational, scientific, and scenic nature, and to improve public use.

2.08 Lake Seminole is located in the eastern portion of the lower Coastal Plain Province. The terrain near the reservoir varies from flat to gently rolling except for a hilly region known as the Apalachicola River Bluffs. These bluffs originate in southwest Georgia and extend downstream along the Flint River from about 10 miles above the Junction of the Chattahoochee and Flint Rivers and along the left bank of the Apalachicola River for a distance of about 25 miles into Florida. In this hilly area the Apalachicola River Bluff region merges with the Altamaha Grit Region. The hills are cut by ravines and small valleys, many of which terminate in a type of amphitheater. Except for this hilly area bordering the lower Flint River, much of the area is underlain by limestone with numerous sloughs and limesinks.

2.09 Jim Woodruff L&D is founded on a single geological formation, the Tampa Limestone of Early Miocene age. The reservoir formed by this dam is located wholly in the Dougherty Plain, one of the four subdivisions of the Coastal Plain. The Dougherty Plain is a broad lowland stretching from central Georgia into Southeastern Alabama and adjacent Florida. It was formed by solution of a belt of soft, porous Eocene and Oligocene limestones.

2.10 The Lime Sink Region adjacent to Lake Seminole is a striking topographic and drainage feature of the Dougherty Plain that is the result of subsurface solution. The solution of the limestone has transformed the upper portions of the rock into a cavernous mass, full of cavities and channels through which flows the major portion of the drainage. The resulting topography is notably flat, with numerous shallow saucer-shaped depressions or ponds which vary from a fraction of an acre to many acres in size. Most of these sinks have gently sloping sides and some of them contain water throughout the year; others dry up except during the rainy season. There are comparatively few small surface streams. Rainwater sinks rapidly into the sandy soil of this area and finds its way into the underground channels of porous limestone to emerge as springs along the banks of the larger creeks and rivers.

2.11 The reservoir rim rocks are predominantly either limestone and sandstone of Eocene age or undifferentiated residuum of Jackson (Eocene) limestone, Oligocene limestone, and greatly disarranged marine beds.

2.12 Mineral resources in the project area are limited to iron ore, fuller's earth, bauxite, kaolin, and sand and gravel. Certain minerals such as iron ore are removed by strip mining, which in the past has resulted in a massive sediment load to portions of the Chattahoochee River well above Lake Seminole. As a result of new Federal and State water quality standards, most of this sediment is now retained at the washing sites and is no longer a serious problem within this area. To date there have been no significant discoveries of oil or gas deposits in any of the three river basins. Beginning several years prior to the completion of Jim Woodruff L&D, sand and gravel have been dredged in the reach of the Chattahoochee River now included in Lake Seminole. The techniques used in the removal of the sand and gravel result in only a slight turbidity and siltation problem within the immediate downstream reach (1 mile) below the dredge. The dredged material is transported by barge downstream and unloaded at Chattahoochee, Florida. The gravel deposits being dredged are not of recent origin because in many cases several feet of clay overburden must be removed to reach the gravel deposits.

2.13 The ground water resources in the Chattahoochee and Flint Basin vary from a limited supply in the area nearest the Fall Line to an abundant supply in the lower basin area which is included in the project area. The yield of ground water aquifers in this region range up to 2,500 gallons per minute. The deep wells are from a porous limestone area which originates in a 40-mile wide band just below the Fall Line. As this formation proceeds southward it develops into the Floridan aquifer which, in places, produces artesian flow and at the coast is the source of springs that produce several thousand gallons per minute.

2.14 The drainage area (a total of 17,230 square miles) above Jim Woodruff L&D is about equally divided between the Chattahoochee and Flint Rivers. The Chattahoochee River which rises on the southern slope of the Blue Ridge

Mountains in northern Georgia, flows southwesterly across the Piedmont Plateau, then southerly to the Coastal Plain at Columbus and thence southerly to its confluence with the Flint River. The Flint River rises just south of Atlanta and flows generally south in an easterly arc, partly in the Piedmont and partly across the Coastal Plain to its confluence with the Chattahoochee.

2.15 Available data indicate that material carried in suspension is appreciable, with the Chattahoochee River carrying more silt than the Flint River. The suspended sediment load transported by the Chattahoochee River near the upper limits of Lake Seminole before the construction of Walter F. George and George W. Andrews Locks and Dams was 1,100,000 tons per year. Due to deposition in the two upstream reservoirs, the present sediment load entering Lake Seminole via the Chattahoochee is computed to be 566,000 tons per year. The suspended sediment inflow from the Flint River, as determined by 7 years of sediment sampling conducted by the Corps between 1953 and 1960, averages 182,000 tons per year. In addition, the drainage area surrounding the reservoir contributes an estimated 145,000 tons per year. Land formerly cultivated by row crop farming is being converted to permanent pasture and to timber growing. This, together with increased soil conservation practices, has minimized sediment deposition from surface runoff into Lake Seminole. The present total suspended sediment inflow into the lake is estimated to be 893,000 tons per year. Approximately 60 percent of the incoming sediment load remains in Lake Seminole with the remainder being passed downstream by Jim Woodruff Lock and Dam. At this percentage, 357,000 tons pass through the lake, while 536,000 tons are deposited annually in the lake. At the present rate of deposition, in 100 years the original lake capacity in 1957 of 367,318 acre-feet at elevation 77.0 will be decreased by 26,500 acre-feet to 340,818 acre-feet, representing an 8 percent lifetime reduction.

2.16 The topography of the region surrounding Lake Seminole varies from slightly sloping to rolling. Over 75 percent of the shoreline has a slope of less than 5 percent. The shoreline is indented with depression areas and limesinks which vary in depth from 2 to 10 feet. Lands adjacent to the main portion of the reservoir are undulating to gently rolling with surface soils consisting mainly of sandy loams. The higher lands are well drained. The lower lands have numerous limesinks, cypress sloughs, and pot holes. A large number of the limesink areas contain water throughout the year. Other basin-like areas hold water mainly during periods of heavy rainfall. In the area adjacent to the reservoir between the Chattahoochee and Flint Rivers, the pool levels of permanently ponded areas are known to vary with certain high stages of the reservoir.

2.17 Following the impoundment of Lake Seminole it was determined that several limesink areas in Seminole and Decatur Counties, Georgia, were adversely affected by the project, resulting in the acquirement of easements on these areas. All of the limesinks, both on and off project lands, provide habitat for numerous species of wildlife, especially waterfowl, thereby enhancing hunting, bird-watching, and other recreational opportunities in the area. However, many of the sinks are generally

inaccessible to the general public, thus providing nesting and refuge areas for many species of wildlife. Several of the large limesinks located off of project lands, but which are covered by easements, are currently being used by their owners as public fishing and duck hunting areas on a fee basis. The Corps operates one public use area, Harvel Pond, on a land-locked sinkhole pond.

2.18 Lands near the reservoir as a whole are covered by stands of trees that include oaks, pines, hickories, gums, maples, ashes, sycamore, elms, mulberry, and a variety of shrubby growths. Lands beyond the heavily timbered areas are suitable for truck farming; row-crops such as cotton, peanuts, corn, cane and watermelons; and pasture land for cattle and hogs to a lesser degree.

2.19 The plant life of the area adjacent to Lake Seminole varies considerably with each sub-physiographic region. For convenience, the area is discussed under three divisions: Apalachicola River Bluff Region, Lime Sink Region, and Altamaha Grit Region:

● Apalachicola River Bluffs Region - These bluffs begin at a point in Florida on the left bank of the Apalachicola River, approximately 25 miles south of the confluence of the Chattahoochee and Flint Rivers, and continue northward and northeastward, diverging from the Flint River in Georgia. The bluffs are dissected by numerous ravines which open out into the Apalachicola River and Lake Seminole. Broadleaf, deciduous trees are found in the alluvial bottoms along the Apalachicola River and along Lake Seminole which include swamp chestnut oak (Quercus prinus), water oak (Quercus nigra), sycamore (Platanus occidentalis), overcup oak (Quercus lyrata), hornbean (Carpinus caroliniana), cottonwood (Populus deltoides), sugarberry (Celtis laevigata), water hickory (Carya aquatica), sweetgum (Liquidambar styraciflua), water tupelo (Nyssa sylvatica), and a deciduous conifer, bald cypress (Taxodium distichum). On the rich slopes and in the ravines along Lake Seminole, other trees are found as follows: shortleaf pine (Pinus echinata), spruce pine (Pinus glabra), southern beech (Fagus grandiflora), southern magnolia (Magnolia grandiflora), sweetbay (Magnolia virginiana), American holly (Ilex opaca), white oak (Quercus alba), silverbell (Halesia carolina), Florida maple (Acer floridanum), wild plums (Prunus americana and umbellata), and black walnut (Juglans nigra). The Florida torreya (Torreya taxifolia) a coniferous tree in the yew family, is found only in the Apalachicola Bluffs in Florida, except in one or two isolated areas immediately north of the Georgia-Florida State line. This tree does occur on Lake Seminole project lands near the reservoir manager's office; however, no Corps activities are planned for the areas in which it is found. The Florida torreya and its much more rare relative, the Florida yew (Taxus floridana), are found in the ravines which dissect the bluffs. Both are endemic relics of a more northerly tertiary plant association. Since the plants of the forest floor are composed of many wild flowers and ferns which cannot tolerate periodic fires, this region evidently has not been subjected to any recent fires. This may be partially explained by the fact that the area is protected on the west by the river and on the east by the much dissected topography.

● Lime Sink Region - This region which lies in Georgia between the Chattahoochee and Flint Rivers, is the southern portion of the Dougherty Plain. The soil in the area is mainly sandy, light colored and acidic in nature. It provides conditions for a distinctive coastal plain flora. The dominant trees are pines, oaks, gums and cypress. Hawthorn species are numerous in various localities. Buttonball (Cephalathus occidentalis) is found in the major portion of the ponded areas. Tree and shrub growths can be divided into three types on the basis of topography and water content of soils: high or dry, low or wet, and intermediate. These intergrade and have a somewhat similar appearance. However, the highlands support longleaf pine, the intermediate type has both longleaf and loblolly pine, and the lowlands have slash pine. Blackjack, bluejack and turkey oaks are found in high, dry areas. Laurel, water and live oaks, gums and cypresses are found in the lowlands. Lime sink ponds usually support dense stands of trees with the species being influenced to a pronounced degree by annual water level fluctuations. With fluctuations that exceed four feet, pond cypress (Taxodium ascendens) occurs in essentially pure stands. Slash pine occurs in stands of cypress where water does not fluctuate more than one foot. Dense growths of evergreen trees, shrubs and vines are also found. There include myrtle dahoon (Ilex myrtifolia), titi (Cyrilla racemiflora), buckwheat tree (Cliftonia monophylla), sweetbay (Magnolia virginiana), fetterbush (Lyonia lucida), large gallberry (Ilex coriacea), bayberry (Myrica carolinensis), wax myrtle (Myrica cerifera), odorless wax myrtle (Myrica indora) and greenbrier (Smilax spp.).

● Altamaha Grit Region - This region is also called the Tifton Upland. It is separated from the Lime Sink Region by an escarpment which is an extension of the Apalachicola River Bluffs into Georgia. It closely approaches Lake Seminole on the left bank of the Flint River from Chattahoochee, Florida, up to Bainbridge, Georgia. The soil of the region is similar to that of the Lime Sink Region, being predominantly sandy at the surface, and becoming reddish sandy clay a few inches beneath the surface. The principal type of forest is longleaf pine. On the dry uplands, there is a mixture of shortleaf pine (Pinus echinata), turkey oak (Quercus laevis), post oak (Quercus stellata), sand live oak (Quercus virginiana var. geminata) and various species of huckleberry. There are all gradations between dry and wet pinelands, as in the Lime Sink Region. Slash pine (Pinus elliottii), pondcypress (Taxodium ascendens) and/or water tupelo (Nyssa sylvatica var. biflora) occur in the flatter areas, but less frequently than in the Lime Sink Region. The undergrowth of the region consists of a variety of shrubs and wild flowers which have difficulty in maintaining themselves because of frequent fires which appear to have resulted in localized extermination of some of the rarer species.

2.20 The Endangered Species Act of 1973 (Public Law 93-205, approved 28 December 1973) directed the Smithsonian Institution in Washington, D.C., to prepare a list of endangered and threatened plant species, to review methods of adequately conserving these species, and to report the Institution's recommendations to the Congress. As a result of this directive, House Document 94-51 entitled "Report on Endangered and Threatened Plant

Species of the United States" was prepared and presented to the Congress on 15 December 1974. Using this House Document as a base for information, data provided by Dr. Daniel B. Ward (a taxonomist with the Agricultural Experiment Station, University of Florida) was supplemented with collections made by the Corps to construct the following list of plants, their status category, and common name when available, which either occur or should be in the Lake Seminole area.

THREATENED:

Wiregrass gentian (Gentiana pennelliana)
Croomia (Croomia pauciflora)
Rhondendron austrinum
Myriophyllum laxum
Magnolia ashei
Pinckneya pubens
Schisandra glabra

ENDANGERED:

Rue anemone (Anemonella thalictroides)
pagoda dogweed (Cornus alterniflora)
honewort (Cryptotaenia canadensis)
Allegheny spurge (Pachysandra procumbens)
Bladder-nut (Staphylea trifolia)
Florida torreya (Torreya taxifolia)
Halberd-leaved yellow violet (Viola hastata)
Cyclodon alabamensis
Veratrum woodii
Houstonia nigricans var. pulvinata

This list does not include all those plant species, named in the above referenced House Document, which may be on project lands. The University of Florida has studies in progress to identify and categorize those species which are considered to be rare, endangered, or threatened in Florida. More complete information on these plants will not be available until the latter part of 1976 or 1977.

2.21 The aquatic plants occurring within Lake Seminole are many and diverse, representing a wide range of plants which have been able to adapt themselves successfully to the conditions prevalent within the lake. The lake has probably the greatest diversity of plants occurring in any impounded lake in the United States. Although the lake is only 18 years old, during this short period of time thousands of acres have been successfully invaded by aquatic plants. Nearly 500 species of aquatic plants have been identified from Lake Seminole. It is believed that there still remain a good number of plants to be collected and identified. There also exists the possibility that additional plants will probably become established. Table 4 contains a listing of the most abundant aquatic plants occurring in Lake Seminole and the number of acres of reservoir covered by each plant species.

TABLE 4

Listing of the Most Abundant Aquatic Plants in Lake Seminole
Compiled by the Corps of Engineers

Common Name	Scientific Name	First Noticed in Lake or Basin	Acres					Plant Types According to Habitat (Note)
			1960	1971	1972	1973	1974	
Chara	Chara spp.					7	5	S
Nitella	Nitella spp.			193	100	50	50	S
Pithophora	Pithophora spp.			20		75	75	S
Pond and bald cypress	Taxodium spp.			310		320	320	E&M
Cattail (2 species)	Typha spp.		1,500	460		500	500	E&M
Illinois pondweed	Potamogeton illinoensis			1,600		2,000	2,000	S
American pondweed	P. nodosus		1,200	1	25	50	75	S
Naiad	Najas spp.			361	275	200	450	S
Hydrilla	Hydrilla verticillata	1965		1	2	5	50	S
Eelgrass	Vallisneria americana			100		225	225	S
Plume grass(2 species)	Erianthus spp.					50	70	E&M
Southern cutgrass	Leersia hexandra			58		75	75	E&M
Maidencane grass	Panicum hemitomon		225	155	75	175	175	E&M
Torpedo grass	P. repens			22	40	50	75	E&M
Knotgrass	Paspalum distichum			21		50	50	E&M
*Giant cutgrass	Zizaniopsis miliacea		3	1,500	1,600	2,200	2,500	E
Spoon flower	Peltandra sagittaefolia					1		M
Arrow arum	P. virginica			15	50	100	5	M
Water hyacinth	Eichhornia crassipes	1955	2,500	260	800	600	500	F
Black willow	Salix nigra			340		375	375	M
Speckled alder	Alnus rugosa					250	250	M
Alligatorweed	Alternanthera philoxeroides	1960	5	135	50	50	50	E&M
Watershield	Brasenia schreberi		200	170	120	150	150	E
Fanwort	Cabomba caroliniana			5		10	50	S
Spatterdock	Nuphar advena		4	22	25	25	25	E
Floating heart	Nymphoides aquaticum		60	190	100	50	50	E
White water lily	Nymphaea odorata		125	220	150	200	200	E
American lotus	Nelumbo lutea		60	65	70	100	150	E

TABLE 4 (Cont'd)

Common Name	Scientific Name	First Noticed in Lake or Basin	Acres 1960	1971	1972	1973	1974	Plant Types According to Habitat (Note)
Water primrose (4 species)	Ludwigia spp.			10		23	21	E&M
Water purslane	L. sphaerocarpa					60	60	E&M
Parrotfeather	Myriophllum brasiliense		500	6		1	1	S,E&M
Eurasian watermilfoil	M. spicatum	1965		2,020	2,000	4,500	5,000	S
Splitleaf pennywort	Hydrocotyle ranunculoides	1967		185	50	50	50	F
Water tupelo	Nyssa aquatica			35		50	50	M
Ogeche lime	N. ogeche					20	20	M
Carolina waterhyssop	Bacopa caroliniana			200		225	225	S,E&M
Limnophilia	Limnophilia indica	1965		2	2	20	20	S
Floating bladderwort	Utricularia inflata		300	218		30	30	F
Bladderwort(2 species)	U. spp.			61		101	101	S
Waterwillow	Justicia americana		15	177		200	200	E&M
Buttonbush	Cephalanthus occidentalis		200	491		550	550	M
Eastern baccharis	Baccharis halimifolia					250	250	M
Coontail	Ceratophyllum demersum			Trace	3	5		S
Smartweeds	Polygonum spp.			10	5	26	26	E&M
Duckweed	Lemna spp.; Spirodela spp.; Wolffia sp.			11		22	20	F

* Giant Cutgrass is a major problem on the lake with no known control, other than mechanical, at the present time.

NOTE: S = submersed
E = emergent
F = floating
M = marginal

2.22 The aquatic plant community of Lake Seminole is continually modifying itself and increasing in overall quantity. For some plants this increases competition and reduces their biomass, while allowing other plants to find additional niches resulting in an increase. As the reservoir ages and conditions change it is possible that some of the less abundant plants may have a greater impact on the reservoir.

2.23 The presence of great numbers and quantities of aquatic plants in Lake Seminole is due to many factors which include: local and upstream sources of plants, the probable introduction by people collecting plants for resale and use in aquariums, accidental introductions by boaters or others visiting the lake. Favorable temperatures, long and suitable growing seasons, waters rich in nutrients, generally favorable pH, variable water chemistry in different arms of the reservoir, large areas of shallow clear water, and extensive inundated uncleared areas also serve to enhance abundant aquatic plant growth. No effective native biological control agent has been found in the lake. However, the Argentina alligatorweed flea beetle was introduced into the lake in 1968 and has been successful as a control measure.

2.24 The rivers flowing into Lake Seminole provide a rich source of nutrients, particularly the Flint River. In addition, aquatic plants are imported into the Lake from upstream sources. Among the plants which are thought to have become established within the lake by this method are giant cutgrass, water hyacinths, parrotsfeather, alligatorweed and water pennywort. It is probable that other plants also came from these sources and that this will occur again. The general turbidity of the Chattahoochee River has been thought to provide a less attractive habitat than other arms of the reservoir, particularly for submersed plants. The Flint River is generally much clearer, except during spring flooding. The other areas in the lake are generally clear year round. Impoundments on both rivers upstream have lessened the degree of turbidity in the lake. If additional impoundments are built upstream the situation will be further improved. In future years this decreased turbidity may assist in the further spread of aquatic plants by greater light penetration in areas where this is not now generally true.

2.25 The spread of aquatic plants in Lake Seminole has been and continues to be almost phenomenal. Factors which contribute to this spread are as follows: the great variety of aquatic plants, the introduction of new species, the present availability of suitable niches, the development of additional niches, the flow of water through the reservoir, wind and wave movement of plants, the slight variation of pool elevations, transportation of plants by boats from one area to another, seasonal breakup of plants, spring flooding and spreading of plants to other areas, the ability of many of the plants to multiply sexually or asexually from plant parts, the silting in and shallowing of additional areas, etc. All of these factors, plus others, tend to increase the spread and density of plants over the reservoir.

2.26 Due to the extremely shallow nature of Lake Seminole, ideal situations exist for the establishment of aquatic plant colonies. This is aided

by periodic variations in pool levels which tend to strand floating plants or plant parts, thus initiating new infestations.The major part of the lake is less than seven feet in depth with an undulating bottom, many shallow sandbars, old river levees, islands, coves, emersed ridges, etc. A number of coves and embayments with shallow or narrow entrances have been completely shut off from the main body of the lake by heavy aquatic plant growths. Widespread beaver damming in conjunction with blockage by giant cutgrass and other rapidly spreading plants are increasing the problem. There are many attractive areas in the lake suitable for duck hunting,fishing, and other uses. However, many of these areas are either not accessible at the present time, or are very difficult to reach. This problem is increasing at a rapid rate.

2.27 As a lake, such as Seminole, ages the process of eutrophication or biological enrichment tends to increase at a more rapid pace and the successional processes and types of plants in the environment become more varied and complex. Because of these conditions, including the effects of competition, it is difficult to forecast at any one time what the potential might be for expansion in the future, and what direction it will take. On most impoundments there are usually seasonal fluctuations of water levels and adequate depths which help greatly in retarding aquatic plant growth, but on Lake Seminole the opposite is true. It is an extremely shallow pool with little or no seasonal fluctuation. Aquatic plant surveys, and other observations made over the years, indicate that there will be continued expansion of aquatic plant growth. Marginal growth such as buttonball, cypress, willow, willow weed, and a host of others will continue to expand along the shorelines of Lake Seminole. Giant cutgrass has expanded at an exceedingly rapid rate in recent years, and this is expected to continue. Giant cutgrass will probably be the dominant marginal growth, at least for the next few years.

2.28 According to the 1974 Aquatic plant Study of Lake Seminole the plants of major concern are Eurasian watermilfoil, giant cutgrass, water hyacinth, and Illinois pondweed. They occupy large niches and their potential for expansion is great. The numerous other species of plants not only are increasing in their own right, but by their presence sometimes enhance conditions for the spread of major plants and, in turn, the growth of the other plants. It is very difficult at any one time to assess the potential of the many different plants occurring on Lake Seminole, but it is thought at this time that some of the plants introduced in recent years such as eelgrass, limnophila, hydrilla, and American pondweed may become major problems in the future.

2.29 Some of the problems created by aquatic plants are clogging of small boat channels, the limiting or prevention of access to many areas, and unsightly appearance. They also present problems in public use areas and in many places where people have boathouses, piers, and docks. In addition they adversely affect fisheries and reduce the quantity of water stored in the reservoir. The presence of aquatic plants is a major factor in the retention of silt in many areas in the reservoir. They cause a rapid buildup

of shoreline areas in Lake Seminole, which is particularly true of giant cutgrass in the Chattahoochee and Flint River arms of the lake. As these areas fill in with silt it permits the cutgrass and other marginal plants to reach farther out into the water. With their increased presence and retention of silt, they change the water flow in many areas which helps to create additional sandbars. These sandbars then stabilize and become infested with emergent or marginal plants which further the process. Many areas cut off from the lake are less affected by wind and wave action thereby increasing their potential for aquatic plant infestation. The increasing aquatic plant community is also providing a more suitable habitat for mosquito production. There were more Anopheline mosquitoes noted in the 1973 mosquito season than in prior years, and their production is expected to increase. The increasing presence of aquatic plants on Lake Seminole is also damaging to operational and recreational values for which the reservoir was created.

2.30 Total control of aquatic plants at Lake Seminole has not been achieved. Eradication of all aquatic plants in Lake Seminole is not feasible nor is it desirable. The reduction in area of one species often will result in an increase in area of another species. With the controls available at the present time, the physical structure of the lake, the complexity and expensive nature of aquatic plants, and the suitable conditions for their growth, very little can be done short of an enormous herbicidal program to effectively deter the overall encroachment and spread of aquatic plants in Lake Seminole.

2.31 Necessary aquatic plant control measures have been conducted on water hyacinth and alligatorweed to protect and enhance the use and operation of Lake Seminole. The aquatic plant control measures used to date on Lake Seminole have consisted of three types herbicidal, mechanical, and biological. The herbicide employed is 2, 4-D at a concentration ranging from 2 to 4 pounds/acre. The argentina alligatorweed flea beetle was introduced in 1968 in order to control its namesake. Aquatic plant control in Lake Seminole has employed one mechanical method — a sawboat for certain submersed aquatic plants. A more detailed discussion of aquatic plant control in Lake Seminole and within the entire Mobile District is covered in a separate environmental statement (EIS) which was available in draft form in February 1975 with the final scheduled to be completed in the spring of 1976.

2.32 There is a large variety of mosquitoes produced in the Lake Seminole area. The mosquito populations are composed of three species of the subfamily Anophelinae - Anopheles quadrimaculatus, Anopheles crucians, and Anopheles punctipennis - and seven genera of the subfamily Culicinae - Aedes, Culex, Culiseta, Mansonia, Psorophora, Orthopodomyia, and Uranotaenia. A varied and everchanging environment produces these insects in varying numbers which are dependent on the type of environment and weather conditions which are suitable for their development. It is apparent that habitat changes occurring in recent years within Lake Seminole have brought about production of certain species in increasing numbers, while others have been produced

in lesser numbers because of a less favorable habitat. It is possible that because of these changing conditions that new or unnoticed species may become important in the future. There has occurred in recent years a rapid development of many shallow areas filled with decayed matter and humus subject to varied water levels which have produced many temporary pool mosquitoes. The presence of thick growths of emergent aquatic plants seems to aid mosquito breeding by providing a natural shaded habitat for the adults and assisting in the retention of silt and debris which further shallows these areas and increases their potential for this type production. The general increase in infestation of Lake Seminole by aquatic plants of many different types has contributed to the production of malarial and other type mosquitoes. There are many breeding areas in Lake Seminole which produce various species of Psorophora and Aedes such as: P. howardi, P. ferox, P. ciliata, P. varipes, A. vexans, A. sticticus, A. atlanticus, and probably many others. High spring flooding causes the production of these types in low marginal areas where suitable habitat is available.

2.33 Important insect vectors prevalent in the Lake Seminole area include the malaria-transmitting mosquito, Anopholes quadrimaculatus, and the eastern sleeping sickness-transmitting mosquito, Mansonia perturbans. Other mosquitoes produced in the Lake Seminole area which are potential vectors of the various types of encephalitis are Culiseta melaneura, Culex nigripalpus, Culex quinquefasciatus, Aedes atlanticus, Aedes infirmatus, and Anopheles crucians. There are other species present in this area also which have been identified as vectors of one or more of the various types of encephalitis.

2.34 Significant production of Anophles quadrimaculatus usually begins in the Lake Seminole area about the first or second week in April when the water temperature reaches the 70°F plateau.

2.35 During the 1973 mosquito breeding season there was an increase in Anopheline production similar to those experienced in 1971 and 1972. One factor responsible for this increase was maintaining the lake at normal levels for the greater part of the breeding season which prevented the mosquito larvae from being stranded as water levels were dropped. In 1973, there was an extended rainy season from April through June with higher lake levels and higher levels in the ponded areas surrounding Lake Seminole. Fluctuations of lake levels were minimal throughout the breeding season. There were other factors also which contributed to higher Anopheline production. One such factor is continued extensive spreading of aquatic plants in exceedingly dense mats which increased production and reduced the effectiveness of the spray.

2.36 Mansonia mosquito larvae,which breathe through the roots of hollow stemmed plants, are increasing as suitable host plants such as cattail, cutgrass, water hyacinth, etc., continue to spread. Also, temporary pool mosquitoes are producing in greater numbers as conditions for them improve. They are an increasing nuisance to people utilizing public use areas

and are a particular problem to campers. Also, the increased production of mosquitoes is a hazard because of their potential for transmission of diseases such as malaria and encephalitis.

2.37 Mosquito control spraying (larviciding) is conducted on Lake Seminole each summer for a period of approximately five months. The areas sprayed are in the reservoir along the shoreline and around islands that are within one mile of human habitation. Some ponded areas located on government lands adjacent to the reservoir are also sprayed. Only those areas having aquatic vegetation, drift, or debris are treated. The larvicide employed in the past was a 6 percent solution of Malathion 95 in diesel oil with an application rate of 3 fluid ounces of Malathion per acre. Beginning in 1974 the spray program changed to ultra-low-volume methodology. This method applies the Malathion concentrate at the rate of 3 fluid ounces per acre through special nozzles. The treatment schedule is based on weekly observations at 45 mosquito count stations distributed around the lake. If the count exceeds 10 individuals per station, that area receives a spray application within the week.

2.38 Temperatures in the Lake Seminole area are usually mild and are influenced by the comparatively rapid moderating effect of the warm waters of the Gulf of Mexico. However, the area temperatures during the winter are subject to occasional wide variations. For example, at Marianna, Florida, the mean January temperatures have been as high as 67.3°F (1950) and as low as 41.0°F (1940), a range of 21°F. For the period of record, the lowest temperature recorded at Marianna was 7°F; at Apalachicola, 13°F; at Eufaula, -4°F; and at Fort Gaines, -2°F. Periods of freezing or lower temperatures usually do not exceed 48 hours. Temperatures of 90°F, or higher, may be expected to occur on a total of about 100 days per year. The mean minimum temperature is approximately 56°F; the mean maximum temperature is about 80°F, with an annual mean of approximately 68°F. The average frost-free season is approximately 260 days and in low areas it is generally a week longer. Table 5 shows the mean monthly and average temperature at Marianna, Florida.

2.39 The average annual rainfall of the area is 56.63 inches. The highest rainfall occurs during the months of July and August. On the average, there are two periods of comparatively low rainfall (April-June and October-November). The greatest annual rainfall was 88.95 inches at Fort Gaines, Georgia, in 1948 and the lowest annual rainfall was 24.52 inches at Clayton, Alabama, in 1954. The months of highest rainfall are March, July and August. Snow may occur in the study area, but will probably be of short duration. Table 5 shows the mean monthly and annual precipitation at Marianna, Florida.

2.40 Based on records at the first order station at Apalachicola, Florida, the mean annual relative humidity is approximately 86 percent at 0700 hours and 69 percent at 1300 hours. The amount of sunshine varies from a mean of 72 percent for spring to a mean of 60 percent for winter. Peak periods of sunshine occur in April-May and October-November.

2.41 The prevailing winds are from the north in the winter, the southeast in the spring, the southwest in the summer, and the northeast in the fall. March is usually the windiest month; July and August are months having comparatively low wind velocities.

TABLE 5

Mean Monthly and Annual Temperature and Precipitation at Marianna, Florida*

MONTH	TEMPERATURE (°F)	PRECIPITATION (Inches)
January	54.4	3.78
February	56.3	4.34
March	61.1	5.70
April	67.7	5.02
May	74.7	4.30
June	80.0	4.82
July	81.0	7.67
August	80.8	6.47
September	77.6	4.31
October	69.0	2.08
November	59.2	3.27
December	54.4	4.07
Annual	68.0	56.33

*Although the data are not directly applicable, this weather station is near enough to the reservoir to yield data sufficiently reliable to depict the general climatological conditions.

2.42 The average evaporation loss for the basin has been estimated at 35 inches per year. At the Jim Woodruff project, the average evaporation loss is estimated to be 46 inches per year based on 15 years of record.

2.43 Flood-producing storms may occur over the basin at any time but are more prevalent in late winter and early spring. Winter storms are of the frontal type and the summer storms are of the localized thunderstorm and hurricane types. This entire area is within the coastal belt that is subject to hurricane weather in the summer and early fall. While high winds and heavy rainfall may occur at Lake Seminole, it is only the last few miles of the Apalachicola River Basin that might lie within the direct path of Gulf hurricanes. Areas around the reservoir that are subject to flooding are indicated in Table 6.

TABLE 6

FLOOD DAMAGE AREAS ON LAKE SEMINOLE

RIVER STRETCH	100-Year Flood (acres) Cleared	Wooded	Total	Annual Damage (Average 1973 prices)
CHATTAHOOCHEE Mi. 0-50	7,200	15,600	22,800	$ 101,900
FLINT Mi. 0-53	3,400	10,500	13,900	46,100
SPRING CREEK Mi. 16-50	200	3,300	3,500	14,000

2.44 Fishing and hunting have been major recreational activities of the Jim Woodruff project area since the early days of its history. Excellent fishing has been provided by the Chattahoochee and Flint Rivers, the tributary spring-fed creeks and sloughs, and permanently ponded limesinks. The Chattahoochee and Flint Rivers supported a fairly diverse number of fish species prior to impoundment. According to Drs. Michael Dahlberg and Donald Scott, there are 96 species of fish recorded from the Chattahoochee and Flint Rivers above Jim Woodruff L&D. Appendix B includes 78 species known to occur, or likely to occur, either in Lake Seminole or its tributaries. The freshwater game fish present in these areas include largemouth bass, spotted bass, white and black crappie, bluegill, redear sunfish, orangespotted sunfish, redbreast sunfish, pumpkinseed sunfish, warmouth and mullet. The commercial and rough fish include channel catfish, blue catfish, flathead catfish, brown bullhead, carp, drum, smallmouth buffalo, suckers, shortnosed gar, and sturgeon. Prior to the construction of Jim Woodruff L&D the saltwater striped bass and the Alabama shad migrated up the Apalachicola, Chattahoochee, and Flint Rivers and their tributaries each spring to spawn. Fish populations in the project area increased substantially due to impoundment. However, anadromous species above Jim Woodruff Lock and Dam have declined in numbers due to the interference of the project with their spring spawning migration. In addition, certain riverine species have also declined in and above Lake Seminole due to the loss of their preferred habitats.

2.45 During the reproduction periods of bass, redear sunfish and blue gill, the water level of the reservoir is controlled so that the downward fluctuation will not exceed eight inches to prevent exposing spawning beds. The regulation required during spawning season is usually accomplished by controlling the Woodruff discharge. The beginning and ending of the spawning season is determined by the Mobile District fisheries biologists in cooperation with the fisheries biologists of the states concerned. Usually bass begin to spawn shortly after the water temperature reaches 70°F; redear sunfish shortly after water temperature reaches 75°F; and blue gill soon after water temperature reaches 78°F. The length of the spawning period depends on how rapidly temperatures increase after spawning commences but in general varies from one to three weeks.

2.46 Whitetail deer are common in the swamps and bottomlands adjacent to Lake Seminole between the Chattahoochee and Flint Rivers especially from points near the mouth of Spring Creek to Bainbridge, Georgia. Wild turkeys are found throughout the project area, being most numerous in the area between the Chattahoochee and Flint Rivers. Gray squirrels are common in the lowland areas. Fox squirrels are more prevalent in the upland portions. Cottontail and swamp rabbits are also common. Fur animals including raccoon, mink, opossum, skunk, gray fox and bobcat have been reduced in numbers due to the loss of habitat resulting from impoundment. Lake Seminole is within the reported range of the Indiana myotis and the Florida panther which are on the Department of the Interior list of threatened wildlife. Appendix C contains a list of mammal species likely to occur in the project area. Table 7 contains wildlife population and hunter harvest estimates of the land areas adjacent to Lake Seminole.

2.47 The Corps is presently financing the formulation of a plan for the management of Lake Seminole's fish and wildlife resources. The management plan should enhance the stability of the lake while at the same time ensuring, and possibly, enhancing the yield to both fishermen and hunters.

2.48 The amphibian and reptile inhabitants of the project area include a variety of animal groups. The major groups include: toads, treefrogs, true frogs, sirens, salamanders, turtles, lizards, common nonpoisonous snakes, a cobra-related snake, and viper and pit viper snakes. Of this variety the Barbour's map turtle, gopher tortoise, northern Florida black swamp snake, and rainbow snake would be considered uncommon. Although the American alligator is on the Department of the Interior list of threatened wildlife, this species is very common in Lake Seminole. Appendix D contains a list of reptiles and amphibians known to occur or likely to occur in the project area.

2.49 In the early years of impoundment, the Lake Seminole area was an important migration route (not a flyway) for ducks and Canada geese, as well as for songbirds, on their way to the Gulf Coast to overwinter. The number of waterfowl migrating this far south in this particular basin has greatly diminished. One primary cause of this decrease is the availability of green feeds at more northern game refuges. Today only a few thousand ducks and even fewer geese may venture south into this area. Waterfowl species include mallard, pintail, American widgeon, wood duck, and ringneck. Lake Seminole is a good stopover for these birds since there are extensive shallow water areas, some restricted hunting areas, and most importantly, an abundant supply of food. All four groups of water birds (gulls and terns, ducks and their allies, herons and their allies, shore birds) and all four groups of land birds (birds of prey, woodpeckers, warblers, and sparrows) are represented in the area. Lake Seminole is within the reported range of the eastern brown pelican, southern bald eagle, and red-cockaded woodpecker which are on the Department of the Interior threatened wildlife list. The brown pelican has been seen in the area. The bald eagle resided at one time in the mid-section of this basin, but this bird has not been observed in the area for several years. The added expanse of water following impoundment has resulted in an

TABLE 7

Wildlife Population on Wildlife Management Areas Surrounding Lake Seminole. Hunter Harvest is Reported in Parenthesis ( ).

HUNTING SEASON -	Florida --- 1972	1973	Georgia --- 1972	1973	Corps Land 1972	1973
Acres in Wildlife Refuge	320	320	400	400	1/	1/
Acres of Public Hunting Grounds Managed					1/	1/
Deer	60(13)	70(14)	35	40(10)	(35)	N.D. 2/
Turkey	0(0)	0(0)	20	25(2)	(6)	N.D
Doves	2,500(1,800)	4,000(2,362)	300	200(150)	(3,000)	N.D.
Quail	4,000(2,000)	4,000(1,983)	300	400(200)	(1,700)	N D.
Squirrels	300(100)	300(60)	500	300(100)	(550)	N.D.
Woodcocks	50(12)	300(95)	50	25(50)	(105)	N.D.
Snipes	200(75)	500(132)	300	300(100)	-	N.D.
Ducks	2,000	1,000	2,500	2,500	26,000(260)	N.D.
Ducks on Peak Day	1,000	200	5,000	5,000	-	N.D.
Geese	0	0	0	0	75	N.D.
Estimate of Hunting Pressure	-	Too Heavy	-	-	-	N D.

1/ All Corps project owned land and water areas have been made available to the hunting public with certain reservations.

2/ No data.

Note: Derived from U. S. Army Corps of Engineers 1972 and 1973 "Utilization of Fisheries and Wildlife" reports.

increase in the levels of resident waterfowl populations in the project area. Quail are common in open fields and in some of the wooded areas surrounding the lake. Doves are found mainly in grain fields. Appendix E contains a list of those bird species which are residents or are regular visitors to the project area. The list does not include rare, occasional, or uncommon visitors.

2.50 The average depth of Lake Seminole is only 9.8 feet, making the reservoir sufficiently shallow, not only for the abundant growth of aquatic plants, but also for the production of fish-food organisms. The abundance of productive habitat together with an overabundant supply of nutrients has resulted in an outstanding sport fishery. Soon after its impoundment the word spread through southeastern Alabama, southwestern Georgia, and northwestern Florida that the bream and bass fishing in Lake Seminole was the best in any reservoir in the Southeast. Consequently, during its first eight to ten years of existence it received heavy fishing pressure and produced thousands of pounds of fish for fishermen to take home.

2.51 An important part of the fishing at Lake Seminole is the tailwater fishery below Andrews L&D and Jim Woodruff L&D. For a tailwater fishery to benefit many fishermen, several conditions must exist. The first essential condition is a continuous supply of good quality water resulting from upstream water conditions. Next, there must be an adequate population of game fish that migrate into the tailwater area which requires that habitat suitable for adequate fish reproduction, balanced forage-carnivorous species relationship, and adequate food supply for the forage and predatory species be available. The tailwater below Andrews L&D usually has water of sufficient quality to sustain a good fish population. It also has the entire productive capacity of Lake Seminole as a potential source of migrant fish. The tailwater below Jim Woodruff L&D is of good quality and very productive. Large saltwater striped bass which migrate up the Apalachicola River from the Gulf of Mexico provide sport fishing. There has been some reduction in the number of striped bass taken below Jim Woodruff in recent years which may possibly be due to the project's interference with the spring spawning migration of the species. Atlantic sturgeon are also caught in the Jim Woodruff tailwater, although in lower numbers than those which were taken shortly after completion of the project in 1957. The decline in Atlantic sturgeon and Alabama shad may also be due to an interference in the spawning activities of these species. An excellent white bass fishery occurs in the Jim Woodruff tailwater along with sunfish and catfish.

2.52 Because of these favorable conditions the Andrews tailwater has been a productive fishing area for thousands of bank and boat fishermen who use the area year round. However, conditions immediately below Andrews L&D are hazardous due to the shallow depth and large volumes of water associated with upstream peak power generation. A buoy line has been installed a few hundred feet below the dam to keep boats out of the area, and many fishermen have protested about it, insisting that one of the better fishing spots on Lake Seminole has been eliminated. But in view of the fact that fishermen persist in not wearing life jackets and fishermen have drowned in this tailwater area since Andrews Dam was completed, the buoy line appears to be worthwhile.

2.53 The use of Lake Seminole by fishermen and hunters along with their yearly total sport catch and bag where available is shown in Table 8. The slump in fishing pressure following the fifth year of impoundment indicates that production decreased after the initial expansion pulse. Even though this has not been substantiated, slumps in fish production usually occur in new reservoirs. Whatever the cause of the slump in fishing pressure, the lake has regained its popularity and the present sport fishery is fairly stable and highly productive.

TABLE 8

Fishing and Hunting Use of Lake Seminole

	TOTAL	FISHING		HUNTING		
	Attendance	Days	Sports Catch*	Days	Season Take*	
Year	(1,000)	(1,000)	(lbs. 1,000)	(1,000)	Ducks	Geese
1957	611	300	600	20	12,000	75
1958	1,316	700	500	60	8,000	50
1959	1,034	300	375	80	600	15
1960	1,370	900	420	27	1,200	12
1961	1,239	250	360	37	800	4
1962	1,168	250	500	47	555	0
1963	1,279	300	450	63	800	4
1964	1,246	380	-	30	-	-
1965	988	230	-	30	-	-
1966	1,148	280	-	40	-	-
1967	1,474	400	-	30	-	-
1968	1,823	780	-	30	-	-
1969	2,100	925	-	25	-	-
1970	2,985	1,200	-	35	-	-
1971	2,985	1,305	-	-	-	-
1972	3,002	1,299	-	-	-	-
1973	3,058	964	-	42	-	-

*No data after 1963.

2.54 The Chattahoochee River arm of Lake Seminole formerly received high pollutional loads from both domestic and industrial sources. However, in the past few years the level of biochemical oxygen demand (BOD) has been reduced in the river due to the installation of secondary treatment facilities. The series of impoundments above Lake Seminole have also helped in the reduction of both the BOD and the fecal coliform count contributed by upstream sources. Even though treatment facilities have been very efficient in reducing the quantity of dissolved carbon released into the river, large quantities of nitrogen and phosphorus are still released with the treated effluents.

2.55 In 1970 the Georgia Water Quality Control Board made a biological survey of the reach of the Chattahoochee River Basin between Columbus, Georgia, and Neal's Landing, Florida (which is in Lake Seminole). Data gathered from baskets attached to navigation buoys indicated that in this impounded stretch of the river macroinvertebrate populations

consisted of species adapted to a static water habitat. The presence of the caddisfly larva Cyrnellus fraternus gives evidence of the impounded nature of this stretch of the river since this species requires little or no current to aerate its gills. Further evidence of the static water condition was the presence in local areas of the colonial bryozoan Pectinatella magnifica. Single individuals of species requiring running water in order to aerate their gills were found only in the tailwater of Andrews L&D.

2.56 The Georgia Water Quality Control Board also concluded that in 1970 the mainstream area of the Chattahoochee arm of Lake Seminole showed very little indication of pollution. However, few bottom organisms attractive to game fish are supported by the mainstream Chattahoochee channel of the lake due to its depth and the action of currents which are too abrasive for fish food organisms to tolerate. The data presented by the 1970 survey are no index of the productivity of fish food organisms in the entire lake since the major fish food organism production is confined to the lake waters no deeper than eight feet. Since numerous mayfly hatches have been observed in the lake, it appears that the shallow water areas of Lake Seminole provide a habitat conducive to the production of desirable fish food organisms.

2.57 During its early years of impoundment Lake Seminole might have received a considerable quantity of dissolved carbon from waste effluents of the Great Northern Paper Company plant at mile 40 on the Chattahoochee River. Since 1970 this source of carbon has been greatly reduced by the installation and operation of advanced waste treatment facilities. This plant presently releases 17,250 pounds of BOD per day, but no evidence of any significant harmful effects upon aquatic life have been noted in the stretch of stream below the outfall.

2.58 At Chattahoochee River mile 44, the Alabama Power Company is currently constructing its first nuclear power plant on a 483-acre site on the west bank of the river. This plant will consist of two generator units, each with a capacity of 861 megawatts of electricity. An Environmental Impact Statement has been prepared on this project which says that the plant will be cooled by a closed-cycle system using mechanical draft cooling towers to prevent any heated water from returning to the river. The maximum withdrawal of water for cooling water purposes will be less than 180 cfs or about 14 per cent of the minimum low flow of the river. Under normal conditions the plant will use about 2 per cent of the river flow. Approximately half of the withdrawn water will be evaporated to the atmosphere and the remaining water will return to the stream at about ambient air temperature.

2.59 Currently there is a great deal of concern about the destruction of primary producers in river water used for cooling purposes. In Alabama Power Co.'s environmental studies of the nuclear plant, it was estimated that about 4,000 tons per year of small primary producers will be drawn through the cooling system. This estimate assumes a population of 85,000 organisms per cubic foot of river water and a maximum withdrawal

of 174 cfs. Since a closed cycle system will kill all of these organisms, the result will be a 14 percent reduction in river population at low flow and 2 percent reduction at normal flow. However, repopulation of these organisms should occur downstream.

2.60 Due to the fact that portions of Lake Seminole lie within three states, the waters of the lake and the tailwaters below Jim Woodruff Dam receive various use classifications. However, despite the differences in terminology between Alabama, Florida, and Georgia each category represents essentially the same criteria. The Chattahoochee River arm of Lake Seminole in Alabama is classified for swimming and for fish and wildlife. In Georgia, the Chattahoochee River arm of the lake is classified for fishing to the State Highway 41 Bridge and for recreation from the bridge to the dam. Also within Georgia is the Flint River arm of Lake Seminole which is classified for fishing above Bainbridge, and for recreation below Bainbridge to the dam. That portion of Lake Seminole and the tailwaters below the dam which occurs within Florida are classified as Class III waters. This classification includes those waters which are used for fish and wildlife propagation and management and for recreational activities, including those involving body contact.

2.61 On the Flint River arm of Lake Seminole there are numerous places where partially treated sewage enters the river. However, due to the limited quantity of sewage involved, the river has been able to reduce the BOD and coliform count by assimilation so that the Flint River from Bainbridge to its mouth is classified for recreational usages.

2.62 Along the lower reaches of both the Chattahoochee and Flint Rivers there are numerous livestock operations which have no provisions for fecal waste disposal other than dispersion by natural runoff. In most cases, the animals have free access to the river or its tributaries and are often seen wading in the shallow waters. Since current methods cannot separate fecal coliform of man from that of livestock, the livestock and wildlife within the drainage area adjacent to Lake Seminole may be major contributors to the fecal coliform contamination encountered there.

2.63 Jim Woodruff Dam is primarily a run-of-river navigation-power improvement and as such, it serves a very minor function as a flood regulator. At normal river flows Lake Seminole retains the water long enough to permit a drastic decrease in bacterial contamination. However, when flood conditions prevail, no flood water retention occurs and the bacterial concentration below the dam resembles that of a free-flowing stream.

2.64 All nutrients entering Lake Seminole come from one of the following sources: the atmosphere, domestic sewage, animal and plant processing wastes, fertilizer and chemical manufacturing spillage, other industrial effluents, and agricultural runoff. Neither sewage treatment by the cities and towns along the Flint and Chattahoochee nor the assimilative capacity of the rivers has been able to effectively reduce the nutrient loading in

these waters. Fortunately, rapid currents in the headwater areas on both arms of Lake Seminole have prevented large phytoplankton growths. In fact, Lake Seminole has never produced a phytoplankton bloom, since the nutrients flow through the mainstream areas of the lake and diffuse only slightly into shallow waters. Unfortunately, Lake Seminole contains habitat suitable for the growth of rooted aquatic plants and these plants are assimilating nutrients in greater amounts each growing season.

2.65 Lake Seminole has never approached a stratified condition. Two factors are responsible for the absence of even a weak stratification. First, the lake is too shallow, and second, the movement of water is too great both from stream flow and wind-wave currents. Thus, there has never been any problem with lake-overturns or with low dissolved oxygen concentrations in either the lake water or in the tailwaters below Jim Woodruff L&D. It is not anticipated that Lake Seminole will ever develop any type of thermal stratification problem.

2.66 Water quality control is not a function of the Jim Woodruff project, and there is no regulation of the reservoir for this purpose. However, the Mobile District maintains a water quality monitoring station which measures dissolved oxygen, temperature, conductivity, pH and turbidity. It is located about 3,200 feet downstream of the dam but is connected to a punch tape recorder located in the reservoir manager's office. The recorder may be set to record at intervals of 15 minutes, 1 hour, 2 hours, or 12 hours. The Environmental Protection Agency is responsible for a water quality data collection program in which cooperating Federal and State agencies and other organizations provide data that are made available on a computerized basis. Water quality data for 13 locations on Lake Seminole and the station monitored by the Corps below Jim Woodruff Dam are included in Appendix F and are shown on Plate 3. Although the water quality data represent different time periods, there is no indication that problem areas exist either in the lake or below the dam. However, the waters of the Chattahoochee River arm of Lake Seminole usually have much higher levels of turbidity than that of other regions of the lake. Since the penstocks on Jim Woodruff Dam are set to draw water from practically the top to the bottom of Lake Seminole, the tailwaters reflect water quality parameters which are more or less an average of those of the lake water. Generally, the tailwaters have the following characteristics: temperatures of 2 to 5°F less than surface water temperatures of the lake; dissolved oxygen levels which are comparable to the surface waters of the lake (almost always contain 5 or more ppm); and levels of other water quality parameters which are identical to those of the lake waters.

2.67 The average daily flow into Lake Seminole from the Chattahoochee River at Andrews L&D (mile 46.5) is 11,850 cfs; from the Flint River at Bainbridge, Georgia (mile 29.0) is 8,855 cfs; and from Spring Creek near Iron City (approximately mile 15) is 485 cfs. The maximum and minimum flows on the Chattahoochee River at Alaga, Alabama (mile 34.4) are 207,000

cfs and 1,230 cfs, respectively. The maximum and minimum flows on the Flint River at Bainbridge are 101,000 cfs and 1,340 cfs, respectively. The mean regulated flow released by Jim Woodruff L&D is 21,900 cfs, with the maximum and minimum flows at this point being 293,000 cfs and 4,540 cfs, respectively. Based upon an average flow of 21,900 cfs, the water exchange rate would be 43 times per year for Lake Seminole. The average complete exchange rate for the lake is computed to be approximately 8.5 days.

2.68 Flood control is not a purpose of the Jim Woodruff project. Whenever the reservoir inflow exceeds the discharge capacity of the turbines (about 20,000 cfs for 3 units) the excess is released through the gated spillway up to its capacity to prevent the pool from rising above elevation 77.5 at the dam. When forecasts indicate expected inflows in excess of 100,000 cfs the pool is lowered to elevation 77.0 in advance of the flood peak and held at that elevation until all usable spillway gates are fully opened and there is no control over the outflow. The gated spillway will discharge up to 203,600 cfs at elevation 77.0, and proper manipulation of the 15 usable gates will maintain the pool at that level for all inflows up to 203,600 cfs. Discharges above about 108,000 cfs cause the power plant to be non-productive because of the high tailwater, so that for higher flows all outflow is through the spillway. When the inflow exceeds 203,600 cfs all usable gates are fully opened and there is no control over the outflow. The pool rises as long as the inflow exceeds the discharge capacity of the spillway including the free-overflow section. The gates remain fully open until the pool drops back to elevation 77.5 at which time they are operated as necessary to maintain the pool at or below elevation 77.5.

2.69 Using the mean flow data of the Chattahoochee River at Alaga, Alabama, the Flint River at Bainbridge, Georgia and the Apalachicola River below Jim Woodruff Dam, and taking the average total nitrogen and total phosphorus concentrations at each location, Dr. John Lawrence (of Auburn University) has calculated the estimated average summertime standing crop of phosphorus, nitrogen, zinc, lead and cadmium in Lake Seminole. Table 9 lists the standing crop of these five elements as partitioned between aquatic plants, fish, bottom ooze, and water plus suspended matter. Also included in the table is the total input of these elements into the lake and their output below the dam.

2.70 The initial recreational plan for the Jim Woodruff Project called for two reservoir operations areas, a landing strip, 20 public parks and recreational areas, nine public service areas, and 22 public use and access areas. The sites were to be distributed in such a manner that they would provide easy access not only for all persons living within a short distance of the reservoir, but also for visitors from U. S. Highways 84, 27 and 90. Wherever possible, existing roads were to be improved in order to provide better access to the recreational areas. Where no roads existed, access was to be provided by acquiring a 100-foot right-

TABLE 9

Elemental Input-Storage-Output of Lake Seminole

Element	Average Summertime Standing Crop (lb/Acre)	Partition of Standing Crop: Aquatic Plants (%)	Fish (%)	Bottom Ooze (%)	Water Plus Suspended Matter (%)	Total Input into Lake Seminole (lb/square mile of drainage area)	Total Output Below Dam (lb/square mile of drainage area)
Nitrogen	35	44	15	19	22	800	674
Phosphorus	9.4	15	17	28	40	582	91
Zinc	8.6	2	0.15	14	83.85	153	175
Lead	0.65	6	0.8	55.2	38	15	18.9
Cadmium	0.17	6	Trace	63	31	4.47	1.99

of-way for a road. Parking space was to be included in the plan for each of the recreational sites.

2.71 The overall recreational plan for Lake Seminole specified particular facilities for each site, such as hand-pumped water to be supplied from deep drilled wells, sanitary facilities which conform to state public health laws, concrete boat ramps, picnic tables with shelters, and camping sites. Some concession areas would also have electricity, running water, bath houses, cabins, boardwalk docks, and swimming areas. Local civic organizations and municipal, county and state agencies were encouraged to lease and develop the public park and recreational areas; private interests were encouraged to lease and develop the public service areas. The Corps of Engineers assumed the responsibility for developing the remaining operational and recreational areas.

2.72 Six concessions have been leased at various locations around the lake. Appendix A contains a list of the initial sites in the recreational plan, with an indication of their present state of development. The recreational areas surrounding Lake Seminole are shown on Plate 3. A summary of those recreational facilities available in 1974 or planned for the future is shown in Table 10.

TABLE 10

Summary of Recreational Facilities Available at Lake Seminole or Planned for the Future

Facility	Total units planned	*Total units available - 1974
Launching ramps	59	45
Picnicking tables	1,030	750
Camping	645	250
Swimming beaches	11	7
Concessions	8	6
Group camps	5	4
Cabins	70	57

* Total number of units available in 1974 includes those on both government maintained and leased recreation areas.

2.73 Land area around the reservoir was assigned in various ways. The Georgia Department of State Parks was given a license to use five areas totaling 1,929 acres. The Florida Bureau of Parks and Historical Memorials was licensed to develop and operate 686 acres in two areas. Three Rivers State Park was developed on part of this land. The Game and Fish Commission of Georgia and the Game and Fresh Water Fish Commission of Florida have leased suitable lands to be used as game management areas. The State of Florida received 5,135 acres in 1955 and Georgia received 3,711 acres in 1960. Parts of both areas have been reserved for refuge purposes while the remaining portions are managed for public hunting.

2.74 The Bainbridge City Commission was given a lease to develop 200 acres into a park and a boat anchorage area. The City of Chattahoochee, Florida was licensed to develop 56 acres for a public park area. The City of Sneads was given a license to develop and operate 50 acres for public use. The city started to develop this land but eventually returned it all to the Corps. The more than 6,000 acres remaining were retained by the Corps of Engineers for the development of public recreational areas and construction of Corps' operational areas.

2.75 The popularity of Lake Seminole among hunters, fishermen, and other recreationalists is enhanced by the availability of boat ramps, parking areas, picnicking, camping facilities, and adequate access roads. Table 11 shows how the number of recreational activities has increased over the life of the project.

2.76 Based on a 1965 recreation survey of the Jim Woodruff project, approximately 58 per cent of the visitors to Lake Seminole travel less than 25 miles to the lake, with 14 per cent traveling between 26 to 50 miles; 7 per cent traveling between 51 to 75 miles; 5 per cent traveling between 76 to 100 miles; and 16 per cent traveling over 100 miles to the project area. It is not anticipated that the development of additional recreation facilities nor changes within the area transportation (highway) system will influence the distribution or the origin of visitations.

2.77 The recreational facilities at Lake Seminole compete for public appeal with a number of other recreational facilities. There are six state park areas with a total area of 5,400 acres within a 75-mile radius of Lake Seminole. Four of the seven areas are located in northwest Florida, one in southwest Georgia and one is located in southeast Alabama. The Florida Caverns is a 1,131-acre state park near Marianna, Florida. Recreation facilities are centered around limestone caverns and offer a wide range of outdoor recreation activities. Torreya State Park is a 1,063-acre area in Liberty County, Florida, on the Apalachicola River. This park area was established primarily to preserve a rare species of the Yew Family, Torreya taxifolia. Killearn Gardens State Park is a 300-acre area located in Leon County, Florida, near Tallahassee. It was donated to the State of Florida for preservation of its wide variety of tree and shrub plantings and landscape features. This state park also provides facilities for picnicking and boating. The St. Andrews State Park is a 1,022-acre park in Bay County, Florida, near Panama City. This park provides facilities for picnicking, camping, swimming and fishing. Kolomoki Mounds State Park is a 1,284-acre area located in the northern part of Early County, Georgia, near Blakely. Even though the park was established for the preservation of prehistoric Indian Mounds, facilities are provided for picnicking, sightseeing, camping, swimming and boating. The State of Florida also manages fourteen additional recreational areas within a 75-mile radius of Lake Seminole. Radium Springs which produces a flow of 70,000 gallons per minute is located south of Albany, Georgia.

TABLE 11

Public Visitation at Lake Seminole

(thousands of visitor days)

YEAR	VISIT	FISHING	HUNTING	CAMPING	PICNICKING	BOATING	SWIMMING	SKIING	MISC.	TOTAL
1955	-	-	-	-	-	-	-	-	-	10
1956	-	-	-	-	-	-	-	-	-	32
*1957	250	300	20	-	25	160	-	10	15	611
1958	115	700	60	20	80	285	-	80	15	1,316
1959	125	300	80	30	70	300	-	125	15	1,034
1960	-	900	27	20	230	75	-	15	-	1,370
1961	390	250	37	15	110	100	55	100	125	1,239
1962	375	250	47	30	100	80	60	190	115	1,168
1963	700	300	63	10	100	90	-	55	-	1,279
1964	420	380	30	30	270	90	-	30	-	1,246
1965	-	230	30	60	180	130	30	30	-	988
1966	335	280	40	60	110	240	40	-	25	1,148
1967	390	400	30	50	190	250	30	70	30	1,474
1968	270	780	30	320	140	60	110	90	15	1,823
1969	300	925	25	360	170	70	115	100	10	2,100
1970	525	1,200	35	400	250	200	170	130	15	2,985
1971	-	1,305	-	-	-	-	-	-	-	2,985
1972	-	1,299	-	-	-	-	-	-	-	3,002
1973	879	964	42	119	397	208	320	122	0	3,058

*Completion of Jim Woodruff Lock & Dam.

Chattahoochee State Park is located in southeastern Houston County, Alabama, near the Florida line. Recreation facilities at this park provide for fishing, swimming and boating. The Apalachicola National Forest, the only Federal area within the zone of influence, is located in Liberty and Franklin Counties, Florida, about 40 miles southeast of Lake Seminole. Little development has been accomplished, but the area is used for hiking, picnicking, camping, nature study and similar activities. Dougherty County, Georgia, operates 600-acre Chehaw State Park. Recreation facilities provide swimming, picnicking and games.

2.78 Five counties, located within three states, are contiguous to Lake Seminole. The 1970 population in the five counties was 159,561, representing an increase of 7 percent over 1950. According to 1970 census data, the largest cities in the area were Dothan, Alabama, with 36,733; Bainbridge, Georgia, with 10,887; Chattahoochee, Florida, with 7,944; Marianna, Florida, with 6,741; and Quincy, Florida, with 8,334. Table 12 presents both historical populations and population projections for these counties, as developed from data compiled for the Water Resources Council by the Bureau of Economic Analysis of the Department of Commerce and the Economic Research Service of the Department of Agriculture (the Office of Business and Economic Research Service --- "OBERS" projections, Series E).

2.79 The five-county region is primarily agricultural with some manufacturing in the urban centers. The latest land use statistics available for the region were compiled in 1967. Of the 1,829,320 acres which make up the area (excluding water areas of 40 acres in size or streams 1/8 mile and over in width), approximately 54 percent were in forest, 31 percent were used for cropland, 9 percent were in pastures, with the remaining 6 percent making up other uses. This latter category consists of urban areas, roads, marshes, wastelands, national forest, parks and other unclassified purposes. Also included in the other use category are 14,052 acres of small water areas of less than 40 acres in size and streams less than 1/8 mile in width, representing 1.0 percent of the total land area in the 5-county region. There was a trend in the region between 1958 and 1967 for an increase in the amount of forest land with a corresponding decrease in cropland and pasture or range.

2.80 A network of paved roads surrounds Lake Seminole connecting the principal population centers of the region, and improved roads lead into all agricultural districts. Easy access is provided for the numerous recreational areas on project lands. There are three Federal and a large number of State highways crossing the region. Two railroads serve the area.

2.81 Commercial transportation on the Chattahoochee and Apalachicola Rivers between World War II and the completion of Jim Woodruff L&D was restricted to the downstream movement of sand and gravel by barge from the dredging site on the Chattahoochee River to the distribution plant at Chattahoochee, Florida. Year-round navigation on the Apalachicola

TABLE 12

Historic Population (1950-1970) and Base Line Population Projections (1980-2020) for Alabama, Florida, and Georgia Counties Contiguous to Lake Seminole (OBERS Projections, Series E)

COUNTY/STATE	1950	1960	1970	1980	1990	2000	2010[1/]	2020
Houston	46,522	50,718	56,574	56,200	58,600	59,100	59,900	60,700
ALABAMA	3,061,743	3,266,740	3,444,165	3,746,700	4,090,400	4,284,300	4,467,000	4,649,700
Gadsden	36,457	41,989	39,184	44,200	51,100	55,900	58,700	62,800
Jackson	34,645	36,208	34,434	42,000	47,000	50,200	52,800	56,300
FLORIDA	2,771,305	4,951,560	6,789,443	8,926,400	10,978,100	12,713,900	14,497,500	16,281,100
Decatur	23,620	25,203	22,310	23,100	24,400	24,400	25,100	25,800
Seminole	7,904	6,802	7,059	7,300	7,700	7,700	7,900	8,200
GEORGIA	3,444,578	3,943,116	4,589,575	5,147,300	5,907,400	6,458,100	6,974,600	7,491,100

1/ Interpolated, using rate of change between 2000 and 2020.

River became a reality in 1957 with the completion of Jim Woodruff L&D and the dredging of the Apalachicola River. In 1963 the completion of Walter F. George L&D and Andrews L&D and the dredging of the Chattahoochee River (below Andrews L&D and below Columbus, Georgia) opened navigation to Columbus. This system was designed to provide a 9-foot deep by 100-foot wide channel from the Gulf of Mexico to the Georgia cities of Bainbridge and Columbus. Since 1957, commercial traffic in the basin has increased at a fairly constant rate.

2.82 Commodities which are moved upstream through Lake Seminole are electrical machinery, equipment and supplies; salt; sulfur; animal feeds; sugar; molasses; crude and refined petroleum products; coal products; chemicals; fertilizers; pipe; insecticides; disinfectants; metals; and manufactured products. Commerce moved downstream through Lake Seminole consists of corn; soybeans; wheat; paper and paper products; clay products; phosphate rocks; and sand, gravel, and crushed rock. Sand and gravel make up a very large percentage of the total commerce moved downstream. Table 13 presents the commerce moved through Lake Seminole, both upstream and downstream, and the total commerce moved within the Chattahoochee-Apalachicola-Flint basins over the past several years.

TABLE 13

Annual Waterborne Commerce (in tons) Moving Upstream and Downstream Through Lake Seminole and the Total Moved Within the Apalachicola-Chattahoochee River Basin

Year	Upstream	Downstream	Total
1951	600	78,000	78,600
1956	---	147,000	---
1957 1/	---	---	221,000
1958	129,277	187,070	339,905
1959	154,920	209,450	386,856
1960	221,332	159,225	404,433
1961	201,273	168,494	383,017
1962	220,347	165,342	388,584
1963	200,461	177,084	381,220
1964	198,899	182,061	382,350
1965	214,924	193,281	415,494
1966	182,242	387,640	387,340
1967	264,302	176,213	452,131
1968	274,605	202,810	489,267
1969	338,523	228,743	677,259
1970	508,098	255,140	913,871
1971	521,773	220,285	898,087
1972	588,815	402,150	1,025,275
1973	---	---	1,024,890

1/ Completion of Jim Woodruff L&D

NOTE: Extracted from the U. S Army Corps of Engineers, Lower Mississippi Valley Division, Waterborne Commerce Statistics Center, New Orleans, La., annual publications entitled "Waterborne Commerce of the United States, Part 2."

2.83 The general public also uses the locks to move pleasure and fishing craft up and down the system. In 1973 Jim Woodruff Lock passed 472 pleasure craft and 1,161 commercial craft.

2.84 In order to maintain navigation on the Apalachicola River, operational procedures specify that sufficient waters will be released by Jim Woodruff Dam in order to provide a 9-foot river channel at all times. Specifically, the dam must release water 24 hours a day for 7 days a week, even though upstream impoundments generally release water on a regular 5-day generation schedule. Throughout most of summer and fall this procedure causes the water level at Lake Seminole to fall on weekends by as much as 1 foot, resulting in curtailment of recreational use. This has given rise to complaints from fishermen, boaters, and other recreationists, as well as concessionaires.

2.85 When traffic is grounded in the channel below Jim Woodruff Dam a complete investigation is made by the Area Engineer, Panama City Area Office, who is responsible for maintenance and operation of navigation facilities on the Apalachicola River system. Based on the investigation he makes a recommendation to designated personnel in the Mobile District Office Operations Division who then decide whether or not a special release should be made to float the grounded vessels. If a special release is authorized, its magnitude and duration is determined by the Power Project Superintendent on the basis of distance downstream and additional depth required.

2.86 Fluctuations in water levels in the reservoir create many problems for boaters and fishermen. In Lake Seminole where there are many shallow water areas, a drop of less than one foot makes such areas inaccessible to boaters and fishermen. More important, however, is the destruction of fish food organisms resulting from exposure of the lake bottom. The extent of this food loss is dependent on the amount of bottom area exposed. The maximum drawdown does not normally exceed one-half foot. Table 14 shows the acreage covered by water and the quantity of lake bottom exposed at various pool elevations.

TABLE 14

Surface Area of Lake Seminole and Quantity of Lake Bottom Exposed at Various Elevations

ELEVATION (feet m.s.l.)	WATER AREA (acres)	LAKE BOTTOM EXPOSED (acres)
75	32,200	5,300
76	34,840	2,660
76.5	36,100	1,400
*77	37,500	0
77.5	38,900	0
78	40,200	0
79	42,980	0

*Average power pool elevation.

2.87 Prior to impoundment of Lake Seminole, two parcels of land were not cleared: one from the mouth of Spring Creek to the then existent Lake Decatur Dam (4,700 acres), and the other between the then existent Florida Highway 126 and the Chattahoochee River (1,700 acres). One other smaller inaccessible area was not cleared and this brought the total uncleared areas to 6,428 acres. Some large trees on the river bank at the mouths of sloughs and creeks were left standing. The uncleared areas in the impoundment were expected to act as attractants for fish and also saved slightly over one million dollars of the initial construction costs. The uncleared areas within Lake Seminole are shown in Plate 3.

2.88 The clearing was started in 1952 and completed in 1954. Essentially all of the flooded trees were dead by 1960 and pronounced natural pruning of smaller tree limbs had already occurred. Strong winds cause many of the remaining deformed trees to break off at or near the waterline. The larger tree trunks often float and are hazards to both recreational and commercial boating. These uncleared areas (shown on Plate 3) are continuing sources of hazardous objects throughout the lower lake region, as parts of dead trees fall into the water and float out into the lake. In order to eliminate this problem and provide better access into these areas, a program was initiated to cut all standing tree trunks within the 60-foot-wide marked boat lanes to a depth of 8 feet. All of this debris was placed on barges, moved to the bank, and burned. The program was started in 1964 and completed in 1966, during which time 25 miles of boat channels were cleared. This channel clearing program has increased the safety and expanded the recreational usage of this area of Lake Seminole.

2.89 When Lake Seminole was impounded, it covered many ponds between the Chattahoochee and Flint Rivers, but the connections between these ponds and the major portion of the lake were so shallow that they were inaccessible by boat. In 1955 tractors and pans were used to cut a 6-foot deep and 30-foot wide channel connecting areas between Fish Pond Drain and Spring Creek. After the lake filled, a similar channel was dredged by barge and dragline between Spring Creek and the Flint River. This permitted boat access to the majority of ponds between the two major arms of the lake. Some deposition has occurred at isolated spots in these channels; however, to date there has been no maintenance dredging. On the Chattahoochee River arm most access channels are at right angles to the river and, consequently, are more subject to siltation, particularly during very high water. Somewhere between 5,000 and 10,000 cubic yards of dredged material are removed each year and placed on dry land adjacent to the channels.

2.90 Although deposition in Lake Seminole from incoming sediment to date has not been severe, problems caused by the loss of channel capacity have arisen, thus requiring annual dredging in the Chattahoochee River. From navigation mile 33 upstream to just below George W. Andrews L&D, a distance of about 13.5 miles, an average of 346,000 tons of predominately sand are removed from the channel each year. For a distance of about 5 miles below Andrews L&D the channel is gradually degrading; however,

material from the banks and bottom shift resulting in the formation of shoals in this reach as well as the reach below to mile 33. Between navigation miles 5 and 6 there is an area where channel deposition is occurring. The old river channel at this location is nearly filled and is approaching the point where navigation is threatened. The aggradation is attributed to shifting bottom sediments. The direction of the currents above the inundated flood plain of the old river cross the navigation channel at about a 60 degree angle and causes the material that is moved along the bottom by flood flows to be carried over and deposited in the channel. Channel shoal areas create additional problems in that any channel flow is halted and forced on top of the inundated flood plain with a corresponding increase in local flow velocity and an increase in abrasive bed movement.

2.91 The abrasive action created by the movement of bottom materials in the Chattahoochee arm of Lake Seminole is not conducive to the growth of large invertebrate populations in this area of the lake. Also, periodic channel dredging operations have aggravated this problem. The dredging procedure used for several years on the stretch of Chattahoochee River immediately below Andrews L&D required pumping the sand from the river bed and depositing it on the bank above normal water level. This process did not remove the problem from the river. Since river floods washed the sand back into the channel and swept it downstream to form new sand bars, it was only a short time before dredging operations were required again. The current dredging method employed is to obtain areas above the river bank and pump the sand and silt into these diked, firm, dredged material sites. Presently, 90 to 95 percent of the dredged materials on the stretch of the Chattahoochee River included in Lake Seminole are placed on firm sites. These sites are selected in such a manner as to minimize environmental impacts of dredged material disposal and will recover over a period of time due to ecological succession. These solid sites for dredging deposition are obtained from local landowners. In many instances, landowners have been reluctant to sell their lands for this purpose. No dredging of the channel on the Flint River arm of Lake Seminole has been necessary.

2.92 Appendix G contains a tabulation of sediment chemical analysis data for 12 stations sampled in the Chattahoochee River arm of Lake Seminole. The Flint River arm of the lake was not sampled since no dredging is performed in this area. These sediment analyses are only portions of the 1974 Corps of Engineers Districtwide sediment sampling program. Due to the fact that over 90 percent of the sediments are classified as sand and gravel, it is not anticipated that problem areas exist with the chemical content of the sediments dredged from the Chattahoochee River navigation channel in Lake Seminole. A more definitive discussion of the results of the sediment analyses will be presented in a separate EIS covering the entire Apalachicola-Chattahoochee-Flint system which is scheduled to be available in draft form in the fall of 1975.

2.93 Snagging operations on the upper stretch of the Chattahoochee arm of Lake Seminole have consisted of picking up fallen trees, dislodged

stumps, and logs and placing this debris on the bank a few feet above normal water level. No particular effort has been made to obtain firm disposal sites for this woody material. Many fishermen contend that snagging operations on the river have destroyed sites attractive to larger fish. Other recreational users insist that snagging destroys part of the natural beauty of the river, is unsightly when debris is placed on the bank, and eliminates the protection from bank erosion afforded by snags and debris. However, snagging is probably more beneficial in eliminating hazards to pleasure craft than to commercial vessels. Two other benefits are the elimination of mosquito breeding sites and attachment sites for aquatic plants.

2.94 Archeological investigations of the project area were conducted in 1953-1954. A total of 135 sites were identified by University of Georgia, Smithsonian Institution, Florida Park Service, Florida Historical Society, and National Park Service personnel and the most important sites that would be inundated were excavated. Findings indicated that human occupation of the area extends back for approximately 3,600 years. The National Park Service recommended that suitable markers be erected to denote the more important sites. They also suggested that an archeological exhibit of habitation sites of the project be combined with displays on the history, construction and operation of the project, and that such exhibits be located in a building associated with the office of the Reservoir Manager. To date, no exhibits have been placed on display in the Reservoir Manager's office. Many relics from Fort Scott (1816-1821) on Flint River and Camp Recovery (1821) on the bluff across the river from Fort Scott are displayed at Wingate's Fish Camp on the Hutchinson Ferry Landing Area. No historical or archeological sites listed in the National Register of Historic Places are located on project lands.

2.95 The Corps has recently established a program, funded under the provisions of P.L. 93-291, that will evaluate all actions from the initiation of preauthorization planning through post authorization planning and design, construction, and operation and maintenance in terms of their effect on cultural resources. Those actions which have an effect on significant cultural resources will be fully coordinated with the National Park Service, State Historic Preservation Officer, and the Advisory Council on Historic Preservation, and appropriate actions will be taken to discharge all Corps responsibilities involved in a spirit of proper stewardship of these resources for the benefit of present and future generations.

2.96 The available head of the Jim Woodruff project is adequate for the production of hydroelectric power during most of an average year. The reservoir level is normally maintained near elevation 77.0 with pondage of one-half foot above and below this elevation being used to reregulate flows into the reservoir from upstream hydroelectric developments that operate as peaking plans. Navigation depths in the Apalachicola River are dependent on continuous flows and the Woodruff power plant, which is a run-of-river plant, operates around the clock every day except when occasional high flows reduce the head causing the plant to be non-productive.

2.97 Since there is no flood control storage available at the project, the reservoir level at the dam will be maintained at elevation 77.0 by

passing the inflow through the spillway gates and/or the power plant until the full discharge capacity of the spillway is reached during periods of high flows. Once the spillway capacity is reached and all gates are fully open, a free overflow condition will prevail and the pool will rise and recede according to the inflow to elevation 77.0 at which time gate operations will be resumed to control the pool at that level.

2.98 The power plant at Jim Woodruff Dam is operated to supply energy and capacity to Florida Power Corporation under terms of a contract negotiated and administered by the Southeastern Power Administration (SEPA). The output of the plant, which operates continuously, varies with changes in the inflow. Plant output data are telemetered to the Florida Power Corporation load dispatcher who adjusts his system as necessary to take care of changes in Woodruff generation.

2.99 The entire output of the plant is delivered at the switchyard to the Florida Power Corporation for delivery to preference customers of the Government. If the plant output is greater than the requirements of the preference customers, the excess energy and capacity are purchased by Florida Power Corporation for use in its own system. When Woodruff cannot meet the needs of the preference customers, the power plant operator notifies SEPA who arranges for support capacity and energy from other sources.

2.100 During periods when the reservoir inflow is equal to or greater than the full water capacity of the turbines, Jim Woodruff will operate strictly as a run-of-river plant. As the flow increases, rising tailwater will result in reduction of head and a corresponding reduction in power output. Occasionally, during extreme floods, the tailwater will be so high that the plant will be out of production. The minimum generating head is about 9 feet, which occurs at a flow of about 108,000 cfs. This head is equalled or exceeded 99 percent of the time.

2.101 The hydroelectric power produced by Jim Woodruff Dam averages 226,000,000 kilowatt hours per year. This comes from three generating units with a total capacity of 30,000 kilowatts operating at a normal head of 26.5 feet. Since electrical energy demand throughout the Apalachicola-Chattahoochee-Flint Basin has continued to rise, such high power production fulfills the secondary purpose for which the project was created. The energy requirement for the entire Apalachicola-Chattahoochee-Flint Basin was 5.3 billion kilowatt hours in 1959; it is projected to be about 18.9 billion in 1975 and about 45.2 billion by the year 2000. This indicates that the generating capacity of Jim Woodruff Dam will continue to be used by the general public.

3.01 Relationship of the Proposed Action to Land Use Plans. The five counties immediately adjacent to Lake Seminole and Jim Woodruff Lock and Dam are Jackson and Gadsden Counties in Florida, Seminole and Decatur Counties in Georgia, and Houston County in Alabama. To date, both the Cities of Bainbridge in Decatur County and Donaldsonville in Seminole County have had comprehensive development plans adopted, but only Gadsden County has completed a comprehensive county-wide land use plan. Basically

all five of these counties are rural and consist mainly of agricultural and forest land. Indications at present are that this will not change. Because of this, it is felt that operation and maintenance of this project is compatible with any existing or future land use plans for the Lake Seminole area.

4.01 The Environmental Impact of the Proposed Action. Over 2,460,893,000 kilowatt hours (KWH) of power were generated by the project between 1966 and 1973 which sold for $11,160,589. Over 225,469,000 KWH were generated in fiscal year 1973 which sold for $1,090,221.

4.02 Lake Seminole has become a well-known recreational scenic attraction with 3,058,000 visiting the project in 1973. In 1965, the Corps predicted that the ultimate attendance to Lake Seminole at the end of its project economic life of 50 years would range between 3.6 and 5.7 million. Fishing is the most popular form of recreation with 32 percent of the 1973 visitors engaged in this activity. Sightseeing accounted for 29 percent of the 1973 visitations, picknicking for 13 percent, swimming for 10 percent, boating for 7 percent, camping and skiing for 4 percent each, and hunting for 1 percent.

4.03 The states of Georgia and Florida operate two wildlife management areas totaling 6,900 acres on Lake Seminole. Game management measures in the areas include salt distribution, firebreak maintenance, controlled burning of vegetation, and herbaceous seed planting for wildlife. In 1973 improved wildlife feeding grounds were maintained on 5,100 acres. Timber is thinned and harvested as necessary. Table 7 presents the hunter harvest and wildlife populations on the wildlife management areas surrounding Lake Seminole for 1972 and 1973.

4.04 There were no fish population studies performed in the project area prior to impoundment; therefore, it is impossible to state the degree of fish population increases and/or decreases that have occurred. However, fish population studies (using rotenone) have been made at two sites by Dr. John Lawrence of Auburn University. The sites studied were Toole's Landing and Saunders Slough, on Lake Seminole in 1967, 1968, 1970, and 1971. The results of these population studies are shown in Table 14.

TABLE 15

Fish Population Studies Conducted on Lake Seminole

		Toole's Landing			Saunders Slough		
Year	Month	Total lb/Acre	Game Fish lb/Acre	Game Fish Percent of Total	Total lb/Acre	Game Fish lb/Acre	Game Fish Percent of Total
1967	April	209.25	26.70	18.0	100.25	50.05	49.0
1967	July	-	-	-	37.20	16.35	44.0
1968	April	266.60	64.80	25.0	34.85	18.05	52.0
1970	April	146.70	29.05	19.8	37.85	20.40	53.8
1970	July	-	-	-	29.55	16.20	55.0
1971	April	180.60	49.95	27.7	36.55	25.45	69.7

4.05 Lake Seminole provides the Florida Game and Freshwater Fish Commission with fishery resources for conducting fish population studies. White bass were collected in 1973 for use in a white bass/striped bass hybridization study.

4.06 Increased fish production is enhanced in Lake Seminole by water level management; water levels are maintained as near constant as possible during the spring spawning season.

4.07 Lake Seminole's abundance of productive, shallow habitat together with an overabundant supply of nutrients has resulted in an outstanding sport fishery. The lake receives heavy fishing pressure, which has been increasing during the past few years and produces thousands of pounds of fish for fishermen to take home. The sport fishery in Lake Seminole is fairly stable as well as being highly productive. An important part of the fishing in Lake Seminole is the tailwater fishery below Andrews L&D. Lake Seminole produces sufficient quantities of fish to enhance the fishing potential of Andrews' tailwater.

4.08 The number of annual fishing visitations to Lake Seminole has gradually increased since the completion of Jim Woodruff L&D. In 1973, 964,401 fishermen utilized the fishery resources of the lake. Before construction it is estimated that the total fishing pressure within the project area did not exceed 25,000 man-days per year. The extremely productive fishery of Lake Seminole has a nationwide reputation, with bass and bream among the most sought-after fish. A great deal of money is spent by fishermen in both the immediate project area as well as in the areas from which they come and along their route of travel to Lake Seminole.

4.09 The continued operation of Jim Woodruff Lock and Dam will continue to effectively stop the annual spawning migration above the project of the anadromous fish species in the Apalachicola-Chattahoochee-Flint drainage system. Anadromous species adversely affected by the project are striped bass, Atlantic sturgeon, and Alabama shad. In addition, the project will continue to hamper the return of young American eels from the sea. The net effect will be a continued reduction in the number of individuals of these species found in the drainage basin above the Jim Woodruff project.

4.10 Although the lake acts as a nutrient trap for wastes and surface runoff, no significant algae problem has ever occurred within the lake. However, a serious aquatic plant problem exists in Lake Seminole dating back to its first partial impoundment in 1955. In 1974, nearly 500 species of identified aquatic plants covered over 10,000 acres of the lake. This area is expected to increase in the future. According to the Corps' aquatic plant survey of Lake Seminole in 1973, the plants of major concern and the number of acres which they cover are as follows: Eurasian watermilfoil -- 4,500 acres, giant cutgrass -- 2,200 acres, water hyacinth -- 600 acres, and Illinois pondweed -- 2,000 acres. The aquatic plant surveys provide a basis for work programs and further studies which should be beneficial to the mosquito control program and other areas of interest on Lake Seminole.

4.11 Conditions within Lake Seminole are ideal for the establishment, growth, and spread of aquatic plants. As long as Lake Seminole exists, one may expect an aquatic plant problem to exist in the lake also. As the lake ages and conditions change it is possible that some of the less abundant plants may have a greater impact on the reservoir. Some of the problems created by aquatic plants are: clogging of small boat channels; limitation or prevention of access to many areas; creation of what some may consider an unsightly appearance; interference with utilization of public use areas; adverse effects on some fishes; reduction in the quantity of water stored in the lake; increasing the buildup and extension of shorelines into the reservoir; and provision of more suitable habitat for mosquito production. Without adequate aquatic plant control, the public use of this lake will be dramatically affected in the future. The exact controls for the major aquatic plants (water hyacinth, alligatorweed, giant cutgrass, Eurasian watermilfoil, and hydrilla) have not totally been determined at this time. In the event that a satisfactory control program for these plants cannot be developed and funded, then the use of the lake will be substantially reduced.

4.12 The environmental impact of the alligatorweed flea beetle, which is employed to control its namesake, is minor. It has been shown that the use of the herbicide 2,4-D is not harmful to man, fish, or other animals when applied in the recommended concentrations. The control of aquatic plants with 2,4-D should cause an increase in the growth rate of fish. This results from a recycling of nutrients tied up by aquatic plants within the ecosystem. It has been shown that lakes with abundant aquatic plant growth tend to be overcrowded with small sunfish. The removal of aquatic plants eliminates cover and exposes small fish to predators. This increases predator growth rates. The small sunfish population is thus reduced and more food is available to the surviving individuals increasing their growth rate.

4.13 A temporary reduction in water quality results from the addition of herbicides to an area heavily infested with aquatic plants. As the plants die and decompose, large amounts of dissolved oxygen are taken from the water, temporarily resulting in a noxious condition in the vicinity. A more detailed discussion of aquatic plant control activities and their associated environmental impacts in Lake Seminole is given in a separate EIS entitled Aquatic Plant Control Program, Mobile District which was available in draft form in February 1975 with the final scheduled to be completed in the spring of 1976.

4.14 Lake Seminole provides an attractive and adequate habitat in which mosquitos may breed. As a result, there is a large variety of mosquitoes produced in the project area. Mosquitoes capable of transmitting malaria, sleeping sickness, and one or more of the various types of encephalitis are produced in the Lake Seminole area. No case of either malaria or sleeping sickness has been recorded for over 20 years in the area. The mosquito control program ensures the health and happiness of those people who reside near the lake as well as those who periodically utilize Seminole's resources. Malathion insecticide is employed by the

Corps in the mosquito control program. In 1974, 834 gallons of 95 percent Malathion were applied at a rate of 3 fluid ounces per acre according to ultra-low-volume methodology.

4.15 Studies have shown that Malathion is generally more toxic to fish food organisms than to fish and it has a relatively low mammalian toxicity compared with other organophosphates. Due to the fact that Malathion hydrolyzes rapidly in alkaline waters, the pH of Lake Seminole is sufficiently high to enhance the degradation of this pesticide. No fish kills attributed to the application of Malathion have been reported to date. However, the potential for Malathion-induced fish kills exists as long as this compound is employed for mosquito control. The major effect of continued use of Malathion in the Lake Seminole mosquito control program, as in mosquito control programs elsewhere, will be an increased selection for mosquitoes and other susceptible invertebrates that are resistant to this organophosphate pesticide. The rate of this resistance buildup is not presently known.

4.16 Although Lake Seminole receives both domestic and industrial wastes containing large amounts of nitrogen and phosphorus, as can be seen in Appendix F, no major water quality problem exists in the lake or below the dam. However, the waters of the Chattahoochee River arm of Lake Seminole usually have higher levels of turbidity than that of the other regions of the lake. Channel maintenance and sand and gravel dredging cause much higher levels at times in areas downstream from dredging sites. According to a report prepared in 1973 for the Florida Department of Natural Resources by Florida State University, it is believed that the Jim Woodruff project has greatly reduced the amount of pollution reaching Apalachicola Bay.

4.17 Due to Lake Seminole's extensive shallow water areas, it has never approached a stratified condition, nor is it ever expected to do so. Thus, there is no problem with lake overturns or with low dissolved oxygen concentrations in either the lake water or in the tailwaters below Jim Woodruff L&D. Since the penstocks on Jim Woodruff Dam are set to draw water from practically the top to the bottom of Lake Seminole, the tailwaters reflect water quality parameters which are more or less an average of those of the lake water. Generally, the tailwaters have the following characteristics: temperatures of 2° to 5°F less than surface water temperatures of the lake; dissolved oxygen levels which are comparable to the surface waters of the lake (always contains five or more ppm); and levels of other water quality parameters which are identical to those of the lake waters. At normal river flows Lake Seminole retains the water long enough to permit a drastic decrease in bacterial contamination. However, when flood conditions prevail, no flood water retention occurs and the bacterial concentration below the dam resembles that of a free-flowing stream. No fish kills or other serious effects on water quality are known from operation of the project.

4.18 The mean regulated flow released by Jim Woodruff L&D is 21,900 cfs, with the maximum and minimum flows at this point being 293,000 cfs and 4,540 cfs, respectively. In order to maintain navigation on the Apalachicola River, operational procedures specify that sufficient waters will be released by Jim Woodruff Dam in order to provide a 9-foot river channel

at all times. Specifically, the dam must release water 24 hours a day for seven days a week, even though upstream impoundments generally release water on a regular five-day generation schedule. Depending on the status of maintenance dredging at the time, flow requirements to maintain a 9-foot channel vary from about 13,000 to 17,000 cfs. Under present conditions of improvement in the Apalachicola-Chattahoochee System, a flow of 13,000 cfs is maintained 75 to 80% of the time. In addition to aiding navigation, the minimum continuous flow below Jim Woodruff provides a more dependable water supply source for downstream users and assists in maintaining a more uniform yearly assimilative capacity in the stream. Throughout most of summer and fall this procedure causes the water level at Lake Seminole to fall on weekends by as much as one foot, resulting in some curtailment of recreational use. The Corps is presently studying methods which would assure year-round navigation on the Apalachicola River.

4.19 The fluctuations in water level have given rise to complaints from fishermen, boaters, and other recreationists, as well as concessionaires. Fluctuations in water level do create many problems for boaters and fishermen. A more important problem, however, is the destruction of fish food organisms when the lake bottom is exposed for even a few hours. The extent of the food loss is directly related to the amount of bottom exposed. The maximum drawdown does not normally exceed one-half foot, which would mean that approximately 1,400 acres of lake bottom are exposed. Since fish food organisms are generally produced in water less than eight feet deep, fluctuations in water level affect the best producing areas most severely.

4.20 Since the completion of Jim Woodruff L&D in 1957, commercial barge traffic through Lake Seminole has increased at a fairly constant rate, adding to the economy and general welfare of the entire basin. In 1972 990,965 tons (total of upstream and downstream) of commodities were moved through Jim Woodruff Lock. This figure represents over 96 percent of the total commerce moved within the entire Apalachicola-Chattahoochee-Flint Basin. No adverse effects to Lake Seminole or the tailwaters below Jim Woodruff L&D have been created as a result of this increase in commercial barge traffic other than some inconvenience to fishermen and other pleasure boating. The general public also uses the lock to move pleasure and fishing craft.

4.21 The project has no adverse effect on any mineral resources or on their development within the project area. Increased depths have probably enhanced sand and gravel operations by making available more economical barge transportation.

4.22 The 18,146 acres of project lands adjacent to Lake Seminole will no longer be used for timber and crop production; however, as mentioned earlier, this land has been set aside for use as wildlife refuges, public hunting areas, or park and recreational areas. The 18,146 acres possess varying degrees of wildlife production due to the variety of activities which occur around the lake. Some types of wildlife habitat have been beneficially affected by impoundment and associated activities (such as for the alligator and wading birds), while the reverse is true for other habitat types (loss of habitat for squirrel and deer).

4.23 Several hundred acres of project land are used to provide access roads; operation, maintenance, and storage buildings; parking, picnicking, and camping areas; and boat launching sites, boat anchorage basins, and other recreation facilities. While these land uses are beneficial to the development of operational and recreational aspects of the Jim Woodruff project, their continued operation and maintenance prevents the complete recovery of the natural faunistic and floristic elements in these areas.

4.24 The 6,428 acres of land which were not cleared prior to impoundment now serve as attractants to fish. These uncleared areas are a continuing hazard, both as dangerous areas for navigation and as sources of floating dead trees throughout the lower lake region. The tree trunks and other debris removed in maintaining 60-foot wide by 8-foot deep boat lanes must be burned, thus detracting from the air quality of the area. However, the burning activities are temporary and do not significantly alter the ambient air quality. The channel clearing program increases the safety and expands the recreational usage of the uncleared areas of Lake Seminole.

4.25 Sedimentation and subsequent dredging in the upper reaches of the Chattahoochee arm of Lake Seminole in order to maintain an adequate navigation channel is definitely an important cause of decreased fish food organism production in this area of the lake. Also, the continuous fine sand burden in rapidly flowing waters produces a scouring action upon any substrate suitable for producing fish food organisms. Daily fluctuations in water levels and variations of flow have aggravated these detrimental scouring effects in the region of Lake Seminole below Andrews L&D.

4.26 The current disposal method used for dredged material is to obtain areas above the river bank and pump the sand and silt into these diked, firm, spoil sites. Presently, 90 to 95 percent of the dredged material on the stretch of the Chattahoochee River included in Lake Seminole are placed on firm sites with the remaining 5 to 10 percent being dumped overboard. These solid sites for spoil disposal are obtained from local landowners. The use of firm disposal sites should result in less sandbar formation and less need for maintenance dredging

4.27 No dredging of the channel on the Flint River arm of Lake Seminole has been necessary.

4.28 Snagging operations on the upper stretch of the Chattahoochee arm of Lake Seminole consist of picking up fallen trees, dislodged stumps and logs, and placing them on the bank a few feet above normal water level. No particular effort has been made to obtain firm disposal sites for this woody material. Snagging operations on the river have destroyed habitat sites attractive to some fish. Specifically, largemouth bass and sunfish are adversely affected by the removal of snags which provide cover, whereas open water species are not affected by these operations.

Some recreational users insist that snagging destroys part of the natural beauty of the river, is unsightly when debris is placed on the bank, and eliminates the protection from bank erosion afforded by snags and debris. However, snagging is probably more beneficial in eliminating hazards to pleasure craft than to commercial vessels. Two other benefits derived from snagging are the elimination of mosquito breeding sites and the reduction of attachment sites for aquatic plants.

4.29 No flood control protection is provided by Lake Seminole due to the lack of storage capacity behind the dam. Periodic natural flooding does occur in which many acres of land adjacent to the lake are subject to flooding. Also, no flood protection is received by areas below Jim Woodruff L&D during flood periods.

4.30 Any popular water recreation area will experience recreation-related accidents and Lake Seminole is no exception. As of 29 September 1975, 67 persons had lost their lives by drowning in Lake Seminole.

5.01 Any Probably Adverse Environmental Effects Which Cannot be Avoided. Lake Seminole's abundance of productive, shallow habitat, overabundant supply of nutrients, and ideal climatic conditions have resulted in a serious aquatic plant problem. In 1974, nearly 500 species of identified aquatic plants covered over 10,000 acres of the lake. As long as Lake Seminole exists one may expect an aquatic plant problem in the lake. Some of the problems created by aquatic plants are: clogging of small boat channels; limitation or prevention of access to many areas; creation of what some may consider an unsightly appearance; interference with utilization of public use areas; adverse effects on some fishes; reduction in the quantity of water stored in the lake; increasing the buildup and extension of shorelines into the reservoir; and provision of more suitable habitat for mosquito production.

5.02 The herbicide 2,4-D, used to control the aquatic plants in Lake Seminole, is not harmful to man, fish, or other animals when applied in the recommended concentrations. However, it is possible that an accident could occur during its application, resulting in an overdose of the herbicide. This would be detrimental to organisms residing in and around the lake. A temporary reduction in water quality results from the plants killed by 2,4-D. As the plants decompose they consume large amounts of dissolved oxygen. A more detailed discussion of aquatic plant control activities and their associated adverse environmental effects in Lake Seminole is given in a separate EIS entitled Aquatic Plant Control Program, Mobile District which was available in draft form in February 1975 with the final scheduled to be completed in the spring of 1976.

5.03 Lake Seminole provides an attractive and adequate habitat in which a variety of mosquitoes may breed. Species capable of transmitting malaria, sleeping sickness, and one or more of the various types of encephalitis are produced in the Lake Seminole area. However, no case of either malaria or sleeping sickness has been recorded for over 20 years in the area. No

fish kills attributed to the application of Malathion have been reported. However, the potential for Malathion-induced fish kills will exist as long as this compound is employed for mosquito control.

5.04 Since Lake Seminole receives water from upstream sources for only five days a week, while Jim Woodruff Dam releases water for seven days a week for downstream navigation purposes, some problems have been created. Throughout most of the summer and fall this procedure causes the water level in Lake Seminole to fall on weekends by as much as one foot. These water level fluctuations create some difficulty with small boat navigation in certain areas of the lake and also destroy fish food organisms when the lake bottom is exposed.

5.05 The increased barge traffic in the Apalachicola system made possible by the presence of Jim Woodruff L&D, together with the associated industrial growth, contributes to the pollution control problems within the basin. The burgeoning recreational usage of the project's facilities also contributes, to some degree, to the pollution control problems of the area.

5.06 The continued operation and maintenance of project facilities will prevent the natural floristic and faunistic conditions from developing extensively in these areas. This includes a continued interference of the annual spawning migrations of anadromous and catadromous fish species occurring in the Apalachicola-Chattahoochee-Flint drainage systems above Jim Woodruff Dam.

5.07 The 6,428 acres of Lake Seminole which were not cleared prior to impoundment are a continuing navigational hazard. Not only are these uncleared areas dangerous to navigate in, but from time to time, they are a source of floating dead trees in the cleared areas. The tree trunks and other debris removed when maintaining boat lanes through these areas must be burned, thus detracting from the air quality of the area. However, the burning activities are temporary and do not significantly alter the ambient air quality.

5.08 Turbid conditions result from dredging the various navigation channels in Lake Seminole and this degrades water quality in the lake. However, this condition is temporary and localized and thus is not considered to be significant.

5.09 Snagging operations in the upper reach of the Chattahoochee arm of Lake Seminole detract somewhat from the aesthetic quality of the lake and destroy some fish habitat. Nevertheless, this snagging process eliminates navigational hazards, mosquito breeding sites, and attachment sites for aquatic plants.

5.10 Due to the large size of Lake Seminole and to the large number of people who take advantage of the lake's water-oriented recreational facilities, a situation is created where accidental drowning is a distinct possibility. As of 29 September 1975, 67 persons had lost their lives by drowning in Lake Seminole.

6.01 Alternatives to the Proposed Action. Several alternatives to the continued operation and maintenance of the Lake Seminole project are available. All operation and maintenance could be discontinued with the existing structures and facilities remaining in place. Deterioration of project buildings and recreational facilities would eventually render them useless and the recreational experience of the users would be degraded. The dredged boat channels would become filled with sediment and boat lanes through the uncleared sections of the lake would become blocked with fallen trees, resulting in the creation of hazards for users of the lake. If the aquatic plant control program were also suspended, Lake Seminole would become increasingly choked with plants. Mosquito populations would expand in the area with the attendant increased chances for the spread of diseases carried by these insects. If operation and maintenance of the project were discontinued, development along those areas of the lake which are already populated could continue to spread, taking in more natural areas along the shore. At the same time, other areas which are now maintained would undergo succession, thus reverting back to conditions which are characteristic of undeveloped areas in the region. This would result in the lake and project lands becoming more conducive for habitation by some wildlife forms while making the lake and surrounding lands less desirable for other animals. The number of people presently utilizing Lake Seminole would decline due to the deterioration of the lake and its facilities. This would result in an increased demand on other water resource projects in the region as these people shifted their water-related recreational interests to other areas. The income brought into the communities and businesses surrounding Lake Seminole, directly and indirectly attributed to the lake's presence, would be lost resulting in a possible decline in the economic potential of the area. In addition, power would have to be obtained from other sources if the Jim Woodruff powerhouse were not maintained. If the demand for power were transferred to other existing facilities, they could possibly be overloaded and production costs would increase. Other hydroelectric generating sites are in short supply and environmental problems would be increased at these sites. If fossil fuel or nuclear fuel plants are substituted, the environment could be more adversely affected by the release of pollutants to the air or of undesirable heat to surface waters. Alternative methods for plant control and dredge material disposal are discussed in detail in the Corps draft environmental statements and entitled Aquatic Plant Control Program, Mobile District and Apalachicola, Chattahoochee, and Flint Rivers, Alabama, Florida, and Georgia (Operation and Maintenance), respectively.

6.02 An alternative to the present project would be to discontinue the special releases for navigation on the weekend. This would result in a more stable recreational pool. Maintaining the lake at a more stable level would benefit the spread of some aquatic plants while retarding the growth of others. In addition, constant pool elevations would be more conducive to the growth of mosquitos as well as fish and fish food organisms. Recreational activities on Lake Seminole during the weekends would be benefited if the water level were not lowered. However, this type of operation would cause much more erratic flow fluctuations and attenant problems in the Apalachicola River below the Jim Woodruff project than are now experienced.

6.03 Another alternative for the project would be to operate without the power feature. This would result in the necessity to obtain foregone power from other sources as stated in paragraph 6.01, which discusses the discontinued operation and maintenance of the powerhouse. Discontinuance of hydroelectric power production at the existing project would have an adverse impact on both the electric power industry and the power consuming market at a time when power demand is increasing and energy resources are critical. If the power were to be generated by other existing facilities, they could possibly be overloaded and production costs would increase. Also, other hydroelectric generating sites are in short supply and environmental problems would be transferred to these sites. As stated earlier, if fossil fuel or nuclear fuel plants are substituted, the environment could be more adversely affected by the release of pollutants to the air, or undesirable heat to the surface waters. Elimination of power from the project would result in a project which may not be economical to operate. The exclusion of power generation should have little effect on pool elevations since the weekend drawdown is for the benefit of navigation and not for power generation. Water which is now used for power generation would have to be passed through the spillway gates if the power plant were closed down.

6.04 Still another alternative to the existing method of operation of the Jim Woodruff project would be to increase the power production capabilities of the existing powerhouse. The possibility of installing additional generating facilities at Jim Woodruff has been recently evaluated by the Corps. The preliminary findings of the study indicated that although it might be possible to produce additional hydroelectric power by the installation of low-head, axial-flow turbines, such development is not economically justified at this time.

6.05 The current method of hydroelectric power production at Jim Woodruff could be converted to a pumped-storage operation. However, there are many inherent problems with this alternative. There is no storage volume in Lake Seminole available for the additional water which would have to be pumped back into the lake. Major modifications to the existing lock, dam and powerhouse would be required for the conversion to a pumped-storage operation. Additional lands would also have to be acquired in order to

implement this alternative. Further, a second impoundment would have to be constructed downstream of the present structure to insure an adequate reservoir from which to pump water. A new impoundment downstream of Jim Woodruff would result in the destruction of additional stream habitat with its associated adverse environmental effects and a possible disruption of navigation. In addition, pumped-storage projects usually require that power be generated only at specific periods during a 24-hour period with water being pumped back into the main reservoir during nongenerating periods. The Jim Woodruff project is designed to generate power 24 hours a day. Modification of the present manner of power generation would require structural alterations of the project and changes in the power generation schedule for the entire system.

6.06 The present method of operation of the Jim Woodruff project could be altered to increase the storage volume of Lake Seminole. Associated with an increase in the volume of storage of Lake Seminole would be a corresponding increase in the surface acreage of the lake. An increase in depth of 1 or 2 feet would increase the lake's surface acreage by 2,700 or 5,480 acres, respectively. Although additional aquatic habitat and water-related recreation areas would be provided , large scale relocations would be required in order to implement this alternative. This alternative could possibly allow greater water level fluctuations to be used in controlling aquatic plants. However, the possibility also exists that if fluctuations in water level are not appropriately timed, the present aquatic plant problem could be intensified. In addition, lowering the pool levels would require that navigation in the Chattahoochee arm of Lake Seminole be stopped; that generation of hydroelectric power at Jim Woodruff be reduced; and that recreation on Lake Seminole be severely curtailed during the drawdown periods. Increasing the storage available in the lake would necessitate structural changes in the dam itself which may prove impractical because of foundation problems. There are presently design limitations on the static head at the Jim Woodruff project which would preclude a greater storage volume than that presently utilized.

6.07 Since completion of the Jim Woodruff project in 1957 there has been a continued decline in the anadromous fishery resources of the Chattahoochee and Flint Rivers above Lake Seminole. Those anadromous fish species which are adversely affected by the project are the striped bass, Alabama shad, and the Atlantic sturgeon. An alternative to the present manner of project operation would be to implement a program which would enable these fish to move above the dam during their annual spring spawning migration. An experiment conducted by the U. S. Fish and Wildlife Service in North Carolina's Cape Fear River concluded that anadromous fish will use navigation locks to pass upstream. Thus, the lock at the Jim Woodruff project could possibly be utilized to restore, at least in part, spawning runs above the dam. Other alternatives are available which have proven to be successful in restoring anadromous fish populations in other rivers. These include the construction of fish ladders,

fish elevators, and fish hatcheries. Future studies will be proposed to investigate the need to take some action to improve anadromous fish populations in the Apalachicola-Chattahoochee-Flint system. Evaluation of the most feasible alternatives available will follow these investigations if the study results warrant further action.

6.08 Another alternative would be to remove the lock, dam, and other facilities and return the stream to a free-flowing condition. This would result in the loss of all benefits from the project. Eventually, forests and wildlife habitat would be restored. The lake fish population would be lost and the stream would again support a stream fishery. Unsightly mud banks would be exposed to erosion until forest and other cover were reestablished. Investments in service and support facilities for project operations would be lost and the local and area economy would suffer. Navigation in the entire basin would be adversely affected by restricting much of the commercial traffic to periods of high water. Broad-water recreational opportunities would be lost. However, stream-related recreational uses of the Chattahoochee and Flint Rivers could take place. Also, mosquito control and aquatic plant control problems would be reduced, although not totally eliminated. Limesink lakes, both on and off project lands, would be adversely affected by lowering the water table, thus resulting in a decline of their fish and wildlife resources. As stated above for the alternative of discontinuing operation and maintenance of the lake and its facilities, the income which is brought into the business community surrounding Lake Seminole would be lost, resulting in a possible decline in the economic potential of the area. In addition, power would have to be obtained from other sources. The possibility exists that the adverse environmental effects associated with these other sources could be more significant than the continued operation and maintenance of the Jim Woodruff project. Implementation of this alternative could be phased over a period of time so as to minimize the resulting adverse impacts of project removal.

7.01 The Relationship Between Local and Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity. By continuing the project in an operation and maintenance status, it will enhance the standard of living for those individuals living close by in Georgia, Alabama, and Florida. The population of the area and elsewhere will be provided with a readily needed source of electrical energy which is fed into a regional system. Utilization of the river flow for production of hydroelectric energy is currently a short-term aid in relieving the electrical energy shortage. The project will continue to provide a link in a navigable waterway from the Gulf of Mexico upstream to the interior of Alabama, Georgia, and Florida.

7.02 Long-term productivity of the area will be increased through more industrialization and urbanization with the project providing a source of water supply, power, and a means of transporting goods over navigable streams.

8.01 Any Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action. Materials and labor used in the continued maintenance, construction of additional facilities, and operation of the project would be irretrievable. Project lands converted from their existing "natural" state for the development of additional facilities would also be irretrievably committed if these facilities are maintained.

9.01 Coordination and Comments and Responses. This section covers the coordination with others and the comments and responses, including the three areas discussed in the following paragraphs.

9.02 Public Participation. No public hearings specifically concerning the proposed project have been held in recent years.

9.03 Government Agencies. In the preparation of the draft environmental statement (EIS) there was informal coordination with the local land use planning agencies.

9.04 The draft EIS was circulated for review and comment to appropriate Federal, State, and local governments. A news release was issued indicating the availability of the statement to anyone interested in the action. Copies of government agencies' letters commenting on the draft EIS are included in Appendix I.

9.05 The following agencies were furnished a copy of the draft EIS but did not comment on the statement:

Department of HUD, Jacksonville Area Office, Jacksonville, FL
Department of Transportation, Federal Highway Administration, Montgomery, AL
Department of Transportation, Federal Highway Administration, Tallahassee, FL
Department of Transportation, Federal Highway Administration, Atlanta, GA
Department of Transportation, Eighth Coast Guard District, New Orleans, LA
Department of Transportation, Federal Railroad Administration, Atlanta, GA
Environmental Protection Agency, Office of Pesticide Programs, Washington, DC
Federal Energy Administration
Southeast Power Administration
Appalachian Regional Commission, Washington, DC
Florida Bureau of Land and Water Management, Tallahassee, FL
Lower Chattahoochee Area, Planning and Development Commission

9.06 Pertinent comments received from each government agency are summarized below with responses as applicable.

a. Environmental Protection Agency (Page I-1)

Comment: We have reviewed the Draft Environmental Impact Statement for Operation and Maintenance of Lake Seminole and Jim Woodruff Lock and Dam in Alabama, Florida and Georgia, and offer the following comments.

There is no analytical data included in the sediment quality discussion. Even though 90% of the spoil will be on upland sites, the characteristics of the other 10% (to be disposed of in open water) should be addressed.

Response: The statement has been expanded to include sediment analysis data collected during the 1974 Corps of Engineers Districtwide sediment sampling program. (Para.2.92, p. 39 and Appendix G)*

Comment: In addition, if there are no Section 404 implications from dredged materials, this office is in agreement with the statement and believes that there will be no long-term effects on water quality.

Response: This environmental statement covers only that dredging which is required to operate and maintain small boat channels in Lake Seminole. As stated in paragraph 2.89, somewhere between 5,000 and 10,000 cubic yards of dredged material are removed each year and placed on dry land adjacent to the channels. A public notice covering the Corps proposal to continue maintenance of the small boat channels in the lake will be coordinated with interested persons and agencies. All dredging performed in Lake Seminole in connection with maintenance of the Apalachicola-Chattahoochee-Flint navigation channel will be covered under a separate EIS. The only maintenance dredging of the navigation channel within Lake Seminole proper will utilize open water disposal and has been included in the EIS for that project and a public notice.

Comment: In view of the foregoing, we have rated LO (lack of objection) to the impact of the action and 2 (insufficient information) to the Impact Statement.

b. Department of the Interior (Page I-2)

Comment (General Comments): The statement adequately describes the mineral resources of the project area, but is inadequate in some aspects of its discussion of fish and wildlife and outdoor recreation resources. It is impossible to segregate this project from the downstream portions of the Apalachicola River. Therefore, the environmental impact statement should be expanded to encompass the project's impact on downstream navigation, river water levels, and biotic resources including the flood plain forest community.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Response: It is felt that the statement adequately describes the environmental impact of the project on areas downstream of Jim Woodruff Lock and Dam. For example, on page 7 it is stated that the project augments low flow conditions downstream which increases the waste assimilation capacity of the Apalachicola River as well as enhancing navigation. Also, on pages 27, 29, and 40, the statement asserts that flood control is not a purpose of the Jim Woodruff project. The project is primarily a run-of-river navigation power improvement. At normal river flows, this water is passed through the power turbines. However, when flood conditions prevail, the increased flow is released through the gated spillway thus causing the river below the dam to resemble a free-flowing stream. Except for the reach of the Apalachicola immediately below Jim Woodruff Dam, it is felt that the project has had no significant impact on the flood plain forest community or biotic resources downstream of the dam.

Comment (Page 22, para. 2.47): Since the plan for the management of Lake Seminole's fish and wildlife resources could have a pronounced effect on the environment, it should be included in this statement or added as a supplement.

Response: As stated in our interim response dated 30 September 1975 to your comment, we do not feel that it would be appropriate to include the fish and wildlife management plan for Lake Seminole in the environmental statement while not including other referenced materials. Also, these plans are quite voluminous and we feel that it would not be in the best public interest to add this amount of material to an environmental statement. The management plans are only portions of the overall Master Plan for Lake Seminole. The Fish Management Plan has been completed and a copy furnished to your agency. The forest resources and wildlife management plan for the Federal lands surrounding Lake Seminole has not been completed.

Comment (Page 24, para. 2.51): Excellent striped bass fishing may have occurred in the past; however, it is questionable whether the "excellent" fishery still exists. A recent survey by Fish and Wildlife Service biologists indicated a reduction in the number of striped bass caught, as well as the number of fishermen who fish for this species.

Reference should be made to the Atlantic sturgeon fishery which formerly existed in the tailwaters. The white bass fishery which presently exists in the tailwaters should be mentioned.

Response: The statement has been expanded to reflect those points discussed in your comment. (Para. 2.51, p.24)*

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* This refers to the page and paragraph in the Final EIS where the modification was made.

Comment (Page 37, para. 2.86): The statement "... water level fluctuations are more destructive of fish and food organisms than are pesticides or any other toxic substances." should be further explained and documented as to how this was determined. The same idea is expressed on page 45, paragraph 4.18.

Response: This statement has been deleted from the final environmental statement. (Para. 2.86, p.37, and para. 4.19, p. 36)*

Comment (Environmental Impact of the Proposed Action): Several comments were made concerning the effect of water level fluctuation on recreation and fishery resources. In order that the reader better understand the problem, it is suggested that a comparison be made of the amount of exposed bottom occurring at normal reservoir elevation (77.0 m.s.l.), the minimum reservoir elevation (76.5 m.s.l.), and at lower elevations.

Response: The statement has been expanded to reflect your suggestion. (Para. 2.86, and Table 14, p. 37)*

Comment (Environmental Impact of the Proposed Action): The impact of the continued operation of the project on the anadromous fish population should be reviewed.

Response: The statement has been expanded as suggested. (Para. 4.09, p.43 , and para. 5.06, p. 49).*

Comment (Page 43, para. 4.11): The cumulative effects of the use of herbicides should be discussed. The effects that weed control has on the buildup of detritus on the bottom substrate and its associated effects on fish spawning activities should be discussed.

Response: It is recognized that herbicidal treatment for aquatic plant control causes some buildup of detritus on the bottom; however, similar anaerobic conditions are found under large mats of living aquatic plants according to studies done by Penfound and Earle (1948) and Timmer and Weldon (1967). Consequently, free swimming organisms dependent on oxygen for life support are found only at the edges of such mats and move to a more suitable habitat for spawning and other activities during the natural aquatic plant decomposition process. This same phenomenon will occur during decomposition of those aquatic plants killed during control operations in Lake Seminole. Those areas in the lake which are presently heavily infested with aquatic plants are of little value as spawning areas

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*This refers to the page and paragraph in the Final EIS where the modification was made.

and therefore will not be significantly affected by the decomposition of aquatic plants. If control operations were halted there would be a continued decrease in spawning areas as the aquatic plants spread to cover new areas.

Comment (Page 44, para. 4.14): The environmental effects of continually using Malathion as an insecticide should be reviewed.

Response: According to a 1971 study by Eichelberger and Lichterberg, Malathion completely disappeared from the water column in four weeks; however, the metabolites of Malathion have not been identified. The major effect of continued use of Malathion in the Lake Seminole mosquito control program, as in mosquito control programs elsewhere, will be an increased selection for mosquitos and other susceptible invertebrates that are resistant to this organophosphate pesticide. The rate of this resistance buildup is not presently known. This information has been added to the final statement. (Para. 4.15, p. 45)*

Comment (Page 45, para. 4.19): This paragraph should be expanded to clearly state what effect increased barge traffic and industrialization has had or recreational use of the lake and tailwater.

Response: The statement has been expanded concerning the effects of increased barge traffic on recreational use of the lake and tailwater. (Para. 4.20, p. 46)*. It is felt that the statement adequately describes the effect of industrialization on Lake Seminole in paragraphs 2.57 through 2.62 and in paragraph 4.16.

Comment (Page 46, para. 4.25): The effects of spoil disposal are not adequately addressed. The effects of erosion of land based disposal sites and subsequent sedimentation in river channels as well as overboard spoiling should be assessed.

Response: Those areas which have been selected for upland disposal of material dredged from the navigation channel are relatively level. As a result of the topography of these areas, no significant erosion has occurred at these locations.

Comment (Page 47, para. 4.27): The environmental effects of snagging should be expanded beyond the point of stating "fishermen contend" and "recreational users insist," since sufficient documentation is available which confirms the value of streamside stumps, fallen trees, logs, and other nonliving cover.

Response: The statement has been expanded as suggested (Para. 4.28, p. 47)*.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Comment (Page 47, para 4.28): Since "no flood control protection is provided by Lake Seminole ..." and "...no flood protection is received by areas below Jim Woodruff L&D ..." flood proofing of structures in those areas including recreational sites should be discussed.

Response: To date none of the recreational facilities on Lake Seminole have been significantly affected by flooding except for some minor inconveniences along the Chattahoochee arm of the lake. It is not felt that flood-proofing would be practical in view of the magnitude of the present problem.

Comment (Page 49, para. 5.10): It is noted near the end of the statement that "As of 8 August 1974, 66 persons had lost their lives by drowning in Lake Seminole." No further discussion has been provided on causes or possible preventive actions. It is uncertain whether the coverage of 10,000 acres of lake surface by aquatic vegetation is a major causative factor, or whether the presence of snags and submerged limestone caverns are contributory factors. Since the loss of lives has averaged almost four annually over a period of about 17 years, yet the lake has an average depth of only 9.8 feet, this appears to be a significant impact that merits some consideration of preventive measures.

Response: The statement has been updated to indicate that as of 29 September 1975, 67 persons had lost their lives by drowning in Lake Seminole. Sixty-six of the bodies recovered were not wearing a life preserver, while the remaining victim had on a defective life preserver. It is not felt that the presence of aquatic vegetation, snags, or submerged limestone caverns were contributory factors in these drownings. Some boating accidents have occurred in the uncleared areas of Lake Seminole which have been attributed to collisions with snags; however, boat channels are clearly marked through these areas and the large majority of accidents could have been prevented by caution exercised on the part of the boat operators. (Para. 4.30, p. 48, and para. 5.10, p. 50)*

Comment (Pages 49 and 50, Alternatives to the Proposed Action): Increased water storage should be considered as a viable alternative. This alternative would allow greater water-level fluctuation which is a recognized method of weed control, while at the same time providing more water for downstream flow augmentation which could possibly eliminate the need for an additional lock and dam on the Apalachicola River. The effects of this mode of operation on recreational use of the lake should also be discussed.

Response: The statement has been expanded as suggested. (Para. 6.06, p. 52)*

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*This refers to the page and paragraph in the Final EIS where the modification was made.

c. Department of Commerce (Page I-5)

Comment (General Comments): The adverse impact on anadromous fish by the project's operation and maintenance is not adequately covered. Alternatives such as using the lock to pass fish, construction of fish by-pass structures, and construction of fish hatcheries to mitigate the loss of spawning habitat should be discussed.

Response: The statement has been expanded as suggested. (Para.4.09, p. 43, para. 5.06, p. 49, and para. 6.07, p. 52).*

Comment (Page 21, para. 2.44): The statement, "Fish populations in the project area have increased substantially due to the impoundment," should be documented. In fact, recent studies indicate that the impoundment is the probable cause of reduced anadromous fish populations (Cox and Auth, 1970-73; Livingston and Thompson, 1975; and Mills, 1972).

Response: The statement refers to the fact that the total number of fish and weight of fish per surface acre of water are greater in Lake Seminole as compared to the numbers and weights which existed in the Chattahoochee and Flint Rivers prior to impoundment. This is attributed to the increase in volume and water surface area associated with the creation of Lake Seminole over that of the rivers. However, the statement has been modified to indicate that anadromous species and certain riverine species have experienced a decline in numbers in and above Lake Seminole due to the loss of their preferred habitat. (Para. 2.44, p. 21).*

Comment (Page 22, para. 2.47): The Corps' formulation plan for management of Lake Seminole's fish and wildlife resources should be described, including any plans for mitigation of anadromous fish losses.

Response: The Fish Management Plan for Lake Seminole does not contain any plans for mitigation of anadromous fish losses, nor do any plans currently exist. The fish management plan describes factors which are important in the production of reservoir fish populations and actions which can be undertaken to ensure the optimum utilization of the fishery resources of Lake Seminole. The forest resources and wildlife management plan for Federal lands surrounding Lake Seminole has not been completed.

Comment (Page 24, para. 2.51): We disagree with the implication that an abundant striped bass fishery exists in the tailwater below the dam (see Cox et al, 1970-73, and Livingston et al, 1975). The current reduction in populations of Apalachicola striped bass, Atlantic sturgeon, and Alabama shad in the tailwater below the dam should be included when describing this fishery (Cox and Auth, 1970-73; Livingston and Thompson, 1975; and Mills, 1972).

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Response: See response to similar comment by the U. S. Department of the Interior on page 56. (Para. 2.51, p. 24)*

Comment (Page 28, para. 2.66): This section should contrast recent reports on poor water quality below the dam with Corps data reports which show only good water quality. For example, Cox and Auth (1970-71; 1972-73) reported low dissolved oxygen values in the immediate area downstream from Lake Seminole which they attributed to industrial pollution sources in Alabama and Georgia. Other studies confirmed these findings but showed that dissolved oxygen values progressively increased downstream and that pesticide levels are also highest immediately below Lake Seminole but progressively decreased downstream (Livingston and Thompson, 1975).

Response: The Florida Game and Fresh Water Fish Commission's 1973-74 annual progress report for the upper Apalachicola River study has been reviewed and there does not appear to be a significant disparity between the levels of dissolved oxygen appearing in this statement and contained in the State of Florida report.

The referenced paper by Livingston and Thompson was also reviewed and there appears to be no significant difference between the pesticide levels of the fish collected below the dam and that of the fish taken from Lake Seminole. Also, it is not possible to compare the pesticide concentrations of the mud and clam samples from these two different environments due to the lack of a sufficient number of samples below the dam.

Comment (Page 42, paragraph 4.04): The Jim Woodruff dam was constructed without an anadromous fish by-pass structure which eliminated 265 miles of historic river spawning habitat (U. S. Study Commission Southeast River Basins, 1963). In view of the current studies previously listed in this letter, we suggest this section be revised to incicate that the project has reduced anadromous fish populations by eliminating approximately 265 miles of historic river spawning habitat. The importance of this reduction should be considered when assessing the value of current tailwater fishing.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Response: See response to similar comment by the U. S. Department of the Interior on page 57. The Jim Woodruff project is not entirely responsible for the elimination of all spawning habitat above the dam. The series of dams on the Chattahoochee River and the Flint River Dam on the Flint River, 104 miles above its confluence with the Chattahoochee, have also contributed to the decline of anadromous species in the entire drainage system. (Para. 4.09, p.43 , and para. 5.06, p.49)*

Comment (Page 49-50): This section should indicate that the loss of 265 miles of anadromous fish spawning habitat need not be an irreversible loss caused by the project, since several alternates are available through Corps funding and Anadromous Fish Conservation Act funding to mitigate this reduction. It may be feasible to pass anadromous fish through the existing lock. This has been demonstrated in North Carolina (Nichols and Louder, 1970). It is possible to construct a fish passing elevator or ladder (Rizzo, 1975). In addition, a hatchery could be built on the site to insure propagation of reduced anadromous fish populations. This section should thoroughly discuss all these alternatives.

Response: The statement has been expanded as suggested. (Para. 6.07, p. 52)*

d. Department of Transportation

(1) Federal Aviation Administration (Page I-9)

Comment: We have reviewed the Lake Seminole and Jim Woodruff L&D (Operation and Maintenance), Alabama, Florida, and Georgia, Draft Environmental Statement with respect to potential environmental impact for which this agency has expertise. Our review of the data presented indicates there will be no significant adverse effects to the existing or planned air transportation system as a result of these projects.

(2) U. S. Coast Guard (Page I-10)

Comment: The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

e. Department of Agriculture.

(1) Soil Conservation Service, Auburn, Alabama (Page I-11):

Comment: We have reviewed the draft environmental impact statement for Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida, and Georgia (Operation and Maintenance). We feel this draft document is adequate and have no comments to offer.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

(2) Soil Conservation Service, Gainesville, Florida (Page I-12).

Comment: We have reviewed the subject draft environmental impact statement and believe all impacts have been adequately addressed. It appears to be a matter of operation and maintenance of a facility that benefits most of the interests in the Lake Seminole region. We appreciate the opportunity to review this statement.

(3) Soil Conservation Service, Athens, Georgia (Page I-13)

Comment: We have reviewed the Draft Environmental Impact Statement for Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance), Alabama, Florida, and Georgia. We have no comments to offer other than to express appreciation for the opportunity to review the statement.

f. Department of Housing and Urban Development

(1) Birmingham Area Office, HUD (Page I-14)

Comment: We are pleased to acknowledge receipt of the above referenced request for HUD comment under the requirements of the National Environmental Policy Act of 1969 (Public Law 91-109). We have reviewed the information submitted with your referral and, to the extent of our available staff resources, have investigated the environmental impact, adverse effects, alternatives, short-term and long-term uses of the local environment and the commitment of resources which the project involves. From the information available to us, we found no basis for formal comment because of special HUD interest or expertise. However, we would call your attention to the areas indicated on the attached "HUD Comments on Draft Environmental Impact Statement" which we feel would assist your agency in the evaluation and execution of this project. These areas are as follows: "The Draft Environmental Statement fails to reflect consultation or clearance with the appropriate State Clearinghouse as required by Circular A-95, Office of Management and Budget. The A-95 Clearinghouse of jurisdiction is: Southeast Alabama Regional Planning and Development Commission, Dothan. (ADO is OK),

Response: Copies of the draft environmental statement have been provided to the clearinghouse offices of the three states affected by the project for review concurrent with your agency's review. Any comments which may be made by the state clearinghouses will be incorporated into the final environmental statement for the project.

Comment: In general, HUD defers to other agencies with respect to establishing and enforcing air and water quality standards, thermal pollution standards, radiation and general safety standards. We have no formal jurisdiction over such matters and no comments contained herein should be construed as assuming such responsibility or jurisdiction.

Response: Any comments received from the appropriate Federal and state agencies on the areas mentioned in the comment will be incorporated into the final environmental statement.

(2) Atlanta Regional Office, HUD. (Page I-18)

Comment: In accordance with your request, we have reviewed the subject document and find the action acceptable to the Department. The proposal to continue operations and maintenance of the facility that was essentially completed in 1957 will not result in an adverse effect on any of those areas of environmental impact which HUD has a responsibility to comment on. From a program standpoint, therefore, we are in support of the action since it contributes to industrial development, community utility and regional recreational potential.

As noted in Section 4.28, the reservoir provides no flood control protection and, therefore, has neither a beneficial nor adverse effect on the flood prone communities in the area. The action will, therefore, not have an effect on the application of the National Flood Insurance Program on those communities.

(3) Atlanta Area Office, HUD. (Page I-19)

Comment: In general, HUD defers to other agencies with respect to establishing and enforcing air and water quality standards, ecological conservation measures and archaeological and historical preservation efforts. Since we have no formal jurisdiction in these areas, the absence of comment on the validity of such matters contained in your draft statement should not be construed as concurrence or approval.

g. Federal Power Administration (Page I-20

Comment: (6.01 Alternative to the Proposed Action) Discontinuance of operation and maintenance of the facilities, with the existing structures remaining in place, would have other environmental effects besides those on the immediate project area. This section should stress the same environmental effects as those stated under Section 6.02, the replacement of a power source forgone by other sources with inherent environmental problems. This would also be true for the alternative under Section 6.03.

Response: The statement has been expanded as suggested. (Para. 6.01 p. 50, and para. 6.03, p. 51).*

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Comment: The following are suggested for inclusion in the section on alternatives to the proposed action:

6.04 Modification of the operation and maintenance program by increasing, decreasing, deleting, or otherwise changing the existing programs. Consideration and discussion should be given to the possibility of increasing power production at the plant if the potential for adding additional conventional units or pump-turbine units does exist.

6.05 Alternative conventional and pump-storage project schemes should be discussed. This would be another alternative means of supplying the power output with short-term environmental impacts.

Response: The statement has been expanded as suggested. (Para. 6.04, and para. 6.05, p. 51)*

Comment: In summary, it does not appear that continued operation and maintenance of the Lake Seminole and Jim Woodruff Lock and Dam would have any adverse effect on matters of concern and responsibility to the Commission. However, any consideration of discontinuance of hydroelectric power production at the existing project would have an adverse impact on the electric power industry at a time when power demand is increasing and energy resources are critical.

Response: The statement has been expanded to reflect this point. (Para. 6.03, p. 51)*

h. State of Alabama

(1) Alabama Development Office (Page I-22)

Comment: The Draft Environmental Impact Statement for the above project has been reviewed by the appropriate State agencies in accordance with Office of Management and Budget Circular A-95, Revised. The Environmental Impact Statement on this project appears to be in order. No comments are offered.

(2) Regional Clearinghouse: Southeast Alabama Regional Planning & Development Commission (Page I-23)

Comment: The proposed work analyzed in the environmental statement consists of the operation and maintenance of the powerhouse, lock, dam, and reservoir, including associated buildings, water quality monitors, access roads, public use areas, and boat channels. The construction of new recreational areas is also covered. The statement appears to be in order; no further comment seems necessary.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

i. State of Florida

(1) Department of Administration, Bureau of Intergovernmental Relations (Page I-25)

Comment: During our review we referred the environmental impact statement to the following agencies, which we identified as interested: Department of Administration, Bureau of Land and Water Management; Department of Agriculture and Consumer Services; Department of Commerce; Department of Environmental Regulations; Department of Natural Resources; Department of State; Department of Transportation; Game and Fresh Water Fish Commission; Public Service Commission; and the Northwest Florida Water Management District. Agencies were requested to review the statement and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from the Department of Administration, Bureau of Land and Water Management; Department of Commerce; Department of Environmental Regulations; Department of Natural Resources; Department of State; Department of Transportation; Game and Fresh Water Fish Commission; Public Service Commission; and the Northwest Florida Water Management District. The Department of Agriculture and Consumer Services, Division of Forestry reported by telephone no adverse comment.

Comment: We have reviewed this statement and the review comments thereon. We find that in order to undertake a complete analysis of the dam's impact on the river system, additional data is required. We specifically suggest that scientific data and analysis be developed concerning nutrient movement, impact of pesticides, and sedimentation.

Response: The Corps plans to initiate a water quality management program at Lake Seminole in 1976 which will also include some portion of the Apalachicola below Jim Woodruff Dam. Several sampling stations will be utilized in the water quality study. At present, the exact location of these stations has not been determined. The management program will be fully coordinated with the states involved in order to determine the proper sampling locations and the parameters to be monitored. The appropriate State of Florida agencies will be contacted in the near future concerning the water quality management plan.

Comment: In accordance with the Council on Environmental Quality guidelines concerning statement on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U. S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement.

Response: All Federal regulations and guidelines have been complied with in completing the final environmental statement. In addition, all letters of comment on the draft statement have been included in Appendix I.

(2) Department of Administration, Bureau of Land and Water Management (Page I-27)

Comment: The Bureau is interested that the operation and maintenance of this project equitably accomplish its multi-purposes for all the states. Allocation of water storage for the purpose of initiating flood control protection into a fore-ground function of the Jim Woodruff Lock and Dam project should be seriously investigated and discussed in the final impact statement. Actually, by allocating small amounts of storage space throughout the upriver (Chattahoochee and Flint) systems the cumulative effect in Florida could be significant. The additional storage could serve a double function if the water was released during low flow periods to augment navigation below the project.

Response: The question of allocating storage space in Lake Seminole for flood control has been raised in the past and studies indicate that the lower pool elevations required would adversely affect navigation in the reservoir. It would become more difficult to provide an outflow sufficiently high to maintain navigation depths downstream and there would be a reduction in power generation because of head loss. Due to the long duration of major floods in this area any benefits accrued by providing flood protection would be minimal because the storage would be depleted before peak stages occurred downstream. Corps of Engineers dams upstream from Jim Woodruff Dam, West Point and Buford, do provide flood protection for the areas below them and water stored there as well as at W. F. George Dam is used to give a more dependable inflow into Lake Seminole during the dry season. These projects, however, are not strategically located to reduce flood peaks on the Apalachicola River.

Comment: Serious consideration should be given to the intensity of effect that the present Jim Woodruff Lock and Dam operations have on the flow regime in the Apalachicola River and what minimum release is necessary to sustain the authorized channel depths in the waterway downriver from this project. In this manner, navigation could be assisted for all three states.

Response: Storage is provided in Lake Seminole to maintain navigation flows on the lower Apalachicola River. The maximum drawdown does not normally exceed one-half foot; however, the lake level is occasionally lowered by as much as 2 feet on weekends to augment the downstream flows when inflows are reduced due to operation at upstream power plants. In addition, all of the Corps of Engineers projects in the Apalachicola River basin are operated as a system to extend the length of time that adequate flows are available for navigation. As mentioned in paragraph 4.18, flows of 13,000 to 17,000 cfs are required to provide a 9-foot navigation channel below Jim Woodruff Dam. It is not possible to maintain the project depths throughout the low-flow season, June to December, each year even with flow augmentation from upstream storage reservoirs.

Comment: Also, the final impact statement should evaluate water quality and quantity effects on the downriver reaches which result from the present operations of Jim Woodruff Dam, in particular, the impact upon the Apalachicola Bay and associated marine species.

Response: As stated in paragraph 2.07 of the statement, the project augments lowflow conditions downstream which increases the waste assimilation capacity of the Apalachicola River. In addition, paragraph 2.96 states that although a large reservoir is created by the Jim Woodruff project, the power plant functions as a run-of-river plant, operating around the clock seven days a week. Paragraphs 2.68 and 2.97 also state that flood control is not a purpose of the project. Therefore, whenever the reservoir inflow exceeds the discharge capacity of the turbines, the excess is released through the gated spillway causing the river downstream of the dam to resemble a free-flowing river. In regards to water quality downstream of the project, paragraph 2.66 says that the tailwaters below the dam reflect water quality parameters which are more or less an average of those of the lake water and that there is no indication that problem areas exist either in the lake or below the dam. Paragraph 2.15 states that approximately 60 percent of the sediment load received by Lake Seminole remains in the lake with the remainder being passed downstream by Jim Woodruff Lock and Dam. Also, according to a report prepared in 1973 for the Florida Department of Natural Resources by Florida State University, it is believed that the Jim Woodruff project has greatly reduced the amount of pollution reaching Apalachicola Bay. The statement has been amended to include this last sentence (Para. 4.16, p. 45).*

(3) Department of Natural Resources, Florida Game and Fresh Water Fish Commission (Page I-29).

Comment: The Bureau of Environmental Protection of the Florida Game and Fresh Water Fish Commission has reviewed the draft environmental impact statement and offers the following comments in keeping with our concern and jurisdiction over the fish and wildlife resources of the state. It is assumed that the purpose is for the continued maintenance and operation of the Jim Woodruff Lock and Dam and Lake Seminole.

Throughout the report, reference is made to the chronic aquatic weed problems associated with this reservoir. Weed control alternatives are also discussed including herbicide application, mechanical removal and water level manipulation. Although none of these alternatives can be considered as permanent solutions to the weed problem, we feel the latter alternative, that of water level manipulation, has merit and that its feasibility should be more thoroughly investigated. Ample documentation exists to indicate that "drawdowns" of impoundments are beneficial, not only for weed control, but also for game fish and migratory waterfowl populations.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Statements such as the last sentence of paragraph 2.86 ("Lake Seminole water level fluctuations are more destructive to fish and fish food organisms than are pesticides or other toxic substances.") are unfounded when considered in terms of long range management. Although it is true that fish habitat and certain numbers of fish will be temporarily eliminated by water level drawdown, the process is an often used, sound management tool for fresh water lakes. Short term lowering of water levels temporarily reverses the eutrophication trend, an inherent problem of Lake Seminole, while simultaneously retarding the growth of aquatic weeds. Refilling of the impoundment traditionally sparks a dramatic growth surge of game fish and the organisms which sustain these species as well as an increase in the utility value of the impoundment to migratory waterfowl. Meanwhile, the aquatic weed population is temporarily reduced and possibly replaced by an earlier level of succession. Although the lake's biota can be expected to eventually return to current conditions, there will be a time lag in which fishing success can be expected to increase while the weed and insect problems show a significant decrease. If herbicides are used as sole agents for eliminating aquatic weeds, the corresponding reduction in dissolved oxygen (DO) levels associated with oxidizing vegetative matter could seriously reduce the game fish which are less tolerant to such conditions.

None of these measures, however, can be expected to approach a permanent solution to maintaining the health of Lake Seminole. The physical profile of this lake is similar to most impoundments in this region in which shallow water, ample sunlight and ample nutrient supply insure irruptive vegetative conditions. The lake, of course, is not a closed ecological system. It is a recipient of feeder streams draining Georgia and Alabama, and it is the source of the Apalachicola River. As such, we feel any environmental impact statement dealing with a system component (such as Lake Seminole) should also address the overall system. For example, studies conducted by this agency on the Apalachicola River indicate the river is suffering, perhaps more than the lake itself, due to the lake's various problems associated with eutrophication.

Although the photosynthetic activities associated with the lake's aquatic vegetation (including phytoplankton) maintains high DO levels in the upper strata of Lake Seminole, the constant supply of decaying vegetative matter which moves through the lock and dam and into the river removes much of the available DO through the process of oxidation. Such conditions pose potentially serious problems to the riverine ecological system. Traditionally, the DO levels of the Apalachicola River were probably greatly enhanced by aeration as a result of turbulence created by shoals and snags within the fast moving river. The removal of most of these through navigation improvement activities seemingly has placed much of the burden of maintaining DO levels on riverine aquatic plant growth. If this is a reasonable assumption, and given the less-than-optimum vegetation propagative qualities of the river due to high silt load and fast current, the effects on riverine biota must also be considered when evaluating weed control techniques in Lake Seminole or any other management alternatives.

This agency continues to be interested and concerned with the management and operation of Lake Seminole and Jim Woodruff Lock and Dam as well as the general condition of the lake and the river. If we can be of any further assistance in these matters, please feel free to contact us.

Response: See response to similar comments made by the U. S. Department of the Interior concerning water level fluctuations for aquatic plant control on page 59 and the statement concerning the destruction of fish food organisms during drawdowns on page 57. Reference is also made to comments submitted by your agency's Aquatic Weed Control Section dated 13 May 1975 on the environmental statement entitled Aquatic Plant Control Program, Mobile District. This letter stated that "drawdowns can increase the water hyacinth problem, apparently when dried exposed seeds of the plants are reflooded as water levels return to normal." According to the best information that we have, if drawdowns are not adequately timed then the aquatic plant problem can be magnified. Specifically, if the drawdown occurs during the plants' growing season, a situation is created enabling the submersed aquatic plants to spread to greater depth, thus increasing the acreage affected within the lake. Due to mild winters which have occurred in the last few years at Lake Seminole, the growing season has been lengthened to cover almost the entire year. No dissolved oxygen problems in the Apalachicola River have been reported to the Corps which may be attributed to the operation of the Jim Woodruff project. Similarly, monitoring conducted by the Corps below the dam indicates that low levels of dissolved oxygen do not exist in the water released by the project (see Appendix F). The impact of the operation and maintenance of the navigation channel in the Apalachicola River will be discussed in a separate EIS concerning the entire Apalachicola-Chattahoochee-Flint system which is scheduled to be available in draft form in the fall of 1975.

(4) Department of Natural Resources (Page I-31)

Comment: The EIS discusses the adverse impacts of a reservoir. Though the outdoor recreation opportunities offered by reservoirs are well known their problems are not. Nevertheless, the problems are serious and difficult to solve. This fact, coupled with the low need in most of Florida for the kinds of recreation offered by reservoirs, accounts for this Division's generally unsympathetic attitude toward new reservoir construction. Lake Seminole, of course, is already built, and there apparently are few options available for management.

We offer these specific comments: (1) Conversation with other agencies indicates the need for a program of monitoring and reporting environmental parameters in Lake Seminole. (2) Page 32 of the EIS states that there are four Florida state parks within a 75 mile radius of Lake Seminole. There are eighteen recreational areas managed by this Division within a 75 mile radius of Lake Seminole.

Response: (1) See response to similar comment by the Department of Administration, Bureau of Intergovernmental Relations on page 66. (2) The statement has been expanded as suggested. (Para. 2.77, p. 32)*

(5) Department of Environmental Regulation

Comment: (21 August 1975, page I-33). The statement refers to degradation of water quality of Lake Seminole resulting from its function as a "trap" for discharged and runoff wastes of nutrients from the watershed and biological monitoring records confirm degradation of Lake Seminole water quality.

Response: Paragraph 4.09 of the statement refers to the fact that the lake acts as a nutrient trap for wastes and surface runoff. However, paragraph 4.15 states that no major water quality problem exists in the lake or below the dam. In addition, water quality data contained in Appendix F of the statement indicate that water quality problems do not occur either in the lake or below the dam.

Comment: The Department recognizes the need of the project and the public benefit operation of Lake Seminole should be balanced against the adverse effects of this operation. For example "desnagging" operations to remove tree trunks as navigational hazards should be confined to bouyed navigational channels since wooded areas were purposely left as fish attractants in the fishery management program.

Response: As stated in paragraph 2.88 of the statement, removal of standing tree trunks is confined to the 60-foot-wide marked boat lanes to a depth of 8 feet through the uncleared portions of the lake.

Comment (19 September 1975, page I-34): Desnagging operations to remove tree trunks and navigational hazards should be confined to buoyed navigational channels since wooded areas were purposely left as fish attractants in the fishery management program.

Response: See response to similar comment in your 21 August 1975 letter above.

Comment: The statement refers to degradation of water quality of Lake Seminole as a result of its function as a trap for discharged and runoff wastes of nutrients from the watershed. Monitoring records confirm degradation of Lake Seminole water quality, particularly below the dam. Extensive investigation into the probable causes of this degradation should be undertaken in order that good water quality can be maintained in the long term. We recommend the Corps of Engineers take the funding of such a study as part of the overall management program of the lake and dam. Such a study should be a continuing program with periodic environmental review by state and local agencies.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Response: See response to similar comment in your 21 August 1975 letter on page 71. In addition, see response to similar comment by the Florida Department of Administration, Bureau of Intergovernmental Relations on page 68.

Comment: This department is responsible for water management programs within the State of Florida. The Apalachicola River downstream of the lock and dam is an integral part of the overall water management program for Northwest Florida. Coordination with this department and its plans and programs is a very important element which the Corps of Engineers should incorporate in any environmental assessment of a maintenance and operations program. We would be pleased to participate in a coordinated effort toward resolving the many water management and water quality problems which can result from any specific course of action with regard to the operation and maintenance of this facility.

Response: See response to similar comment by the Florida Department of Administration, Bureau of Intergovernmental Relations, on page 66.

Comment: This department is aware of several other studies which are being conducted on Lake Seminole and the Apalachicola River. We recommend the Corps of Engineers coordinate all proposed activities with the principals involved in these studies so that maximum assessment of this project can be obtained.

Response: All studies which are presently being conducted on Lake Seminole and the Apalachicola River, or will be undertaken in the future, are and will be fully coordinated with the principals involved.

(6) Northwest Florida Water Management District

Comment: (15 August 1975, page I-36) A review of the subject project has been made and it appears to be compatible with the operation and maintenance plans of the District. However, it should be made clear that the District does not endorse indefinite service and that at some future time a reapplication for operation and maintenance of this facility should be submitted. In addition, if the construction of new recreational areas appears emminent, a copy of the plans or proposals should be submitted to this office for concurrence.

Response: The final environmental statement will cover the continued operation and maintenance of Lake Seminole unless the operation and maintenance of the project is significantly altered at which time a new statement will be prepared. Corps policy does not require that construction of planned recreational sites on Federal lands be coordinated with the State unless sanitary facilities are to be included at the sites. Any construction of new recreation areas not included in the master plan for

Lake Seminole would be coordinated with the State due to the recent requirement that the cost of additional recreational facilities be shared between the Federal government and the local sponsor.

Comment: (31 October 1975, page I-37). A review of comments made by several agencies to the Lake Seminole and Jim Woodruff Lock and Dam operation and maintenance draft environmental impact statement was made. The District staff agrees with the comments expressed. In particular, the District supports the Game and Fresh Water Fish Commission comment about water level fluctuations not being destructive to fishing as referenced in their letter.

Response: See response to similar comment by the Florida Game and Fresh Water Fish Commission on page 70.

Comment: In addition to the comments expressed in the District letter of 15 August 1975, the following should be added. In cases of extreme drawdown of Lake Seminole, the District should be informed in advance of the drawdown.

Response: In the event that the water level of Lake Seminole should be significantly drawndown as a result of project operation, the appropriate Federal and state agencies shall be notified.

(7) Florida Public Service Commission (page I-38)

Comment: No comment.

(8) Department of Commerce, Bureau of Marketing Development (page I-39)

Comment: No comment.

(9) Department of Transportation, Bureau of Planning (page I-40)

Comment: We have reviewed the transportation aspects of the subject statement and have no adverse comments.

(10) Department of State (page I-41)

Comment: We have reviewed the above draft statement with respect to archaeological, historical and National Register properties and have the following comments: The statement notes that an archaeological and historical survey of the basin was performed before flooding, and that no sites are listed on the National Register of Historic Places. Site location and assessment data have been published in reports and supplied to the Corps. These should be referred to before additional land clearing or disturbance is begun. Since the impact statement is administrative in nature, and no actual construction or modification is intended, we have no adverse comment.

Response: Before any new construction is initiated in the project area, the area to be disturbed will be examined for cultural resources. Should any cultural resources be discovered appropriate actions will be taken if it is determined that they are significant.

j. State of Georgia

(1) Georgia State Clearinghouse, Office of Planning and Budget (page I-42)

Comment: Para. 2.12 - The discussion of gravel mining and any related environmental impact from mining operations should be discussed in greater detail due to previous discussions of the subject and requests for thorough impact evaluation prior to any new permits being issued.

Response: The impacts associated with sand and gravel operations are not created by actions attributed to the operation and maintenance of Jim Woodruff Lock and Dam and Lake Seminole; therefore, these impacts are not discussed at length in this environmental statement. However, since the impacts created by the removal of sand and gravel from the Chattahoochee River arm of Lake Seminole contribute to the overall environmental setting of the lake, these impacts were discussed in the statement. The adverse environmental impacts of these mining operations are presented in paragraph 2.12 of the statement. A more detailed discussion of the impacts associated with the removal of sand and gravel in the entire system will be included in the environmental statement for the operation and maintenance of the navigation channel in the Apalachicola-Chattahoochee-Flint system which is scheduled to be available in draft form in the fall of 1975. Prior to the issuance of additional permits or the extension of existing permits for sand and gravel operations in the entire system, a decision on the environmental impact of these activities will be made in light of the above referenced environmental statement.

Comment: Paragraph 2.24. This paragraph lists impoundments upstream from Lake Seminole as a cause for decreased turbidity in the lake and projects that future impoundments will continue to cause a decrease in turbidity, which may permit aquatic plants to spread into greater areas than now infested. This is not likely, in that future impoundments on the Chattahoochee and Flint Rivers are not probable.

Response: The statement has been modified to read that "if additional impoundments are built upstream the situation will be further improved." Preliminary engineering studies indicate that there are several feasible sites for the location of hydroelectric projects on the Flint River. Whether or not more detailed studies are initiated and/or these projects are constructed will depend upon future priorities and policies based on engineering, economic and environmental evaluations.

Comment: Paragraph 2.77. The reference to "Chehaw State Park" should be corrected in that the park is now operated by Dougherty County as a local park rather than a unit of the State Park system.

Response: The reference to "Chehaw State Park" has been modified in the statement.

Comment: Paragraph 2.86. The questions of water level fluctuation and relative impacts on the various users of the lake should be taken into greater consideration in the discussion of alternatives to the current manner of operation of the project.

Response: The statement has been expanded as suggested. (Para. 6.06, p. 52).*

Comment: Paragraphs 2.90-2.91. Discussions regarding the difficulty of maintaining adequate channel depth should include an analysis of economic justification, needed to cause the necessary time and money to be dedicated to continual maintenance dredging on the river. Based upon such an analysis of the project, a valid discussion could then be made regarding continual expenditures of public funds to maintain adequate channel depths.

Response: A separate environmental statement covering the operation and maintenance of the Apalachicola-Chattahoochee-Flint navigation system is scheduled to be available in the fall of 1975. This statement will contain information on the economics of the navigation project as well as discussing the benefits and environmental impacts of maintaining channel depths.

Comment: Paragraph 4.20. Statements such as those made here regarding enhancement of sand and gravel operation seem to conclude that operations such as these should be continued. This assumption may not be valid and should not be made prior to completion of the environmental impact statement (EIS) on such actions which is being prepared in conjunction with the EIS for operation and maintenance of the existing projects on the Apalachicola, Flint and Chattahoochee rivers.

Response: The statement concerning the enhancement of sand and gravel operations by the increased depths of Lake Seminole refers to the fact that it is easier and safer for barge traffic to move in the Chattahoochee River since it has been developed for navigation. The statement should not be construed to mean that this environmental statement concludes that these operations should continue. Also, see response to your previous comment on the issuance of permits for sand and gravel operations in the Apalachicola-Chattahoochee Flint River system on page 74.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Comment: Paragraph 6.01-6.03. These alternatives to the project should receive much more analysis and consideration than is indicated by the space allotted to them in this document. In addition to the alternatives discussed in this document, the various alternative uses which could possibly be the primary objective of operation of the project should be more seriously analyzed.

Response: The statement has been expanded as suggested. (Para. 6.01-6.08, p. 50-53).*

(2) Regional Clearinghouse, Southwest Georgia Planning and Development Commission (page I-44).

Comment: As a result of the review it has been determined that the proposed project is in accord with regional and local plans, programs, and objectives as of this date. You should now complete and file your formal application with the appropriate Federal agency(s). A copy of this form must be attached to your application.

Response: The draft statement has been reviewed by interested state and Federal agencies.

9.07 Citizen Groups. Copies of the draft EIS were furnished to the following individuals and citizen groups and organizations:

Alabama Conservancy
Environment Information Center, Inc.
The Coalition on American Rivers
Sierra Club, Slidell, LA
Sierra Club, Baton Rouge Group
Sierra Club, New Orleans Group
Sierra Club, Gulf Coast Group
Sierra Club, Tuscaloosa Group
Sierra Club, Big Bend Group
Ecology Center of Louisiana
National Wildlife Federation
Alabama Wildlife Federation
Arkansas Ecology Center
Water, Air, Soil Prot. Soc. of Citrus County, FL
League of Women Voters
Environment Research Group
National Audubon Society
Birmingham Audubon Society
Orleans Audubon Society
The Georgia Conservancy, Inc.
Georgia Power Company
Horace Morgan, Priv. Citz, GA
Don Wright, Priv. Citz., AL
Dr. J. H. Blackstone, Priv. Citz.,AL
Michael L. Crago, Priv. Citz., LA
Clifford Danby, Priv. Citz., LA
Dr. Geo. Tolkerts, Priv. Citz., AL
Center for Urban Affairs, Northwestern University, IL
Phil Gnote, Priv. Citz., AL
Ms. Myrt Jones, Priv. Citz., AL
J. Ronald Lawson, Priv.Citz.,GA
Tex Middlebrooks, Priv.Citz.,AL
Robert R. Reid,Jr., Priv.Citz.,AL
Library, Univ of West Florida
Carey B. Oakley, Priv.Citz.,GA
Florida Chamber of Commerce
David Lahart, Priv. Citz., FL
Dr. David Hall, Priv. Citz., FL
Dr. Eugene Black, Priv.Citz.,GA
Dr. Joseph R. Caldwell, Priv.Citz.,GA
Raymond Djak, Priv.Citz.,FL
John R. Michael, Priv.Citz., FL
Brannon H. Wilder, Priv. Citz.,GA
Charles D. Peters, Priv. Citz., AL
William Tolbert, Priv. Citz., FL

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*This refers to the page and paragraph in the Final EIS where the modification was made.

In addition, information concerning rare and endangered plants in the project area was obtained from Dr. Daniel Ward, during the preparation of the draft EIS.

9.08 Formal comments received from individuals are summarized below with responses as applicable.

a. Dr. Daniel B. Ward, University of Florida (Page I-45).

Comment: Mr. David Hall has called to my attention your draft environmental statement of the Lake Seminole area, and has pointed out that the source of the data given you calls for a change, as follows:

Paragraph 2.20 - line 5 - change "Institutipn's" to "Institution's"; line 9 - change " . David Hall (etc.)" to "Dr. Daniel B. Ward, taxonomist with the Agricultural Experiment Station, University of Florida"; line 26 - change "Torreya takifolia" to "Torreya taxifolia".

Response: These changes have been incorporated into the statement. (Para. 2.20, p. 11)*

b. Dr. Carey B. Oakley, University of Alabama, Office of Ecological Research (Page I-46)

Comment: In response of your letter of July 18, 1975, requesting our review and comment on the above project, I would like to make the following comments and recommendations:

1. I could find no mention of any reference to archaeological or historical sites within the specified project area. However, since this statement covers operation and maintenance of an existing project, the destruction of archaeological sites may not have been considered.

2. From a maintenance viewpoint, I would recommend an archaeological survey to be conducted along the shore lines of the existing reservoir. Significant archaeological/historical sites recorded should be protected by rip-rap, signs, etc. to protect them against erosion due to lake fluctuation and/or vandalism. Both factors are a constant threat to the destruction of marginal shoreline sites.

3. I noticed that this impact statement covers expansion of new recreational facilities. These specific areas should be investigated for the presence of archaeological sites prior to construction of new facilities.

4. As an ongoing part of the operation and maintenance of this reservoir, I recommend that the operating personnel be acquainted with various state and Federal laws protecting historic sites and properties from treasure seekers and vandalism.

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*This refers to the page and paragraph in the Final EIS where the modification was made.

Response:

1. The archeological investigations of the project area which were conducted prior to construction of Lake Seminole and Jim Woodruff Lock and Dam were discussed in the draft statement (para. 2.93, page 39). However, the statement has been expanded to explain how cultural resources discovered in the project area will be handled in the future if they are threatened by the operation of the project.

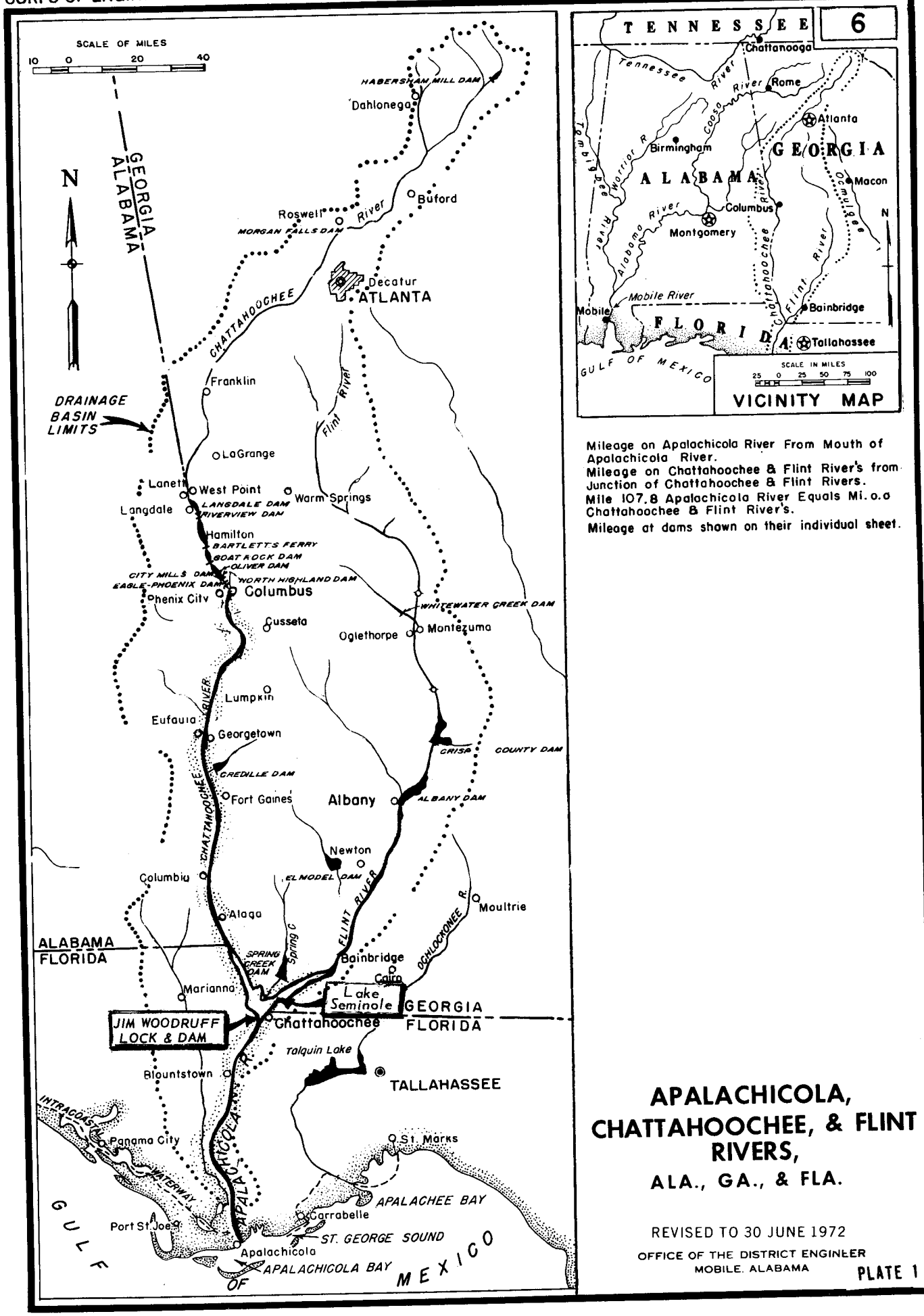
2. As stated above, the Corps will establish and implement a program to ensure consideration and protection of cultural resources at existing Corps operated projects under their jurisdiction. In cases where cultural properties on or eligible for inclusion in the National Register are being or would be adversely affected as a result of past or future activities such as land alteration, shoreline erosion, traffic or public use; and methods for protection or preservation are infeasible or economically unreasonable, data recovery through scientific excavation shall be considered in the same manner as if the lands had recently been acquired for construction of a new project. Any mitigation plan that is implemented will be executed under the provisions of a Memorandum of Agreement obtained from the Advisory Council on Historic Protection. This action is prescribed in "Procedures for the Protection of Historic and Cultural Properties" printed in the Federal Register, 4 February 1975, Volume 40, Number 24, Part II, pp 5244-5248.

3. As stated in 1. above, all Corps actions will be evaluated in terms of their effect on cultural resources.

4. Concur with the comment. In the event that significant cultural sites are discovered, the Corps will make every effort possible to ensure that they are not vandalized.

CORPS OF ENGINEERS

U. S. ARMY



Mileage on Apalachicola River From Mouth of Apalachicola River.
Mileage on Chattahoochee & Flint River's from Junction of Chattahoochee & Flint Rivers.
Mile 107.8 Apalachicola River Equals Mi. 0.0 Chattahoochee & Flint River's.
Mileage at dams shown on their individual sheet.

APALACHICOLA, CHATTAHOOCHEE, & FLINT RIVERS, ALA., GA., & FLA.

REVISED TO 30 JUNE 1972

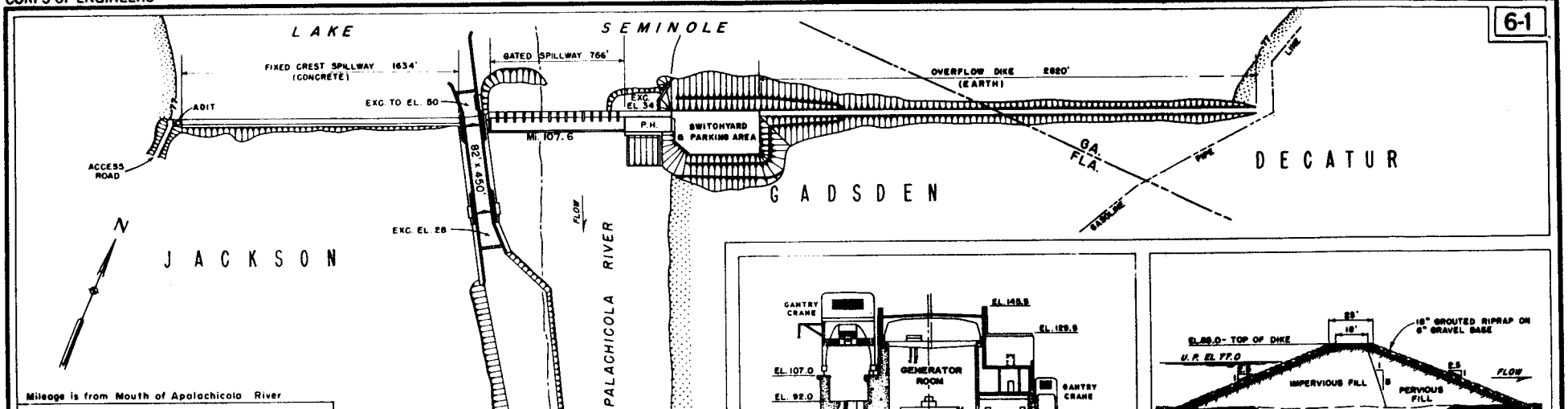
OFFICE OF THE DISTRICT ENGINEER
MOBILE, ALABAMA

PLATE 1

CORPS OF ENGINEERS

U. S. ARMY

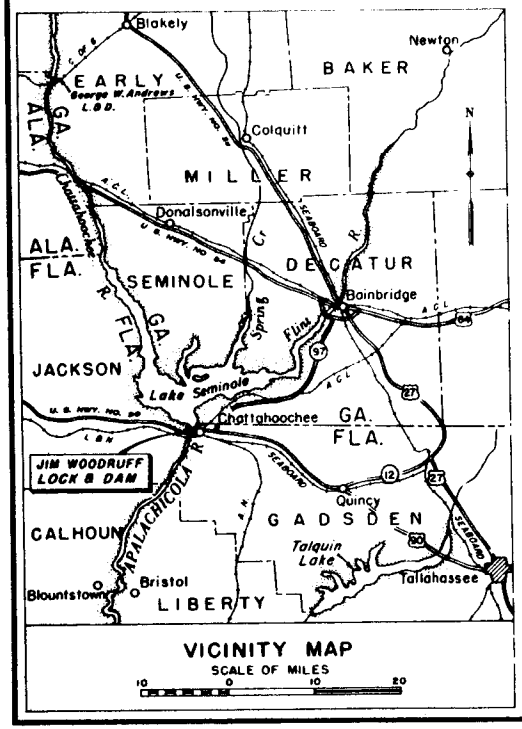
6-1



PLAN

SCALE IN FEET

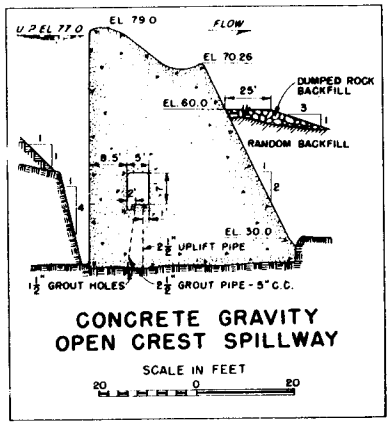
400 0 400 800 1200



VICINITY MAP

SCALE OF MILES

10 0 10 20



CONCRETE GRAVITY OPEN CREST SPILLWAY

SCALE IN FEET

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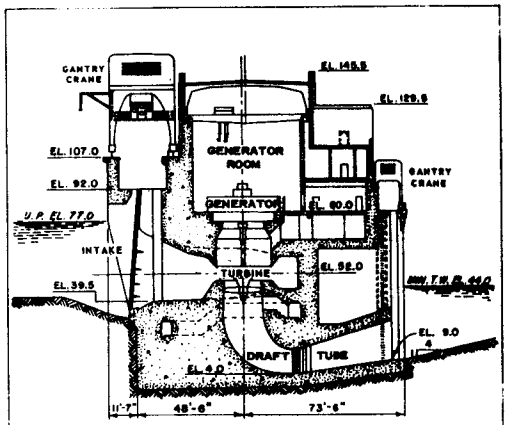

SECTION THROUGH POWERHOUSE

SCALE IN FEET

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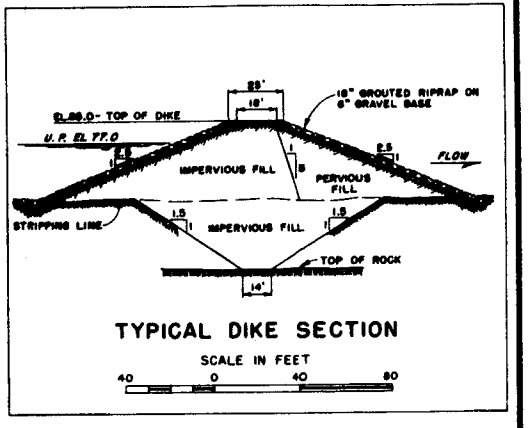

TYPICAL DIKE SECTION

SCALE IN FEET

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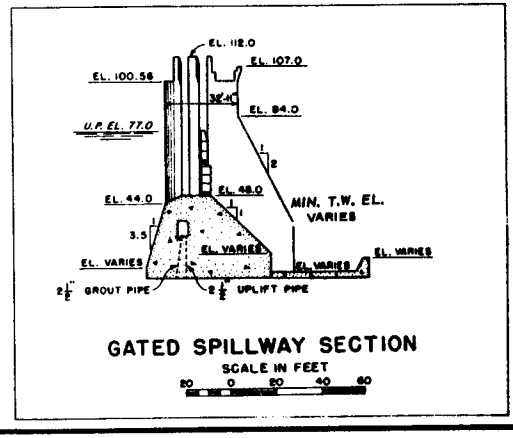

GATED SPILLWAY SECTION

SCALE IN FEET

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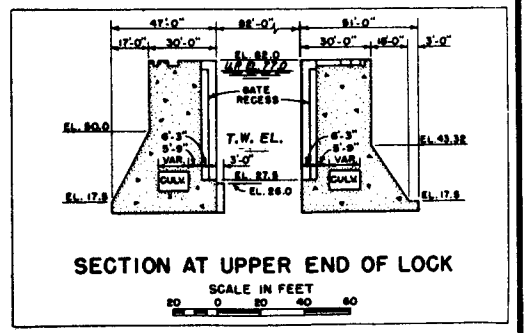


SECTION AT UPPER END OF LOCK

SCALE IN FEET

20 0 20 40 60

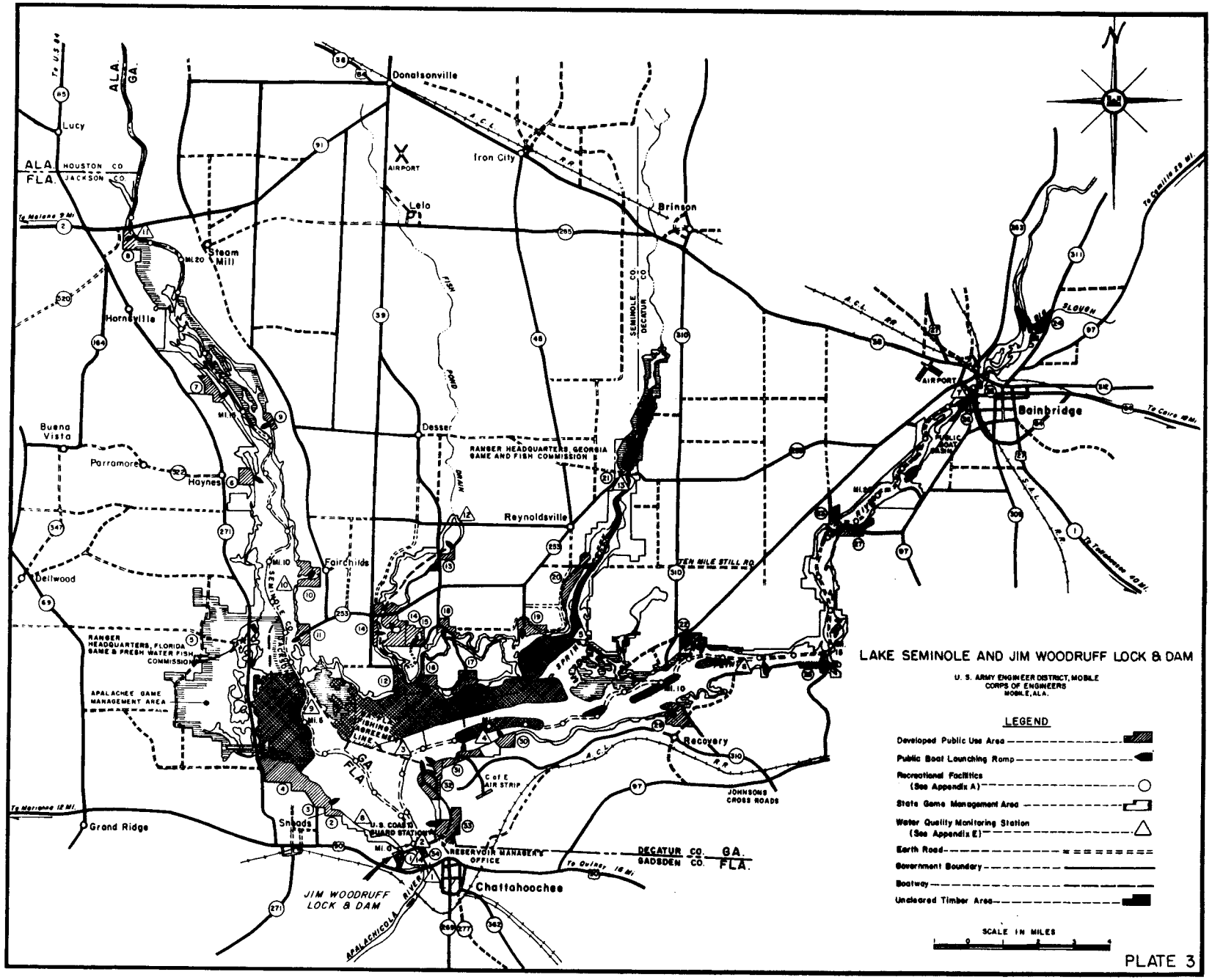
APALACHICOLA, CHATTAHOOCHEE & FLINT RIVERS, ALA., GA., & FLA.

JIM WOODRUFF DAM

REVISED TO 30 JUNE 1972

OFFICE OF THE DISTRICT ENGINEER
MOBILE, ALABAMA

PLATE 2



LAKE SEMINOLE AND JIM WOODRUFF LOCK & DAM

U. S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
MOBILE, ALA.

LEGEND

- Developed Public Use Area
- Public Boat Launching Ramp
- Recreational Facilities (See Appendix A)
- State Game Management Area
- Water Quality Monitoring Station (See Appendix E)
- Earth Road
- Government Boundary
- Boatway
- Uncleared Timber Area

SCALE IN MILES

PLATE 3

APPENDIX A

LAKE SEMINOLE RECREATIONAL FACILITIES AVAILABLE IN 1974 OR PLANNED FOR THE FUTURE WITH AN INDICATION OF THEIR PRESENT STATE OF DEVELOPMENT.

Recreational Facility. No. (See Plate 3)	Area Name	Acreage	Miles Above Dam on River Arm	1974 State of Development %	Public Boat Launching Ramp	Boat and Motor Rentals, Fuel	Boat Docking and Mooring	Bait and Supplies	Tent and Trailer Camp Area	Overnite Accommodations	Restaurant or Snack Bar	Childrens Playground	Comfort Station	Drinking Water	Picnic Area	Swimming Beach	Bath Houses	Sight Seeing	Water Skiing	Operated by
1	Jim Woodruff Dam: West Overlook	17	0	85														X		Corps
2	Sneads Landing	54	3 Chattahoochee	85		X	X	X	X	X	X		X	X				X		Concession
3	Sneads Park	50	3 Chattahoochee	35	X								X	X	X	X	X	X	X	Corps
4	Three Rivers State Park and Blue Springs Landing	566	4 Chattahoochee	95	X	X	X	X	X	X		X	X	X	X	X	X	X	X	State of Florida
5	Apalachee Game Management Area (Florida)	5,135	5 Chattahoochee	90	X				X									X		State of Florida
6	Parramore Landing	121	13.5 Chattahoochee	85	X	X	X	X		X	X		X	X				X		Concession
7	Buena Vista Access Area	154	16.5 Chattahoochee	50	X				X				X	X	X			X		Corps
8	Neal's Landing Access Area	121	23 Chattahoochee	70	X				X				X	X	X			X		Corps
9	Desser Access Area	68	15 Chattahoochee	50	X								X	X	X			X		Corps
10	Fairchilds State Park	293	9.5 Chattahoochee	75	X		X		X				X	X	X			X		State of Georgia
11	Butler's Ferry Landing	161	8.5 Chattahoochee	85	X	X	X	X	X	X	X		X	X	X			X		Concession
12	Cummings Access Area	57	5 Fish Pond Drain	85	X				X				X	X	X			X		Corps
13	Ray's Lake No. 1 Access Area	50	10 Fish Pond Drain	50	X								X	X	X			X	X	Corps
14	Seminole State Park and Dunn's Marina	312	6.5 Fish Pond Drain	95	X	X	X	X	X		X	X	X	X	X	X	X	X	X	State of Georgia
15	Harvel Pond Access Area	90	7 Fish Pond Drain	85	X													X		Corps
16	Island Point Access Area	103	5 Flint	50	X								X	X	X			X		Corps
17	Sealy Point Access Area	172	5 Flint	50	X								X	X	X			X		Corps
18	Cypress Pond Access Area	90	7 Fish Pond Drain	60	X													X		Corps
19	Spring Creek Landing	16	8 Spring Creek	85	X	X	X	X	X	X	X		X	X				X		Concession
20	Reynoldsville Access Area	150	11 Spring Creek	75	X			X			X		X	X	X			X		State of Georgia
21	Decator Lake No. 2 Access Area	5	13.5 Spring Creek	100	X													X		Corps
22	Ten Mile Still Landing	27	8 Flint	85	X	X	X	X	X	X	X		X	X	X			X		Concession
23	Hale's Landing Access Area	88	19 Flint	35	X								X	X	X			X		Corps
24	Big Slough Park Access Area	95	31 Flint	5	X													X		Corps
25	Bainbridge Access Area	35	25.5 Flint	90	X							X	X	X	X			X		City of Bainbridge
26	Bainbridge Bypass Park	216	26 Flint	40	X							X	X	X	X	X		X		City of Bainbridge
27	Horseshoe Bend Park	245	19 Flint	25	X								X	X	X			X		State of Georgia
28	Faceville Landing Access Area	127	10 Flint	45	X								X	X	X			X		Corps
29	Hutchinson's Ferry Landing	322	9.5 Flint	85	X	X	X	X	X	X	X		X	X				X		Concession & Corps
30	Flint River Park Access Area	125	5 Flint	10	X													X		Corps
31	River Junction Access Area	160	2.5 Flint	75	X				X				X	X	X			X		Corps
32	Chattahoochee Park and Booster Club Landing	223	2 Flint	50	X	X	X	X			X	X	X	X	X	X		X	X	City of Chattahoochee
33	Jim Woodruff Dam: East Bank Public Use Area	158	1 East side of Lake	100	X				X				X	X	X		X	X		Corps
34	Jim Woodruff Dam: Fishing Deck and Powerhouse	20	0 East side of Apalachicola R. adjacent to dam	0									X	X				X		Corps
—	Rhodes Ferry Park	35	11 Spring Creek	0																
—	Florida State Park	120	9.0 Chattahoochee	0																
—	Spring Creek State Park	850	12 Spring Creek	0																
—	Dell Park	136	5.5 Flint	0																
—	Four Mile Creek Park	389	21 Flint	0																
—	River Road Park	231	12 Chattahoochee	0																
—	Recovery Road	35	7 Flint	0																
—	Southlands	202	17.5 Flint	0																
—	Lewis Pond Nos. 1 & 2	79	9.5 Fish Pond Drain	0																
—	Flatwoods	305	18.5 Chattahoochee	0																
—	Apalachee	45	1 Chattahoochee	0																
—	Ray's Lake No. 2 Access Area	25	10.2 Fish Pond Drain	0																

APPENDIX B

Fish Present in Lake Seminole
From Freshwater Fishes in Georgia, 1971,
Dalberg and Scott, and the Results of Fish Population Surveys
by the Fisheries Division of the Georgia Game and Fish Commission

SCIENTIFIC NAME	COMMON NAME
Ichthyomyzon gagei	Southern brook lamprey
Acipenser oxyrhynchus	Atlantic sturgeon
Lepisosteus oculatus	Spotted gar
L. osseus	Longnose gar
Amia calva	Bowfin
Anguilla rostrata	American eel
Alosa alabamae	Alabama shad
A. chrysochloris	Skipjack herring
Dorosoma cepedianum	Gizzard shad
D. petenense	Threadfin shad
Esox americanus	Redfin pickerel
E. niger	Chain pickerel
Carassius auratus	Goldfish
Cyprinus carpio	Carp
Hybopsis harperi	Redeye chub
Notemigonus crysoleucas	Golden shiner
Notropis baileyi	Rough shiner
N. callitaenia	Bluestripe shiner
N. cummingsae	Dusky shiner
N. emiliae	Pugnose minnow

SCIENTIFIC NAME	COMMON NAME
Notropis euryzonus	Broadstripe shiner
N. hudsonius	Spottail shiner
N. hypselopterus	Sailfin shiner
N. longirostris	Longnose shiner
N. lutipinnis	Yellowfin shiner
N. maculatus	Taillight shiner
N. petersoni	Coastal shiner
N. texanus	Weed shiner
N. venustus	Blacktail shiner
N. zonistius	Banfin shiner
Semotilus atromaculatus	Creek chub
Carpiodes cyprinus	Quillback
Erimyzon oblongus	Creek chubsucker
E. sucetta	Lake chubsucker
Hypentelium etowanum	Alabama hog sucker
Minytrema melanops	Spotted sucker
Moxostoma lachneri	Greater jumprock
M. poecilurum	Grayfin redhorse
Ictalurus brunneus	Snail bullhead
I. catus	White catfish
I. natalis	Yellow bullhead
I. nebulosus	Brown bullhead
I. punctatus	Channel catfish
I. serracanthus	Spotted bullhead

SCIENTIFIC NAME	COMMON NAME
Noturus gyrinus	Tadpole madtom
N. leptacanthus	Speckled madtom
Pylodictis olivaris	Flathead catfish
Aphredoderus sayanus	Pirate perch
Strongylura marina	Atlantic Needlefish
Fundulus notti	Starhead topminnow
F. stellifer	Southern studfish
Cambusia affinis	Mosquitofish
Morone chrysops	White bass
M. saxatilis	Striped bass
Ambloplites rupestris	Rock bass
Centrarchus macropterus	Flier
Elassoma zonatum	Banded pygmy sunfish
Enneacanthus gloriosus	Bluespotted sunfish
Lepomis auritus	Redbreast sunfish
L. cyanellus	Green sunfish
L. gulosus	Warmouth
L. humilis	Orangespotted sunfish
L. macrochirus	Bluegill
L. megalotis	Longear sunfish
L. microlophus	Redear sunfish
L. punctatus	Spotted sunfish
Micropterus punctulatus	Spotted bass
M. salmoides	Largemouth bass

SCIENTIFIC NAME	COMMON NAME
Pomoxis annularis	White crappie
P. nigromaculatus	Black crappie
Etheostoma edwini	Brown darter
E. parvipinne	Goldstripe darter
E. swaini	Gulf darter
Perca flavescens	Yellow perch
Percina nigrofasciata	Blackbanded darter
Cottus carolinae	Banded sculpin
Mugil cephalus	Striped mullet
Trinectes maculatus	Hogchoker

APPENDIX C

Mammals Which Probably Appear in the

Lake Seminole Area

SCIENTIFIC NAME	COMMON NAME
Didelphis marsupialis	Opossum
Sorex longirostris	Southeastern shrew
Cryptotis parva	Least shrew
Blarina brevicauda	Shorttail shrew
Scalopus aquaticus	Eastern mole
Myotis keeni	Keen myotis
M. lucifugus	Little brown myotis
M. grisescens	Gray myotis
M. autroriparius	Mississippi myotis
M. sodalis	Indiana myotis
Pipistrellus subflavus	Eastern pipistrel
Lasiurus borealis	Red bat
Eptesicus fuscus	Big brown bat
Lasiurus intermedius	Eastern yellow bat
L. cinereus	Hoary bat
L. seminolus	Seminole bat
Nycticeius humeralis	Evening bat
Plecotus rafinesquei	Eastern big-eared bat
Tadrida brasiliensis	Mexican freetail bat
Procyon lotor	Raccoon
Mustela frenata	Longtail weasel
M. vison	Mink
Lutra canadensis	River otter
Spilogale putorius	Spotted skunk
Mephitis mephitis	Striped skunk
Vulpes fulva	Red fox
Urocyon cinereoargenteus	Gray fox
Lynx rufus	Bobcat
Tamias striatus	Eastern chipmunk
Sciurus carolinensis	Eastern gray squirrel
S. niger	Eastern fox squirrel
Glaucomys volans	Southern flying squirrel
Geomys pinetis	Southeastern pocket gopher
Castor canadensis	Beaver
Reinthrodontomys humulis	Eastern harvest mouse
Peromyscus polionotus	Oldfield mouse
P. gossypinus	Cotton mouse
P. nuttali	Golden mouse
Neotoma floridana	Eastern woodrat
Oryzomys palustris	Rice rat

SCIENTIFIC NAME	COMMON NAME
Sigmodon hispidus	Hispid cotton rat
Pitymys pinetorum	Pine vole
Neofiber alleni	Florida water rat
Ondatra zibethica	Muskrat
Rattus norvegicus	Norway rat
R. rattus	Black rat
Mus musculus	House mouse
Sylvilagus floridauus	Eastern cottontail
S. aquaticus	Swamp rabbit
S. palustris	Marsh rabbit
Odocoileus virginianus	Whitetail deer
Sus scrofa	Wild boar
Dasypus novemcinctus	Armadillo

APPENDIX D

Checklist of Amphibians and Reptiles
in the Vicinity of Lake Seminole

This list was compiled from data provided by the Tall Timbers Research Station near Tallahassee, Florida. Conceivably, there may be one or two species listed that are not found on Corps of Engineers administered lands at Lake Seminole; conversely, there may also be one or two species that are found in the area that are not on the list.

SCIENTIFIC NAME	COMMON NAME
SALAMANDERS	
Pseudobranchus striatus spheniseus	Slender dwarf siren
Siren intermedia intermedia	Eastern lesser siren
S. lacertina	Greater siren
Necturus beyeri	Gulf Coast waterdog
N. punctatus lodingi	Dwarf waterdog
Amphiuma means means	Two-toed amphiuma
Notophthalmus viridescens viridescens	Red-spotted newt
Diemictylus viridescens louisianensis	Central newt
Ambystoma cingulatum bishopi	Reticulated flatwoods salamander
A. maculatum	Spotted salamander
A. opacum	Marbled salamander
A. talpoideum	Mole salamander
A. Tigrinum tigrinum	Eastern tiger salamander
Desmognathus fuscus auriculatus	Southern dusky salamander
D. fuscus fuscus	Northern dusky salamander
Eurycea bislineata cirrigea	Southern two-lined salamander
E. longicauda guttolineata	Three-lined salamander
Manculus quadridigitatus	Dwarf salamander
Hemidactylium scutatum	F[illegible]-toed salamander
Plethodon glutinosus glutinosus	Slimy salamander
Pseudotriton montanus montanus	Eastern mud salamander
P. ruber vioscai	Southern red salamander
P. montanus floridanus	Rusty mud salamander
FROGS	
Scaphiopus holbrooki	Eastern spadefoot
Bufo quercicus	Oak toad
B. terrestris	Southern toad
B. woodhousei fowleri	Fowler's toad

SCIENTIFIC NAME	COMMON NAME
Acris crepitans crepitans	Northern cricket frog
A. gryllus gryllus	Southern cricket frog
Hyla avivoca avivoca	Western bird-voiced treefrog
H. cinerea cinerea	Green treefrog
H. crucifer	Spring peeper
H. femoralis	Pine woods treefrog
H. gratiosa	Barking treefrog
H. squirella	Squirrel treefrog
H. versicolor versicolor	Eastern gray treefrog
Limnaoedus ocularis	Little grass frog
Pseudacris nigrita nigrita	Southern chorus frog
P. ornata	Ornate chorus frog
P. triseriata feriarum	Upland chorus frog
Rana areolata aesopus	Florida gopher frog
R. catesbeiana	Bullfrog
R. clamitans	Bronze frog
R. grylio	Pig frog
R. pipiens sphenocephala	Southern leopard frog
Gastrophryne carolinensis	Eastern narrow-mouthed toad

CROCODILIANS

Alligator mississippiensis	American alligator
Chelydra serpentina	Snapping turtle
Kinosternon bauri	Striped mud turtle
K. subrubrum subrubrum	Eastern mud turtle
Macroclemys temmincki	Alligator snapping turtle
Sternotherus minor minor	Loggerhead musk turtle
S. odoratus	Stinkpot
Clemmys guttata	Spotted turtle
Dierochelys reticularia	Chicken turtle
Gopherus polyphemus	Gopher tortoise
Graptemys barbouri	Barbour's map turtle
G. nigrinoda	Black-knobbed sawback
G. pulchra	Alabama map turtle
Malaclemys terrapin macrospilota	Ornate diamondback terrapin
Pseudemys concinna concinna	River cooter
P. floridana floridana	Florida cooter
P. nelsoni	Florida red-bellied turtle
P. scripta scripta	Yellow-bellied turtle
Terrapene carolina major	Gulf Coast box turtle
Trionyx ferox	Florida softshell
T. muticus	Smooth softshell
T. spinifer asper	Gulf Coast softshell

SCIENTIFIC NAME	COMMON NAME
LIZARDS	
Anolis carolinensis carolinensis	Green anole
A. distichus	Bahamian bark anole
A. sagrei stejnegreri	Key West anole
Phrynosoma cornutum	Texas horned lizard
P. douglassi brevirostre	Eastern short-horned lizard
Sceloporus undulatus undulatus	Southern fence lizard
S. woodi	Florida scrub lizard
Hemidactylus turcicus turcicus	Mediterranean Gecko
Cnemidophorus sexlineatus	Six-lined racerunner
Eumeces anthracinus	Coal skink
E. egregius egregius	Georgia red-tailed skink
E. fasciatus	Five-lined skink
E. inexpectatus	Southeastern five-lined skink
E. laticeps	Broad-headed skink
Neoseps reynoldsi	Sand skink
Lygosoma laterale	Ground skink
Ophisaurus attenuatus	Slender glass lizard
O. compressus	Island glass lizard
O. ventralis	Eastern glass lizard
Rhineura floridana	Worm lizard
SNAKES	
Cemophora coccinea	Scarlet snake
Coluber constrictor priapys	Southern black racer
Diadophis punctatus punctatus	Southern ringneck snake
Elaphe guttata guttata	Corn snake
E. obsoleta spiloides	Gray rat snake
Farancia abacura	Mud snake
Abastor erythrogrammus	Rainbow snake
Heterodon platyrhinos	Eastern hognose snake
Heterodon simus	Southern hognose snake
Lampropeltis calligaster rhombomaculata	Mole snake
L. getulus getulus	Eastern kingsnake
L. doliata doliata	Scarlet kingsnake
Masticophis flagellum flagellum	Eastern coachwhip
Natrix cyclopion cyclopion	Green water snake
N. erythrogaster erythrogaster	Red-bellied water snake
N. sipedon fasciata	Banded water snake
N. taxispilota	Brown water snake
N. rigida	Glossy water snake

SCIENTIFIC NAME	COMMON NAME
Natrix septemvittata	Queen snake
Opheodrys aestivus	Rough green snake
Pituophis melanoleucas mugitus	Florida pine snake
Liodytes alleni	Striped swamp snake
Rhadinea flavilata	Yellow-lipped snake
Seminatrix pygaea	Black swamp snake
Storeria dekayi wrightorum	Midland brown snake
S. occipitomaculata	Red-bellied snake
Tantilla coronata coronata	Southeastern crowned snake
Thamnophis sauritus sackeni	Southern ribbon snake
T. sirtalis sirtalis	Eastern garter snake
Haldea striatula	Rough earth snake
H. valeriae	Smooth earth snake
Micrurus fulvius	Eastern coral snake
Agkistrodon contortrix contortrix	Southern copperhead
A. piscivorus piscivorus	Eastern cottonmouth
Crotalus adamanteus	Eastern diamondback rattler
Crotalus horridus atricaudatus	Canebrake rattler
Sistrurus miliarius barbouri	Dusky pygmy rattlesnake

APPENDIX E

Birds Which May Occur in the Lake Seminole Area

(Rare, Occasional or Uncommon Birds are not included.)

SCIENTIFIC NAME	COMMON NAME
Phalacrocorax auritus	Double-crested cormorant
Podilymbus podiceps	Pied-billed grebe
Colymbus auritis	Horned grebe
Anhinga anhinga	Water-turkey
Ardea herodias	Great blue heron
Casmerodius albus	Great egret
Leucophoyx thula	Snowy egret
Bubulcus ibis	Cattle egret
Florida coerulea	Little blue heron
Butorides virescens	Green heron
Nycticorax nycticorax	Black-crowned night heron
N. violacea	Yellow-crowned night heron
Botaurus lentiginosus	American bittern
Ixobrychus exilis	Least bittern
Anas platyrhynchos	Mallard
A. rubripes	Black duck
A. acuta	Pintail
A. carolinensis	Green-winged teal
A. discors	Blue-winged teal
A. strepera	Gadwall
Mareca americana	American widgeon
Glaucionetta albeola	Buffle-head
Aix sponsa	Wood duck
Aythya collaris	Ring-necked duck
A. affinis	Lesser scaup duck
A. marila	Greater scaup duck
Branta canadensis	Canada goose
Chen hyperborea	Snow goose
Spatula clypeata	Shoveller
Mergus merganser	American merganser
Lophodytes cucullatus	Hooded merganser
Cathartes aura	Turkey vulture
Coragyps atratus	Black vulture
Elanoides forficatus	Swallow-tailed kite
Ictinia mississipiensis	Mississippi kite
Accipiter striatus	Sharp-shinned hawk
A. cooperii	Cooper's hawk
Buteo jamaicensis	Red-tailed hawk
B. platypterus	Broad-winged hawk

SCIENTIFIC NAME	COMMON NAME
B. lineatus	Red-shouldered hawk
Haliaetus leucocephalus	Bald eagle
Circus cyaneus	Marsh hawk
Pandion haliaetus	Osprey
Falco sparverius	Sparrow hawk
Colinus virginianus	Bob-white quail
Meleagris gallopavo	Turkey
Rallus elegans	King rail
Mycteria americana	Wood ibis
Gaura alba	White ibis
Plegadis mexicana	Eastern glossy ibis
Grus canadensis	Sandhill crane
Aramus guaranuna	Limpkin
Porphyrula martinica	Purple gallinule
Gallinula chloropus	Florida gallinule
Squatarola squatarola	Black-bellied Plover
Actitus macularia	Spotted sandpiper
Tringa solitaria	Eastern solitary sandpiper
Totanus melanoleucus	Greater yellow-legs
T. flavipes	Lesser yellow-legs
Erolia minutilla	Least sandpiper
E. alpina	Dunlin
Limnodromus griseus	Eastern dowitcher
Ereunetes pusillus	Semi-palmated sandpiper
E. mauri	Western sandpiper
Larus argentatus	Herring gull
L. delawarensis	Ring-billed gull
L. philadelphia	Bonaparte's gull
Sterna hirundo	Common tern
Porzana carolina	Sora rail
Fulica americana	Coot
Charadrius vociferus	Killdeer
Philohela minor	Woodcock
Capella gallinago	Common snipe
Zenaidura macroura	Mourning dove
Columbigallina passerina	Ground dove
Coccyzus americanus	Yellow-billed cuckoo
Tyto alba	Barn owl
Otus asio	Screech owl
Bubo virginianus	Great horned owl
Strix varia	Barred owl
Caprimulgus carolinensis	Chuck-will's-widow
C. vociferus	Whip-poor-will
Chordeiles minor	Nighthawk
Archilochus colubris	Ruby-throated hummingbird
Megaceryle alcyon	Belted kingfisher

SCIENTIFIC NAME	COMMON NAME
Colaptes auratus	Yellow-shafted flicker
Hylatomus pileatus	Pileated woodpecker
Centurus carolinus	Red-bellied woodpecker
Melanerpes erythrocephalus	Red-headed woodpecker
Sphyrapicus varius varius	Yellow-bellied sapsucker
Dendrocopus villosus	Hairy woodpecker
D. pubescens	Downy woodpecker
D. borealis	Red-cockaded woodpecker
Tyrannus tyrannus	Eastern kingbird
Myiarchus crinitus	Crested flycatcher
Sayornis phoebe	Eastern phoebe
Empidonax virescens	Acadian flycatcher
Contopus virens	Eastern wood pewee
Iridoprocne bicolor	Tree swallow
Riparia riparia	Bank swallow
Stelgidoptery ruficollis	Rough-winged swallow
Hirundo rustica	Barn swallow
Petrocheliodon pyrrhonota	Cliff swallow
Progne subis subis	Purple martin
Cyanocitta cristata	Blue jay
Parus carolinensis	Carolina chickadee
P. bicolor	Tufted titmouse
Sitta carolinensis	White-breasted nuthatch
S. pusilla	Brown-headed nuthatch
S. canadensis	Red-breasted nuthatch
Corvus ossifragus	Fish crow
C. brachyrhynchos	Common crow
Certhia familiaris	Brown creeper
Troglodytes aedon	House wren
Thryomanes bewickii	Bewick's wren
Thryothorus ludovicianus	Carolina wren
Cistothorus platensis	Short-billed marsh wren
Minus polyglottos	Mockingbird
Dumetella carolinensis	Catbird
Toxostoma rufum	Brown thrasher
Turdus migratorius	Robin
Hylocichla mustelina	Wood thrush
H. guttata faxoni	Hermit thrush
Sialia sialis	Eastern bluebird
Polioptila coerulea	Blue-gray gnatcatcher
Regulus satrapa	Golden-crowned kinglet
R. calendula	Ruby-crowned kinglet
Anthus spinoletta	American pipit
Bombycilla cedrorum	Cedar waxwing
Lanius ludovicianus	Loggerhead shrike
Sturnus vulgaris	Starling

SCIENTIFIC NAME	COMMON NAME
Vireo griseus	White-eyed vireo
V. favifrons	Yellow-throated vireo
V. solitarius	Solitary vireo
V. olivaceus	Red-eyed vireo
Mniotilta varia	Black and white warbler
Prothonotaria citrea	Prothonotary warbler
Limnothlypis swainsonii	Swainson's warbler
Helmitheros vermivorus	Worm-eating warbler
Vermivora celata	Orange-crowned warbler
Parula americana	Parula warbler
Dendroica petechia	Yellow warbler
D. tigrina	Cape May warbler
D. coronata	Yellow-rump warbler
D. dominica	Yellow-throated warbler
D. pinus	Pine warbler
D. palmarum	Palm warbler
Seiurus aurocapillus	Oven-bird
S. noveboracensis	Northern water-thrush
Oporonis formosus	Kentucky warbler
Geothylpis trichas	Yellow-throat
Icteria virens	Yellow-breasted chat
Wilsonia citrina	Hooded warbler
Setophaga ruticilla	American redstart
Passer domesticus	English sparrow
Dolichonyx oryzivorus	Bobolink
Sturnella magna	Meadowlark
Agelaius phoeniceus	Red-wing blackbird
Euphagus carolinus	Rusty blackbird
Quiscalus quiscula	Purple grackle
Cassidix mexicana	Boat-tailed grackle
Molothrus ater	Eastern cowbird
Piranga rubra	Summer tanager
P. olivacea	Scarlet tanager
Richmondena cardinalis	Cardinal
Guiraca coerula	Blue grosbeak
Passerina cyanea	Indigo bunting
Spinus tristis	Common goldfinch
Passervulus sandwichensis	Savannah sparrow
P. henslowii	Henslow's sparrow
Poecetes gramineus	Vesper sparrow
Junco hyemalis	Slate-colored junco
Spizella passerina	Chipping sparrow
S. pusilla	Field sparrow
Zonotrichia albicollis	White-throated sparrow
Melospiza georgiana	Swamp sparrow

SCIENTIFIC NAME	COMMON NAME
Melospiza melodia	Song sparrow
Aimophila aestivalis	Bachman's sparrow
Pipilo erythrophthalmus	Rufous-sided towhee

APPENDIX F

Water Quality Data for 14 Locations On
Lake Seminole and Below Jim Woodruff Dam
(See Plate 3 for Sampling Locations)

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
1	Apalachicola River at U.S. Hwy 90 Bridge 1 Mile Below Jim Woodruff L&D.	Water Temperature (^{o}C)	21.5	28.0	14.0	11/30/60	08/23/72
		Turbidity (JTU)	25.4	48.0	0.2	06/29/64	08/23/72
		Conductivity (μmho)	82.0	82.0	82.0	08/23/72	08/23/72
		DO (mg/l)	7.1	9.3	3.7	11/30/60	08/23/72
		BOD (mg/l)	0.8	1.0	0.6	04/09/69	08/23/72
		pH	7.2	7.4	6.8	11/30/60	08/23/72
		Total Alkalinity (as mg/l $CaCO_3$)	33.0	33.0	33.0	04/09/69	04/09/69
		Organic Nitrogen (as mg/l N)	0.69	0.69	0.69	08/23/72	08/23/72
		NH_3 (as mg/l N)	0.23	0.23	0.23	08/23/72	08/23/72
		NO_3 (as mg/l N)	0.42	0.42	0.42	08/23/72	08/23/72
		Total Hardness (as mg/l $CaCO_3$)	36.0	36.0	36.0	04/09/69	04/09/69
		Total Phosphorus (as mg/l PO_4)	0.1	0.1	0.1	08/23/72	08/23/72
		Beck Biotic Index	7.2	18.0	0.0	11/30/60	03/23/66
2	Jim Woodruff Dam Water Intake; U.S. Public Health Service Station	Water Temperature (^{o}C)	18.5	20.8	15.1	08/23/72	03/20/74
		Turbidity (JTU)	23.5	42.0	7.0	08/23/72	03/20/74
		Conductivity (μmho)	120.0	150.0	90.0	08/23/72	02/21/74
		DO (mg/l)	8.7	8.7	8.7	03/20/74	03/20/74
		BOD (mg/l)	1.9	3.9	0.8	08/23/72	03/20/74

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
		pH	7.2	7.2	7.2	02/21/74	03/20/74
		Total Alkalinity (as mg/l $CaCO_3$)	25.3	46.0	7.0	08/23/72	03/20/74
		Organic Nitrogen (as mg/l N)	0.47	0.85	0.15	08/23/72	03/20/74
		NH_3 (as mg/l N)	0.33	1.32	0.00	08/23/72	03/20/74
		NO_2 (as mg/l N)	0.008	0.008	0.008	02/21/74	03/20/74
		NO_3 (as mg/l N)	0.06	0.9	0.32	08/23/72	03/20/74
		Total Phosphorus (as mg/l PO_4)	0.07	0.1	0.04	08/23/72	03/20/74
		Beck Biotic Index	11.7	17.0	6.0	11/10/64	04/09/69
		Total Organic Carbon (as mg/l C)	10.0	0.9	0.32	02/21/72	02/21/74
		Total Coliform (MPN per 100 ml)	1,146.7	1,600.0	240.0	10/18/73	03/20/74
		Fecal Coliform (MPN Tubecode)	29.7	33.0	23.0	10/18/73	03/20/74
3	In Lake Seminole; Flint River Mile 3	Water Temperature (^{o}C)	10.9	10.9	10.9	01/17/73	01/17/73
		DO (mg/l)	9.2	9.2	9.2	01/17/73	01/17/73
		Beck Biotic Index	2.0	2.0	2.0	03/05/63	03/05/63
4	In Lake Seminole; Latitude: 30°45'25" Longitude: 84°50'46"	Water Temperature (^{o}C)	25.4	28.8	18.3	06/20/73	11/03/73
		Turbidity (Percent Light Transmission)	80.0	90.0	67.0	06/20/73	11/03/73
		Conductivity (μmho)	130.7	159.0	108.0	06/20/73	11/03/73
		DO (mg/l)	6.8	9.2	3.2	06/20/73	11/03/73
		pH	7.4	8.2	7.0	06/20/73	11/03/73

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
		Total Alkalinity (as mg/l $CaCO_3$)	54.8	71.0	40.0	06/20/73	11/03/73
		NH_3 (as mg/l N)	0.08	0.11	0.04	06/20/73	11/03/73
		NO_2 & NO_3 (as mg/l N)	0.45	0.56	0.39	06/20/73	11/03/73
		Total Kjeldahl Nitrogen (as mg/l N)	0.39	0.5	0.2	06/20/73	11/03/73
		Total Phosphorus (as mg/l P)	0.049	0.062	0.035	06/20/73	11/03/73
		Dissolved Ortho-phosphate (as mg/l P)	0.013	0.021	0.007	06/20/73	11/03/73
		Chlorophyll "a" (mg/l)	7.3	9.8	5.0	06/20/73	11/03/73
5	In Lake Seminole; Latitude: 30°48'00" Longitude: 84°47'00"	Water Temperature (°C)	24.7	29.2	19.0	06/20/73	11/03/73
		Turbidity (Per-cent Light Trans-mission	89.5	96.0	77.0	06/20/73	11/03/73
		Conductivity (μmho)	180.5	213.0	161.0	06/20/73	11/03/73
		DO (mg/l)	7.1	8.6	5.7	06/20/73	11/03/73
		pH	7.5	8.1	7.2	06/20/73	11/03/73
		Total Alkalinity (as mg/l $CaCO_3$)	85.7	97.0	77.0	06/20/73	11/03/73
		NH_3 (as mg/l N)	0.06	0.1	0.04	06/20/73	11/03/73
		NO_2 & NO_3 (as mg/l N)	0.21	0.31	0.1	06/20/73	11/03/73
		Total Kjeldahl Nitrogen (as mg/l N)	0.42	0.8	0.2	06/20/73	11/03/73
		Total Phosphorus (as mg/l P)	0.03	0.04	0.02	06/20/73	11/03/73
		Dissolved Ortho-phosphate (as mg/l P)	0.007	0.008	0.004	06/20/73	11/03/73
		Chlorophyll "a" (mg/l)	4.3	6.1	3.0	06/20/73	11/03/73

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
6	In Lake Seminole; Latitude: 30°47'29" Longitude: 84°41'56"	Water Temperature (°C)	24.9	28.2	18.6	06/20/73	11/03/73
		Turbidity (Percent Light Transmission)	89.3	96.0	82.0	06/20/73	11/03/73
		Conductivity (μmho)	128.3	157.0	110.0	06/20/73	11/03/73
		DO (mg/l)	6.6	7.8	4.3	06/20/73	11/03/73
		pH	7.4	7.7	6.8	06/20/73	11/03/73
		Total Alkalinity (as mg/l $CaCO_3$)	48.1	59.0	39.0	06/20/73	11/03/73
		NH_3 (as mg/l N)	0.1	0.16	0.06	06/20/73	11/03/73
		NO_2 & NO_3 (as mg/l N)	0.61	0.75	0.47	06/20/73	11/03/73
		Total Kjeldahl Nitrogen(as mg/l N)	0.36	0.5	0.2	06/20/73	11/03/73
		Total Phosphorus (as mg/l P)	0.06	0.07	0.05	06/20/73	11/03/73
		Dissolved Orthophosphate (as mg/l P)	0.03	0.05	0.02	06/20/73	11/03/73
		Chlorophyll "a" (mg/l)	2.43	4.5	0.9	06/20/73	11/03/73
7	In Lake Seminole; at U.S. Hwy 27 Bridge at Bainbridge, Georgia	NH_3 (as mg/l N)	0.24	1.89	0.02	03/10/73	02/24/74
		NO_2 (as mg/l N)	0.009	0.019	0.004	03/10/73	02/24/74
		NO_3 (as mg/l N)	0.37	0.69	0.176	03/10/73	02/24/74
		NO_2 & NO_3 (as mg/l N)	0.378	0.7	0.184	03/10/73	02/24/74
		Total Kjeldahl Nitrogen (as mg/l N)	1.02	2.6	0.2	03/10/73	02/24/74
		Total Phosphorus (as mg/l P)	0.08	0.14	0.05	03/10/73	02/24/74
		Dissolved Orthophosphate (as mg/l P)	0.036	0.068	0.023	03/10/73	02/24/74

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
8	In Lake Seminole; near Sneeds, Florida Latitude: 30°42'35" Longitude: 84°52'50"	NH_3 (as mg/l N)	6.92	14.6	2.4	04/18/73	03/21/74
		NO_2 (as mg/l N)	0.023	0.053	0.008	04/18/73	03/21/74
		NO_3 (as mg/l N)	0.144	0.23	0.012	04/18/73	03/21/74
		NO_2 & NO_3 (as mg/l N)	0.172	0.28	0.02	04/18/73	03/21/74
		Total Kjeldahl Nitrogen (as mg/l N)	27.02	35.0	16.0	04/18/73	03/21/74
		Total Phosphorus (as mg/l P)	21.8	46.0	13.5	04/18/73	03/21/74
		Dissolved Ortho-phosphate (as mg/l P)	6.8	10.2	1.82	04/18/73	03/21/74
9	In Lake Seminole; Latitude: 30°45'57" Longitude: 84°55'44"	Water Temperature (°C)	25.4	29.2	18.9	06/20/73	11/03/73
		Turbidity (Percent light transmission)	74.7	79.0	66.0	06/20/73	11/03/73
		Conductivity (μmho)	77.8	85.0	70.0	06/20/73	11/03/73
		DO (mg/l)	7.3	8.4	6.2	06/20/73	11/03/73
		pH	7.4	7.6	7.2	06/20/73	11/03/73
		Total Alkalinity (as mg/l $CaCO_3$)	21.8	26.0	18.0	06/20/73	11/03/73
		NH_3 (as mg/l N)	0.085	0.13	0.04	06/20/73	11/03/73
		NO_2 & NO_3 (as mg/l N)	0.22	0.33	0.11	06/20/73	11/03/73
		Total Kjeldahl Nitrogen (as mg/l N)	0.6	1.6	0.3	06/20/73	11/03/73
		Total Phosphorus (mg/l) P (as mg/l P)	0.052	0.058	0.039	06/20/73	11/03/73
		Dissolved Ortho-phosphate (as mg/l P)	0.009	0.011	0.008	06/20/73	11/03/73
		Chlorophyll "a" (mg/l)	9.9	15.3	5.5	06/20/73	11/03/73

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
10	In Lake Seminole; Chattahoochee River Mile 10, Buoy 59	Water Temperature (^{o}C)	15.0	15.0	15.0	03/11/70	03/11/70
		Turbidity (JTU)	5.1	10.0	0.2	03/11/70	03/05/73
		DO (mg/1)	8.2	8.2	8.2	03/11/70	03/05/73
		BOD (mg/1)	1.1	1.4	0.8	03/11/70	03/05/73
		pH	7.4	7.4	7.4	03/11/70	03/11/70
		Total Alkalinity (as mg/1 $CaCO_3$)	3.0	3.0	3.0	03/05/73	03/05/73
		Organic Nitrogen (as mg/1 N)	0.305	0.31	0.3	03/11/70	03/05/73
		NH_3 (as mg/1 N)	0.003	0.075	0.0	03/11/70	03/05/73
		NO_3 (as mg/1 N)	0.53	0.68	0.38	03/11/70	03/05/73
		Total Phosphorus (as mg/1 PO_4)	0.06	0.06	0.06	03/05/73	03/05/73
		Beck Biotic Index	7.0	7.0	7.0	11/29/60	11/29/60
		Total Coliform (MPN per 100 ml)	1,300	1,300	1,300	03/11/70	03/11/70
11	In Lake Seminole; Chattahooche River Mile 21.5 at Neals Landing	Water Temperature (^{o}F)	67.0	85.9	46.0	07/09/71	05/31/74
		Conductivity (μmho)	66.0	231.0	34.0	07/09/71	05/31/74
		DO (mg/1)	8.7	12.1	5.3	07/09/71	05/31/74
		pH	6.6	8.0	5.9	07/09/71	05/31/74

Station Number	Station Description	Parameter	Mean	Maximum	Minimum	Beginning Date	End Date
12	Fish Pond Drain, tributary to Lake Seminole in Georgia. Latitude: 30°51'00" Longitude: 84°51'00"	NH_3 (as mg/1 N)	0.064	0.320	0.015	03/11/73	02/24/74
		NO_2 (as mg/1 N)	0.002	0.006	0.001	03/11/73	02/24/74
		NO_3 (as mg/1 N)	0.021	0.076	0.01	03/11/73	02/24/74
		NO_2 & NO_3 (as mg/1N)	0.023	0.08	0.01	03/11/73	02/24/74
		Total Kjeldahl Nitrogen (as mg/1 N)	0.86	2.3	0.23	03/11/73	02/24/74
		Total Phosphorus (as mg/1 P)	0.039	0.175	0.005	03/11/73	02/24/74
		Dissolved Orthophosphate (as mg/1 P)	0.008	0.02	0.005	03/11/73	02/24/74
13	In Lake Seminole; below outlet to Lake Decatur at Rt. 253 Bridge in Georgia.	NH_3 (as mg/1 N)	0.065	0.385	0.007	03/10/73	02/24/74
		NO_2 (as mg/1 N)	0.004	0.007	0.001	03/10/73	02/24/74
		NO_3 (as mg/1 N)	0.27	0.46	0.08	03/10/73	02/24/74
		NO_2 & NO_3 (as mg/1 N)	0.27	0.47	0.08	03/10/73	02/24/74
		Total Kjedahl Nitrogen (as mg/1 N)	0.66	2.94	0.1	03/10/73	02/24/74
		Total Phosphorus (as mg/1 P)	0.039	0.13	0.01	03/10/73	02/24/74
		Dissolved Orthophosphate (as mg/1 P)	0.013	0.035	0.005	03/10/73	02/24/74

Mobile District Water Quality Monitoring Station
Approximately 0.6 Mile below Jim Woodruff L&D
Station Number 14

Year	Month	DO mg/l			Temp (°F)			pH			Cond (μmho)			Turb (JCU)		
		Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
1970	Aug	-	-	-	90.0	82.8	86.4	8.40	6.65	7.26	27	17	20	-	-	-
1972	Feb	12.02	9.39	10.73	61.7	49.4	54.1	8.09	5.91	6.97	65	34	44	455	35	137
	Apr	10.70	6.71	8.36	76.8	67.2	73.0	8.24	6.74	7.49	105	62	84	-	-	-
	May	-	-	-	81.8	74.6	77.6	-	-	-	174	82	132	-	-	-
	Jun	-	-	-	84.7	74.6	80.2	-	-	-	173	63	115	-	-	-
	Jul	-	-	-	86.2	80.8	83.0	-	-	-	77	63	70	-	-	-
	Aug	6.91	5.00	5.89	89.6	84.3	86.8	8.19	6.80	7.36	-	-	-	45	26	32
	Sep	-	-	-	87.6	81.6	84.7	8.43	5.16	7.33	184	98	137	75	20	39
	Oct	-	-	-	80.4	68.4	74.4	8.26	6.64	7.28	149	61	90	64	22	40
	Nov	9.92	7.37	8.62	74.1	57.0	65.9	7.58	7.17	7.40	105	64	85	111	24	65
	Dec	-	-	-	69.0	55.6	59.0	7.98	6.94	7.37	90	7	58	112	20	49
1973	Jan	11.72	9.49	10.76	60.3	49.1	54.7	6.92	6.75	6.83	88	8	47	119	26	75
	Feb	12.02	9.39	10.73	61.7	49.4	54.1	8.09	5.91	6.97	65	34	44	455	35	137
	Mar	11.70	7.87	9.55	67.8	55.4	62.8	8.00	6.05	6.90	86	48	61	-	-	-
	Apr	13.96	2.93	8.89	73.0	61.4	66.0	-	-	-	131	0	50	-	-	-
	Sep	9.68	3.42	6.95	85.6	75.8	82.7	8.59	5.76	7.86	190	5	157	-	39	-
	Oct	-	-	-	83.7	67.0	76.7	8.81	4.99	-	276	12	183	-	25	249

Year	Month	DO mg/l			Temp (°F)			pH			Cond (mho)			Turb (JCU)		
		Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
	Nov	-	-	-	70.3	62.8	66.2	-	-	-	116	-	-	-	-	-
	Dec	11.56	1.67	9.26	73.2	-	58.1	8.59	6.74	-	-	11	73	-	9	312
1974	Jan	12.29	7.88	-	66.2	58.3	61.5	8.15	6.19	-	91	40	58	106	88	98
	Feb	12.41	7.84	10.80	66.6	53.4	59.9	-	-	-	59	34	47	-	-	-
	Mar	13.6	.09	11.43	68.9	55.0	64.1	10.39	6.30	7.71	112	13	82	238	93	204
	Apr	13.58	1.05	7.86	75.2	-	69.2	9.80	4.68	6.93	-	50	74	-	70	228

APPENDIX G

SEDIMENT ANALYSES RESULTS FROM SELECTED SAMPLE STATIONS IN THE CHATTAHOOCHEE RIVER ARM OF LAKE SEMINOLE. THE OVERALL STUDY IS A PORTION OF THE 1974 CORPS OF ENGINEERS DISTRICT-WIDE SEDIMENT SAMPLING PROGRAM

	CHATTAHOOCHEE RIVER MILES											
ITEM	33.55	36.4	36.7	37.8	38.5	39.1	40.9	41.6	43.4	44.55	46.4	46.9
CHEMICAL ANALYSES												
Moisture (%)	19.14	17.00	14.49	18.02	21.11	18.23	17.15	22.11	16.28	16.06	18.13	44.16
Volatile Solids (%)	0.08	0.07	0.13	0.09	0.10	0.15	0.09	0.09	0.14	0.13	0.15	4.40
C.O.D. ($mg/kgx10^3$)	13.12	11.80	1.91	15.93	14.48	13.97	7.88	2.09	0.98	0.98	1.99	16.08
T.O.C. ($mg/kgx10^3$)	4.91	4.42	0.72	5.97	5.42	5.23	2.95	0.78	0.37	0.37	0.75	6.02
Total Phosphate (mg/kg P)	21.50	21.25	18.25	46.75	19.50	51.25	37.50	29.75	43.25	29.25	36.25	45.75
T.K.N. (mg/kg N)	50.4	91.3	54.9	106.4	83.4	65.0	90.7	50.4	78.4	74.5	67.2	370.7
Ammonia Nitrogen (mg/kg N)	33.6	33.6	44.8	43.7	23.5	59.9	66.6	20.2	10.6	60.5	11.2	149.0
Oil and Grease (mg/kg)	218	148	103	195	399	526	432	424	454	360	449	922
Eh (mvolts)	21	26	61	13	10	4	10	5	8	10	20	10
HEAVY METAL ANALYSES												
Moisture (%)	14.1	10.3	13.0	14.8	19.1	15.1	11.9	13.1	12.9	17.4	20.4	24.3
Hg (mg/kg)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	2.00	0.10	0.23	1.96
As (mg/kg)	1.2	1.2	1.3	1.2	1.2	1.7	0.8	1.2	1.6	1.1	3.2	3.8
Cu (mg/kg)	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	3.8
Zn (mg/kg)	3.7	3.4	620.0	5.2	1.1	2.7	5.7	2.8	3.6	8.7	4.9	25.0
Cd (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pb (mg/kg)	<0.5	1.1	<0.5	1.2	2.4	1.2	2.4	2.3	1.2	2.4	2.4	11.6
Ni (mg/kg)	1.3	1.1	0.5	1.4	1.1	1.1	1.1	1.6	1.9	1.7	1.9	6.8
Cr (mg/kg)	2.5	2.8	<0.5	2.2	1.8	2.6	2.6	4.5	2.6	4.2	2.7	7.8
Fe^{++} (mg/kg)	<0.3	<0.3	0.3	0.4	<0.3	0.4	4.2	<0.3	<0.3	<0.3	<0.3	1.2
PESTICIDE ANALYSES												
Diazinon (ppb)			0.886				N.D.					N.D.
DDD(TDE) (ppb)			N.D.				N.D.					9.900
DDE (ppb)			N.D.				N.D.					10.226
DDT (ppb)			N.D.				N.D.					9,177
Aldrin (ppb)			N.D.				N.D.					N.D.
Chlordane (ppb)			N.D.				N.D.					N.D.
Dieldrin (ppb)			N.D.				N.D.					N.D.
Endrin (ppb)			N.D.				N.D.					N.D.
Heptachlor (ppb)			N.D.				N.D.					N.D.
Heptachlor Epoxide (ppb)			N.D.				N.D.					N.D.
Lindane (ppb)			N.D.				N.D.					N.D.
Methoxychlor (ppb)			N.D.				N.D.					N.D.
Mirex (ppb)			N.D.				N.D.					N.D.
Toxaphene (ppb)			N.D.				N.D.					N.D.
Guthion (ppb)			N.D.				N.D.					N.D.
Malathion (ppb)			N.D.				N.D.					N.D.
Methyl Parathion (ppb)			N.D.				N.D.					N.D.
Parathion (ppb)			N.D.				N.D.					N.D.
PCB (AR 1242) (ppb)			N.D.				N.D.					N.D.
PCB (AR 1254) (ppb)			N.D.				N.D.					N.D.
PCB (AR 1260) (ppb)			N.D.				N.D.					N.D.

NOTE: Results are expressed on a dry weight basis. N.D. = Non-detectable.

APPENDIX H

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APPENDIX I

LETTERS OF COMMENT ON

DRAFT STATEMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

September 10, 1975

Mr. Lawrence R. Green
Chief, Planning Division
Department of the Army
Mobile District, Corps of Engineers
P. O. Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

We have reviewed the Draft Environmental Impact Statement for Operation and Maintenance of Lake Seminole and Jim Woodruff Lock and Dam in Alabama, Florida and Georgia, and offer the following comments.

There is no analytical data included in the sediment quality discussion. Even though 90% of the spoil will be on upland sites, the characteristics of the other 10% (to be disposed of in open water) should be addressed.

In addition, if there are no Section 404 implications from dredged materials, this office is in agreement with the statement and believes that there will be no long-term effects on water quality.

In view of the foregoing, we have rated LO (lack of objection) to the impact of the action and 2 (insufficient information) to the Impact Statement.

We would appreciate receiving five copies of the final environmental impact statement, and if we can be of further assistance, please let us know.

Sincerely,

David R. Hopkins

David R. Hopkins
Chief, EIS Branch

I - 1

United States Department of the Interior

OFFICE OF THE SECRETARY

Southeast Region / 148 Cain St., N.E. / Atlanta, Ga. 30303

ER-75/714

SEP 15 1975

District Engineer
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36601

Dear Sir:

As requested in your July 18, 1975, letter to the Assistant Secretary, Program Policy, we have reviewed the draft environmental statement for Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance) Houston County, Alabama; Gadsden, Jackson Counties, Florida; and Seminole and Decatur Counties, Georgia, for project effects on national park areas and historic sites, outdoor recreation, hydrology, geology, mineral, and fish and wildlife resources.

We offer the following comments for your consideration:

General Comments

The statement adequately describes the mineral resources of the project area, but is inadequate in some aspects of its discussion of fish and wildlife and outdoor recreation resources. It is impossible to segregate this project from the downstream portions of the Apalachicola River. Therefore, the environmental impact statement should be expanded to encompass the project's impact on downstream navigation, river water levels, and biotic resources including the flood plain forest community.

Specific Comments

Page 22, paragraph 2.47

Since the plan for the management of Lake Seminole's fish and wildlife resources could have a pronounced effect on the environment, it should be included in this statement or added as a supplement.

Page 24, paragraph 2.51

Excellent striped bass fishing may have occurred in the past, however, it is questionable whether the "excellent" fishery still exists. A

recent survey by Fish and Wildlife Service biologists indicated a reduction in the number of striped bass caught, as well as the number of fishermen who fish for this species.

Reference should be made to the Atlantic sturgeon fishery which formerly existed in the tail waters. The white bass fishery which presently exists in the tail waters should be mentioned.

Page 37, paragraph 2.86

The statement " . . . water level fluctuations are more destructive of fish and food organisms than are pesticides or any other toxic substances." should be further explained and documented as to how this was determined. The same idea is expressed on page 45, paragraph 4.18.

Environmental Impact of the Proposed Action

Several comments were made concerning the effect of water level fluctuation on recreation and fishery resources. In order that the reader better understand the problem, it is suggested that a comparison be made of the amount of exposed bottom occurring at normal reservoir elevation (77.0 m.s.l.), the minimum reservoir elevation (76.5 m.s.l.), and at lower elevations.

The impact of the continued operation of the project on the anadromous fish population should be reviewed.

Page 43, paragraph 4.11

The cumulative effects of the use of herbicides should be discussed. The effects that weed control has on the buildup of detritus on the bottom substrate and its associated effects on fish spawning activities should be discussed.

Page 44, paragraph 4.14

The environmental effects of continually using Malathion as an insecticide should be reviewed.

Page 45, paragraph 4.19

This paragraph should be expanded to clearly state what effect increased barge traffic and industrialization has had on recreational use of the lake and tail water.

Page 46, paragraph 4.25

The effects of spoil disposal are not adequately addressed. The effects of erosion of land based disposal sites and subsequent sedimentation in river channels as well as overboard spoiling should be assessed.

Page 47, paragraph 4.27

The environmental effects of snagging should be expanded beyond the point of stating "fishermen contend" and "recreational users insist," since sufficient documentation is available which confirms the value of streamside stumps, fallen trees, logs, and other nonliving cover.

Page 47, paragraph 4.28

Since "No flood control protection is provided by Lake Seminole . . . " and " . . . no flood protection is received by areas below Jim Woodruff L&D . . . " flood proofing of structures in those areas including recreational sites should be discussed.

Page 49, paragraph 5.10

It is noted near the end of the statement that "As of 8 August 1974, 66 persons had lost their lives by drowning in Lake Seminole." No further discussion has been provided on causes or possible preventive actions. It is uncertain whether the coverage of 10,000 acres of lake surface by aquatic vegetation is a major causative factor, or whether the presence of snags and submerged limestone caverns are contributory factors. Since the loss of lives has averaged almost four annually over a period of about 17 years, yet the lake has an average depth of only 9.8 feet, this appears to be a significant impact that merits some consideration of preventive measures.

Pages 49 and 50, Alternatives to the Proposed Action

Increased water storage should be considered as a viable alternative. This alternative would allow greater water-level fluctuation which is a recognized method of weed control, while at the same time providing more water for downstream flow augmentation which could possibly eliminate the need for an additional lock and dam on the Apalachicola River. The effects of this mode of operation on recreational use of the lake should also be discussed.

Sincerely yours,

June Whelan

(Miss) June Whelan
Special Assistant to the Secretary
Southeast Region

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

October 1, 1975

Mr. Lawrence R. Green
Mobile District, Corps of Engineers
Department of the Army
Post Office Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

The draft environmental impact statement "Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida, and Georgia, Operation and Maintenance", which accompanied your letter of July 18, 1975, has been received by the Department of Commerce for review and comment. The statement has been reviewed and the following comments are offered for your consideration.

General Comment:

The adverse impact on anadromous fish by the project's operation and maintenance is not adequately covered. Alternatives such as using the lock to pass fish, construction of fish by-pass structures, and construction of fish hatcheries to mitigate the loss of spawning habitat should be discussed.

Specific Comments:

Environmental Setting of the Project

Page 21, paragraph 2.44

The statement, "Fish populations in the project area have increased substantially due to the impoundment," should be documented. In fact, recent studies indicate that the impoundment is the probable cause of reduced

anadromous fish populations (Cox and Auth, 1970-73; Livingston and Thompson, 1975; and Mills, 1972).

Page 22, paragraph 2.47

The Corps' formulation plan for management of Lake Seminole's fish and wildlife resources should be described, including any plans for mitigation of anadromous fish losses.

Page 24, paragraph 2.51

We disagree with the implication that an abundant striped bass fishery exists in the tailwater below the dam (see Cox et al, 1970-73, and Livingston et al, 1975). The current reduction in populations of Apalachicola striped bass, Atlantic sturgeon, and Alabama shad in the tailwater below the dam should be included when describing this fishery (Cox and Auth, 1970-73; Livingston and Thompson, 1975; and Mills, 1972).

Page 28, paragraph 2.66

This section should contrast recent reports on poor water quality below the dam with Corps data reports which show only good water quality. For example, Cox and Auth (1970-71; 1972-73) reported low dissolved oxygen values in the immediate area downstream from Lake Seminole which they attributed to industrial pollution sources in Alabama and Georgia. Other studies confirmed these findings but showed that dissolved oxygen values progressively increased downstream and that pesticide levels are also highest immediately below Lake Seminole but progressively decreased downstream (Livingston and Thompson, 1975).

The Environmental Impact of the Proposed Action

Page 42, paragraph 4.04

The Jim Woodruff dam was constructed without an anadromous fish by-pass structure which eliminated 265 miles of historic river spawning habitat (U.S. Study Commission Southeast River Basins, 1963). In view of the current studies previously listed in this letter, we suggest this section be revised to indicate that the project has reduced anadromous fish populations by eliminating approximately 265 miles of historic river spawning habitat. The importance of this reduction should be considered when assessing the value of current tailwater fishing.

3.

Alternatives to the Proposed Action

Page 49-50

This section should indicate that the loss of 265 miles of anadromous fish spawning habitat need not be an irreversible loss caused by the project, since several alternates are available through Corps funding and Anadromous Fish Conservation Act funding to mitigate this reduction. It may be feasible to pass anadromous fish through the existing lock. This has been demonstrated in North Carolina (Nichols and Louder, 1970). It is possible to construct a fish passing elevator or ladder (Rizzo, 1975). In addition, a hatchery could be built on the site to insure propagation of reduced anadromous fish populations. This section should thoroughly discuss all these alternatives.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure
Literature Cited

Literature Cited

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SOUTHERN REGION
P. O. BOX 20636
ATLANTA, GEORGIA 30320

July 23, 1975

Mr. Lawrence R. Green
Chief, Planning Division
Department of the Army
Mobile District, Corps of Engineers
P. O. Box 2288
Mobile, Alabama 36628

Dear Mr. Green:

We have reviewed the Draft Environmental Statements listed below with respect to potential environmental impact for which this agency has expertise:

1. Proposed flood control work on Gordons Creek, Forrest County, Hattiesburg, Mississippi

2. Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance), Alabama, Florida, and Georgia.

Our review of the data presented indicates there will be no significant adverse effects to the existing or planned air transportation system as a result of these projects.

Sincerely,

for BENNY C. FRAZIER
Chief, Planning and Appraisal Staff

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

15 SEP 1975

Mr. Lawrence R. Green
Chief, Planning Division
Mobile District, Corps of Engineers
P. O. Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

This is in response to your letter of 18 July 1975 addressed to Capt. William R. Riedel concerning a draft environmental impact statement for Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance), Alabama, Florida, and Georgia.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

The opportunity to review this draft statement is appreciated.

Sincerely,

D. J. RILEY
Captain, U. S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems
By direction of the Commandant

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 311, Auburn, AL 36830

August 29, 1975

Mr. Lawrence R. Green
Chief, Planning Division
Corps of Engineers
P. O. Box 2288
Mobile, AL 36601

Dear Mr. Green:

We have reviewed the draft environmental impact statement for Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida, and Georgia (Operation and Maintenance). We feel this draft document is adequate and have no comments to offer.

Sincerely,

J. H. Dent

W. B. Lingle ACTING
State Conservationist

cc:
R. M. Davis, Administrator, Washington, D. C.
F. G. Maxwell, Washington, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
State Office, P. O. Box 1208, Gainesville, FL 32602

September 10, 1975

District Engineer
U. S. Army Engineer District
P. O. Box 2288
Mobile, AL 36628

Dear Sir:

RE: Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida and Georgia; Operation and Maintenance

We have reviewed the subject draft environmental impact statement and believe all impacts have been adequately addressed. It appears to be a matter of operation and maintenance of a facility that benefits most of the interests in the Lake Seminole region.

We appreciate the opportunity to review this statement.

Sincerely,

William E. Austin
State Conservationist

cc: R. M. Davis
F. G. Maxwell

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 832, Athens, Georgia 30601 Telephone: 404-546-2275

August 12, 1975

Mr. Lawrence R. Green, Chief
Planning Division
Department of the Army
Mobile District, Corps of Engineers
P. O. Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

We have reviewed the Draft Environmental Impact Statement for Lake Seminole and Jim Woodruff Fork and Dam (Operation and Maintenance) Alabama, Florida, and Georgia.

We have no comments to offer other than to express appreciation for the opportunity to review the statement.

Sincerely,

Dwight M. Treadway, Acting
Charles W. Bartlett
State Conservationist

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
BIRMINGHAM AREA OFFICE
DANIEL BUILDING, 15 SOUTH 20TH. STREET, BIRMINGHAM, ALABAMA 35233

July 28, 1975

REGION IV
Peachtree-Seventh Building
50 Seventh Street, N.E.
Atlanta, Georgia 30323

IN REPLY REFER TO:

Mr. Lawrence R. Green
Chairman, Planning Division
Mobile District
Corp of Engineers
P.O. Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

Subject: Draft Environmental Impact Statement
Lake Seminole, Jim Woodruff Lock & Dam
HUD Contract #271

We are pleased to acknowledge receipt of the above referenced request for HUD comment under the requirements of the National Environmental Policy Act of 1969 (Public Law 91-109.)

We have reviewed the information submitted with your referral and, to the extent of our available staff resources, have investigated the environmental impact, adverse effects, alternatives, short-term and long-term uses of the local environment and the commitment of resources which the project involves. From the information available to us, we found no basis for formal comment because of special HUD interest or expertise.

However, we would call your attention to the areas indicated on the attached "HUD Comments on Draft Environmental Impact Statement" which we feel would assist your agency in the evaluation and execution of this project.

If further clarification of our review be deemed necessary, please contact me at 254-1619.

Sincerely,

Robert E. Lunsford
Environmental Officer

Attachment

271

DHUD COMMENTS ON DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Project Identification:

DEPT. OF THE ARMY

Project Location:

LAKE SEMINOLE - JIM WOODRUFF
LOCK & DAM - ALA, FLA AND GEORGIA

The following includes the general caveats and remarks which we feel should be brought to the attention of any State, local or Federal agency which has requested DHUD review of and comment on a draft Environmental Statement under the Environmental Policy Act of 1969 and the CEQ Guidelines. We have checked those comments which seem to be particularly applicable to the draft statement identified above; however the letter of transmittal will amplify these general comments if appropriate.

COMMENTS

☐ Inasmuch as HUD has no direct program involvement in Historic sites or structures effected by the subject project, we defer to the Advisory Council on Historic Preservation with respect to Historic Preservation matters.

☐ HUD has direct program involvement in the Historic Preservation aspects of the proposed project and appropriate comment is included in the transmittal letter.

☐ The subject project effects an urban park or recreational area and appropriate comment is included in the transmittal letter.

☐ The subject project effects only rural parks and recreational areas and HUD therefore defers to the Forest Service of the Department of Agriculture, the Bureau of Outdoor Recreation, Bureau of Land Management, National Park Service and the Bureau of Sports Fisheries and Wildlife with respect to comments on the Parks, Forests and Recreational effects thereof.

☐ This project will probably involve a statutorily required HUD review under Section 4(f) of the Transportation Act of 1966. Therefore, we defer comment on the parks and recreational aspects of the project pending request by D.O.T. for such a review.

☐ This review covers the HUD responsibilities under Section 4(f) of the Transportation Act of 1966.

☐ The Draft Environmental Statement fails to reflect clearance or consultation with the appropriate local planning agency which is: _____.

☐ The Draft Environmental Statement fails to reflect consultation or clearance with the appropriate areawide planning agency which is: _____.

☒ The Draft Environmental Statement fails to reflect consultation or clearance with the appropriate State Clearinghouse as required by Circular A-95, Office of Management and Budget. The A-95 Clearinghouse of jurisdiction is: SOUTHEAST ALA REGIONAL PLANNING & DEVELOPMENT COMMISSION, DOTHAN. CADO IS OK.

☐ The project apparently requires the displacement of businesses or residences. The Draft Environmental Statement does not reveal full consideration of the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646). If relocation assistance is desired, please contact Mr. Bob ~~Lunsford~~ HAND, ~~Director~~, Operations Div., Daniel Bldg., 15 So. 20th Street, Birmingham, Ala. at 205-~~323-2691~~. In the local community the person or office most familiar with relocation resources is: _____.

☐ The draft statement does not discuss apparently feasible alternatives which may have a more beneficial effect on the urban environment. See letter of transmittal for possibly overlooked alternatives.

☒ In general, HUD defers to other agencies with respect to establishing and enforcing air and water quality standards, thermal pollution standards, radiation and general safety standards. We have no formal jurisdiction over such matters and no comments contained herein should be construed as assuming such responsibility or jurisdiction.

☐ Since this project raises issues involving radiation safety, we recommend consultation with: Dr. Joseph Lieberman, Radiation Office, E.P.A., 5600 Fishers Lane, Parklawn Building, Rockville, Maryland 20852.

☐ We recommend that you write or call the Office of Management and Budget for a copy of "Directory of State, Metropolitan and Regional Clearinghouses under B.O.B. Circular A-95," and consult with such clearinghouses as appropriate.

7-23-75
DATE

John Rowe
PREPARED BY
(FIELD REPRESENTATIVE)

7/23/75
DATE

William S Edmundson
CONCURRED IN
(PROGRAM MANAGER)

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
PERSHING POINT PLAZA, 1371 PEACHTREE STREET, N.E.
ATLANTA, GEORGIA 30309

September 18, 1975

REGION IV

IN REPLY REFER TO:

4C

Mr. Larry R. Green
Chief, Planning Division
Department of the Army
Mobile District, Corps of Engineers
Post Office Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

Subject: Draft Environmental Impact Statement
Lake Seminole and Jim Woodruff Lock and Dam
Georgia, Alabama and Florida

In accordance with your request, we have reviewed the subject document and find the action acceptable to the Department.

The proposal to continue operations and maintenance of the facility that was essentially completed in 1957 will not result in an adverse effect on any of those areas of environmental impact which HUD has a responsibility to comment on. From a program standpoint, therefore, we are in support of the action since it contributes to industrial development, community utility and regional recreational potential.

As noted in Section 4.28, the reservoir provides no flood control protection and, therefore, has neither a beneficial nor adverse effect on the flood prone communities in the area. The action will, therefore, not have an effect on the application of the National Flood Insurance Program on those communities.

Please send us a copy of the Final Environmental Impact Statement when it is issued.

Sincerely,

for E. Lamar Seals
Regional Administrator

I-18

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
ATLANTA AREA OFFICE
PEACHTREE CENTER BUILDING, 230 PEACHTREE STREET, N.W.
ATLANTA, GEORGIA 30303

REGION IV
Pershing Point Plaza
1371 Peachtree Street, N.E.
Atlanta, Georgia 30309

September 15, 1975

IN REPLY REFER TO:
4.1SS

Mr. Lawrence R. Green
Chief, Planning Division
Department of the Army
Mobile District, Corps of Engineers
Post Office Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

Subject: Operation and Maintenance
Lake Seminole and Jim Woodruff
Lock and Dam
Alabama, Florida and Georgia

We have reviewed the Draft Environmental Impact Statement on the above captioned project and have no objection to the proposed action.

In general, HUD defers to other agencies with respect to establishing and enforcing air and water quality standards, ecological conservation measures and archaeological and historical preservation efforts. Since we have no formal jurisdiction in these areas, the absence of comments on the validity of such matters contained in your draft statement should not be construed as concurrence or approval.

Thank you for giving us an opportunity to review your Draft Environmental Impact Statement. Although we did not offer any comments on your statement, we would appreciate receiving a copy of the final statement when it is published.

Sincerely,

W. A. Hartman
Area Director

FEDERAL POWER COMMISSION
REGIONAL OFFICE
730 Peachtree Building
Atlanta, Georgia 30308
September 15, 1975

District Engineer
Corps of Engineers
Department of the Army
Post Office Box 2288
Mobile, Alabama 36601

Dear Sir:

This is in response to your letter of July 18, 1975, file SAMPD-EE, and enclosure requesting our review and comments on the Draft Environmental Statement for the continued operation and maintenance of the Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida, and Georgia.

Staff comments relate to the role of expertise of the Federal Power Commission under the National Environmental Policy Act of 1969, and the Guidelines for the President's Council on Environmental Quality, dated April 23, 1971, and are directed to the potential impact of proposals on matters of concern and responsibility to the Commission. Such responsibilities and concerns relate to the development of hydroelectric power and assurance of reliability and adequacy of electric service under the Federal Power Act, and the construction and operation on natural gas pipelines under the Natural Gas Act.

We have reviewed the Draft Environmental Impact Statement for the Jim Woodruff Lock and Dam and make the following comments in regard to the Environmental Statement:

6.01 Alternative to the Proposed Action. Discontinuance of operation and maintenance of the facilities, with the existing structures remaining in place, would have other environmental effects besides those on the immediate project area. This section should stress the same environmental effects as those stated under Section 6.02, the replacement of a power source forgone by other sources with inherent environmental problems. This would also be true for the alternative under Section 6.03.

The following are suggested for inclusion in the section on alternatives to the proposed action:

6.04 Modification of the operation and maintenance program by increasing, decreasing, deleting, or otherwise changing the existing programs. Consideration and discussion should be given to the possibility of increasing power production at the plant if the potential for adding additional conventional units or pump-turbine units does exist.

6.05 Alternative conventional and pumped-storage project schemes should be discussed. This would be another alternative means of supplying the power output with short-term environmental impacts.

In summary, it does not appear that continued operation and maintenance of the Lake Seminole and Jim Woodruff Lock and Dam would have any adverse effect on matters of concern and responsibility to the Commission. However, any consideration of discontinuance of hydroelectric power production at the existing project would have an adverse impact on the electric power industry at a time when power demand is increasing and energy resources are critical.

The opportunity to review this material is appreciated.

Very truly yours,

C. L. Fishburne

C. L. Fishburne
Regional Engineer

2cc: Div. Engr.
Atlanta, Ga.

STATE OF ALABAMA

ALABAMA DEVELOPMENT OFFICE

George C Wallace | [illegible] | W M [illegible]

October 14, 1975

TO: Mr. Lawrence R. Green
Chief, Planning Division
Mobile District, Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36601

FROM: Michael R. Amos
State Clearinghouse
State Planning Division

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT

Applicant: Corps of Engineers, Mobile District

Project: Draft Environmental Impact Statement for Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance) Alabama, Florida, and Georgia

State Clearinghouse Control Number: ADO-016-75

The Draft Environmental Impact Statement for the above project has been reviewed by the appropriate State agencies in accordance with Office of Management and Budget Circular A-95, Revised.

The Environmental Impact Statement on this project appears to be in order. No comments are offered.

Please contact us if we may be of further assistance. Correspondence regarding this proposal should refer to the assigned Clearinghouse Number.

A-95/06

Agencies contacted for comment:
Conservation and Natural Resources
Coastal Zone Management
Environmental Health Administration
Southeast Alabama Regional Planning & Development Commission
ADO - Bill Wallace

AMERICAN REVOLUTION BICENTENNIAL

I-22

SOUTHEAST ALABAMA REGIONAL PLANNING & DEVELOPMENT COMMISSION

P. O. BOX 1406 DOTHAN, ALABAMA 36301 TELEPHONE 794-4093

August 11, 1975

TO:

RBOUR

TO: Mr. Lawrence R. Green
Chief, Planning Division
Mobile District, Corps of Engineers
P. O. Box 2288
FFEE Mobile, Alabama 36601

FROM: Donald D. Johnson Donald D. Johnson
Projects Coordinator
Regional Clearinghouse

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT

IVINGTON Applicant: Corps of Engineers, Mobile District

Project: Draft Environmental Impact Statement for Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance) Alabama, Florida, and Georgia

State Clearinghouse Control Number: ADO_016-75

LE

The Draft Environmental Impact Statement for the above project has been reviewed by the appropriate Regional agencies in accordance with Office of Management and Budget Circular A-95, Revised.

The comments received from the reviewing agencies are attached.

NEVA

Please contact us if we may be of further assistance. Correspondence regarding this proposal should refer to the assigned Clearinghouse Number.

cc: Alabama Development Office

NRY

JSTON

I-23

SEARPDC Staff A-95 Review Comments
Corps of Engineers Draft Environmental Impact Statement
for Lake Seminole and Jim Woodruff Lock & Dam
August 4, 1975

The proposed work analyzed in the environmental statement consists of the operation and maintenance of the powerhouse, lock, dam, and reservoir, including associated buildings, water quality monitors, access roads, public use areas, and boat channels. The construction of new recreational areas is also covered.

The statement appears to be in order; no further comment seems necessary.

The Florida Department of Administration

DIVISION OF STATE PLANNING

620 SOUTH MERIDIAN STREET (BRYANT BUILDING), TALLAHASSEE, FLORIDA 32304 • TELEPHONE (904) 488-2371

BUREAU OF INTERGOVERNMENTAL RELATIONS

Reubin O'D. Askew
GOVERNOR

Lt. Gov. J. H. "Jim" Williams
SECRETARY OF ADMINISTRATION

hittle, Jr.
DIRECTOR

September 29, 1975

Mr. Laurence R. Green
Chief, Planning Division
Department of the Army Corps
of Engineers
P. O. Box 2288
Mobile, Alabama 36628

Dear Mr. Green:

Functioning as the State planning and development clearinghouse contemplated in U. S. Office of Management and Budget Circular A-95, we have reviewed the following draft environmental impact statement:

> Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida and Georgia, Operation and Maintenance. SAI 76-0135F

During our review we referred the environmental impact statement to the following agencies, which we identified as interested: Department of Administration, Bureau of Land and Water Management; Department of Agriculture and Consumer Services; Department of Commerce; Department of Environmental Regulations; Department of Natural Resources; Department of State; Department of Transportation; Game and Fresh Water Fish Commission; Public Service Commission; and the Northwest Florida Water Management District. Agencies were requested to review the statement and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from the Department of Administration, Bureau of Land and Water Management; Department of Commerce; Department of Environmental Regulations; Department of Natural Resources; Department of State; Department of Transportation; Game and Fresh Water Fish Commission; Public Service Commission; and the Northwest Florida Water Management District. The Department of Agriculture and Consumer Services, Division of Forestry reported by telephone no adverse comment.

We have reviewed this statement and the review comments thereon. We find that in order to undertake a complete analysis of the dam's impact on the river system, additional data is required. We specifically suggest that scientific data and analysis be developed concerning nutrient movement, impact of pesticides, and sedimentation.

In accordance with the Council on Environmental Quality guidelines concerning statement on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U. S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement.

We request that you forward us copies of the final environmental impact statement prepared on this project.

Sincerely,

Ed Maroney

E. E. Maroney, Chief
Bureau of Intergovernmental Relations

EEM/Ccm

Attachments

cc: Mr. John Bethea
Mr. Charles Blair
Mr. Harold E. Jones
Mr. T. Mabry Ervin
Mr. J. Landers
Mr. W. N. Lofroos
Mr. Harmon Shields
Mr. E. J. Trombetta
Mr. H. E. Wallace
Mr. Robert Williams
Mr. Calvin A. Winter
Mr. Walter Kolb

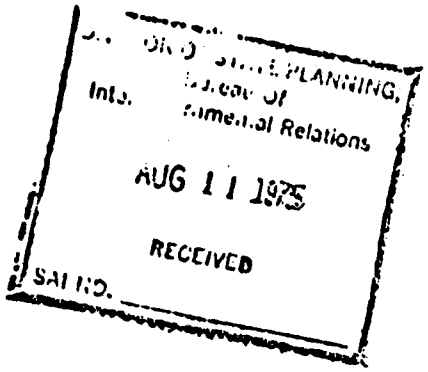
Department of Administration
Division of State Planning
660 Apalachee Parkway · IBM Building
TALLAHASSEE
32304
(904) 488-4925

Reubin O'D. Askew
GOVERNOR

arl M. Starnes
TE PLANNING DIRECTOR

Lt. Gov. J. H. "Jim" Williams
SECRETARY OF ADMINISTRATION

August 8, 1975



Mr. Ed Maroney
Chief
Bureau of Intergovernmental Relations
Division of State Planning
Bryant Building
Tallahassee, Florida 32304

RE: SAI 76-035E

Dear Mr. Maroney:

The Draft Environmental Statement, Lake Seminole and Jim Woodruff Lock and Dam (Operation and Maintenance), Alabama, Florida and Georgia, which is being circulated for comment, has been reviewed by the Bureau of Land and Water Management. Pertinent comments are transmitted so they will reach the Mobile District, Corps of Engineers by September 16, 1975, as requested.

The Bureau is interested that the operation and maintenance of this project equitably accomplish its multi-purposes for all the states. Allocation of water storage for the purpose of initiating flood control protection into a fore-ground function of the Jim Woodruff Lock and Dam project should be seriously investigated and discussed in the final impact statement. Actually, by allocating small amounts of storage space throughout the upriver (Chattahoochee and Flint) systems the cumulative effect in Florida could be significant. The additional storage could serve a double function if the water was released during low flow periods to augment navigation below the project.

Serious consideration should be given to the intensity of effect that the present Jim Woodruff Lock and Dam operations have on the flow regime in the Apalachicola River and what minimum release is necessary to sustain the authorized channel depths in the waterway downriver from this project. In this manner, navigation could be assisted for all three states. Also the final impact statement should evaluate water quality and quantity effects on the downriver reaches which result from the present operations of Jim Woodruff Dam, in particular, the impact upon the Apalachicola Bay and associated marine species.

Thank you for the opportunity to review this draft document and please contact Jim McNeal at 488-4925 if additional attention is necessary.

Sincerely,

Eastern W. Tin
Chief, Bureau of Land
and Water Management

EWT/JMc/ms

cc: Mr. Walter Kolb
Mr. Lawrence Green

FLORIDA GAME AND FRESH WATER FISH COMMISSION

Farris Bryant Building
620 South Meridian Street
Tallahassee, Florida 32304
September 10, 1975

Mr. E. E. Maroney, Chief
Bureau of Intergovernmental Relations
Department of Administration
620 South Meridian Street
Tallahassee, Florida 32304

Re: SAI 76-0135, Draft Environmental Impact Statement
Lake Seminole & Jim
Woodruff Lock and Dam

Dear Mr. Maroney:

The Bureau of Environmental Protection of the Florida Game and Fresh Water Fish Commission has reviewed the above mentioned draft environmental impact statement and offers the following comments in keeping with our concern and jurisdiction over the fish and wildlife resources of the state. It is assumed that the purpose is for the continued maintenance and operation of the Jim Woodruff Lock and Dam and Lake Seminole.

Throughout the report, reference is made to the chronic aquatic weed problems associated with this reservoir. Weed control alternatives are also discussed including herbicide application, mechanical removal and water level manipulation. Although none of these alternatives can be considered as permanent solutions to the weed problem, we feel the latter alternative, that of water level manipulation, has merit and that its feasibility should be more thoroughly investigated. Ample documentation exists to indicate that "drawdowns" of impoundments are beneficial, not only for weed control, but also for game fish and migratory waterfowl populations.

Statements such as the last sentence of paragraph 2.86 ("Lake Seminole water level fluctuations are more destructive to fish and fish food organisms than are pesticides or other toxic substances.") are unfounded when considered in terms of long range management. Although it is true that fish habitat and certain numbers of fish will be temporarily eliminated by water level drawdown, the process is an often used, sound management tool for fresh water lakes. Short term lowering of water levels temporarily reverses the eutrophication trend, an inherent problem of Lake Seminole, while simultaneously retarding the growth of aquatic weeds. Refilling of the impoundment traditionally sparks a dramatic growth surge of game fish and the organsims which sustain these species as well as an increase in the utility value of the impoundment to migratory waterfowl.

Meanwhile, the aquatic weed population is temporarily reduced and possibly replaced by an earlier level of succession. Although the lake's biota can be expected to eventually return to current conditions, there will be a time lag in which fishing success can be expected to increase while the weed and insect problems show a significant decrease. If herbicides are used as sole agents for eliminating aquatic weeds, the corresponding reduction in dissolved oxygen (DO) levels associated with oxidizing vegetative matter could seriously reduce the game fish which are less tolerant to such conditions.

None of these measures, however, can be expected to approach a permanent solution to maintaining the health of Lake Seminole. The physical profile of this lake is similar to most impoundments in this region in which shallow water, ample sunlight and ample nutrient supply insure irruptive vegetative conditions. The lake, of course, is not a closed ecological system. It is a recipient of feeder streams draining Georgia and Alabama, and it is the source of the Apalachicola River. As such, we feel any environmental impact statement dealing with a system component (such as Lake Seminole) should also address the overall system. For example, studies conducted by this agency on the Apalachicola River indicate the river is suffering, perhaps more than the lake itself, due to the lake's various problems associated with eutrophication.

Although the photosynthetic activities associated with the lake's aquatic vegetation (including phytoplankton) maintains high DO levels in the upper strata of Lake Seminole, the constant supply of decaying vegetative matter which moves through the lock and dam and into the river removes much of the available DO through the process of oxidation. Such conditions pose potentially serious problems to the riverine ecological system. Traditionally, the DO levels of the Apalachicola River were probably greatly enhanced by aeration as a result of turbulence created by shoals and snags within the fast moving river. The removal of most of these through navigation improvement activities seemingly has placed much of the burden of maintaining DO levels on riverine aquatic plant growth. If this is a reasonable assumption, and given the less-than-optimum vegetation propagative qualities of the river due to high silt load and fast current, the effects on riverine biota must also be considered when evaluating weed control techniques in Lake Seminole or any other management alternatives.

This agency continues to be interested and concerned with the management and operation of Lake Seminole and Jim Woodruff Lock and Dam as well as the general condition of the lake and the river. If we can be of any further assistance in these matters, please feel free to contact us.

Sincerely,

H. E. Wallace
Deputy Director

HEW/JRM/ra

State of Florida

DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE MEMORANDUM

August 28, 1975

TO : Jim Smith

FROM: Paul Darst

SUBJ: SAI 76-0135E

The EIS discusses the adverse impacts of a reservoir. Though the outdoor recreation opportunities offered by reservoirs are well known, their problems are not. Nevertheless, the problems are serious and difficult to solve. This fact, coupled with the low need in most of Florida for the kinds of recreation offered by reservoirs, accounts for this Division's generally unsympathetic attitude toward new reservoir construction. Lake Seminole, of course, is already built, and there apparently are few options available for management.

We offer these specific comments:

(1) Conversation with other agencies indicates the need for a program of monitoring and reporting environmental parameters in Lake Seminole.

(2) Page 32 of the EIS states that there are four Florida state parks within a 75 mile radius of Lake Seminole. There are eighteen recreational areas managed by this Division within a 75 mile radius of Lake Seminole.

RPD/shc

Department of Administration
Division of State Planning
660 Apalachee Parkway - IBM Building
TALLAHASSEE
32304
(904) 488-2371

Reubin O'D. Askew
GOVERNOR

Lt. Gov. J. H. "Jim" Williams
SECRETARY OF ADMINISTRATION

M. Starnes
PLANNING DIRECTOR

TO: Mr. Harmon Shields, Ex. Dir.
Department of Natural Resources
Crown Building
Tallahassee, Florida 32304

DATE: AUG 6 1975

DUE DATE: AUG 20 1975

9/8

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 76-0135E

Please review and comment to us on the above draft environmental impact statement, copy attached. In reviewing the statement, you should consider possible effects that actions contemplated could have on matters of concern to your agency.

If you feel that a conference is needed for discussion of the project or resolution of conflicts, or if you have questions concerning the statement, please call Mr. Walt Kolb at (904) 488-2401. Please check the appropriate box below, attach any comments on your agency's stationery and return to BIGR or telephone "no adverse comments" by the above due date.

On that date, we intend to consider all review comments received and develop a state position on the project. In both telephone and written correspondence please refer to the above SAI number.

Sincerely,

Ed Mooney
Chief
Bureau of Intergovernmental Relations

Enclosure

****

TO: Bureau of Intergovernmental Relations

FROM: James G. Smith

SUBJECT: DEIS Review and Comments

No Comments

X Comments Attached

Reviewing Agency: Department of Natural Resources

Signature: James G. Smith I-32

Date: 9/2/75

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
2562 EXECUTIVE CENTER CIRCLE, EAST
MONTGOMERY BUILDING
TALLAHASSEE, FLORIDA 32301

REUBIN O'D. ASKEW
GOVERNOR

JOSEPH W. LANDERS, JR.
SECRETARY

August 21, 1975

Mr. E. E. Maroney
Bureau of Intergovernmental Relations
Department of Administration
Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32301

RE: SAI: 76-0135 Draft Environmental Statement, Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida and Georgia, Operation and Maintenance

Dear Mr. Maroney:

The Department of Environmental Regulation has reviewed the above referenced "draft environmental statement".

The statement refers to degredation of water quality of Lake Seminole resulting from its function as a "trap" for discharged and runoff wastes of nutrients from the watershed and biological monitoring records confirm degredation of Lake Seminole water quality.

The Department recognizes the need of the project and the public benefit operation of Lake Seminole should be balanced against the adverse effects of this operation. For example "desnagging"operations to remove tree trunks as navigational hazzards should be confined to bouyed navigational channels since wooded areas were purposely left as fish attractants in the fishery management program.

Sincerely,

Robert L. Lulofs

RLL/lh

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
2562 EXECUTIVE CENTER CIRCLE, EAST
MONTGOMERY BUILDING
TALLAHASSEE, FLORIDA 32301

N O'D. ASKEW
OVERNOR

JOSEPH W. LANDERS, JR.
SECRETARY

September 19, 1975

Mr. E. E. Maroney, Chief
Bureau of Intergovernmental Relations
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

Dear Mr. Maroney:

Department of the Army, Mobile District Corps of Engineers, Draft Environmental Impact Statement, Operation and Maintenance of Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida and Georgia. SAI Project Number 76-135

The Department of Environmental Regulation has reviewed the draft environmental impact statement prepared by the Corps of Engineers for the operation and maintenance of Lake Seminole and the Jim Woodruff Lock and Dam. The following comments are submitted:

1. Desnagging operations to remove tree trunks and navigational hazards should be confined to buoyed navigational channels since wooded areas were purposely left as fish attractants in the fishery management program.

2. The statement refers to degradation of water quality of Lake Seminole as a result of its function as a trap for discharged and runoff wastes of nutrients from the watershed. Monitoring records confirm degradation of Lake Seminole water quality, particularly below the dam. Extensive investigation into the probable causes of this degradation should be undertaken in order that good water quality can be maintained in the long term. We recommend the Corps of Engineers take the funding of such a study as part of the overall management program of the lake and dam. Such a study should be a continuing program with periodic environmental review by state and local agencies.

3. This department is responsible for water management programs within the State of Florida. The Apalachicola River downstream of the lock and dam is an integral part of the overall water management program for Northwest Florida. Coordination with this department and its plans and programs is a very important element which the Corps of Engineers should incorporate in any environmental assessment of a maintenance and operations program. We would be pleased to participate in a coordinated effort toward resolving the many water management and water quality problems which can result from any specific course of action with regard to the operation and maintenance of this facility.

4. This department is aware of several other studies which are being conducted on Lake Seminole and the Apalachicola River. We recommend the Corps of Engineers coordinate all proposed activities with the principals involved in these studies so that maximum assessment of this project can be obtained.

We appreciate the opportunity to review this draft statement and would like to review the final statement when completed.

Sincerely,

Dan F. Farley, Director
Division of Environmental
Permitting

DFF/rfs

Northwest Florida
Water Management District

SUITE C-135
325 JOHN KNOX ROAD
TALLAHASSEE, FLORIDA 32303

Calvin A. Winter
Executive Director

(904) 488-8281

August 15, 1975

Mr. Ed Maroney, Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

Re: SAI 76-0135, Lake Seminole and Jim Woodruff Lock and Dam

Dear Mr. Maroney:

A review of the subject project has been made and it appears to be compatible with the operation and maintenance plans of the District. However, it should be made clear that the District does not endorse indefinite service and that at some future time a reapplication for operation and maintenance of this facility should be submitted. In addition, if the construction of new recreational areas appears emminent, a copy of the plans or proposals should be submitted to this office for concurrence.

Sincerely,

C.R. Boynton

For: Calvin A. Winter
Executive Director

CAW/rma

cc: Mr. Walt Kolb

I-36

Northwest Florida
Water Management District

SUITE C-135
325 JOHN KNOX ROAD
TALLAHASSEE, FLORIDA 32303

Calvin A. Winter
Executive Director

(904) 488-8281

October 31, 1975

Mr. Ed Maroney, Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

Re: SAI 76-0135E

Dear Mr. Maroney:

A review of comments made by several agencies to the Lake Seminole and Jim Woodruff Lock and Dam Operation and Maintenance draft environmental impact statement was made. The District staff agrees with the comments expressed. In particular, the District supports the Game and Fresh Water Fish Commission comment about water level fluctuations not being destructive to fish, as referenced in their letter.

In addition to the comments expressed in the District letter of August 15, 1975, the following should be added. In cases of extreme drawdown of Lake Seminole, the District should be informed in advance of the drawdown.

If we can be of further assistance, do not hesitate to call on us.

Sincerely,

Calvin A. Winter
Executive Director

CAW/rma

I-37

Division of State Planning
660 Apalachee Parkway · IBM Building
TALLAHASSEE
32304
(904) 488-2371

M. Starnes
ACTING DIRECTOR

Reubin O'D. Askew
GOVERNOR

Lt. Gov. J. H. "Jim" Williams
SECRETARY OF ADMINISTRATION

TO: Public Service Commission
700 South Adams Street
Tallahassee, Florida 32304

DATE: AUG 6 1975

DUE DATE: AUG 20 1975

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 76-0135E

Please review and comment to us on the above draft environmental impact statement, copy attached. In reviewing the statement, you should consider possible effects that actions contemplated could have on matters of concern to your agency.

If you feel that a conference is needed for discussion of the project or resolution of conflicts, or if you have questions concerning the statement, please call Mr. Walt Kolb at (904) 488-2401. Please check the appropriate box below, attach any comments on your agency's stationery and return to BIGR or telephone "no adverse comments" by the above due date.

On that date, we intend to consider all review comments received and develop a state position on the project. In both telephone and written correspondence please refer to the above SAI number.

Sincerely,

Ed Maroney
Chief
Bureau of Intergovernmental Relations

Enclosure

****

TO: Bureau of Intergovernmental Relations

FROM: Florida Public Service Commission

SUBJECT: DEIS Review and Comments

No Comments ✓

Comments Attached

Reviewing Agency:

Signature: Edward C. Jones I-38

Date: Aug 8, 1975

Division of State Planning
660 Apalachee Parkway · 4SM Building
TALLAHASSEE
32304
(904) 488-2371

M. Starnes
ACTING DIRECTOR

Reubin O'D. Askew
GOVERNOR

Lt. Gov. J. H. "Jim" Williams

DATE: AUG 6 1975

TO: Mr. Edward Trombetta, Secretary
Department of Commerce
510 Collins Building
Tallahassee, Florida 32304

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: FG-0135E

Please review and comment to us on the above draft environmental impact statement, copy attached. In reviewing the statement, you should consider possible effects that actions contemplated could have on matters of concern to your agency.

If you feel that a conference is needed for discussion of the project or resolution of conflicts, or if you have questions concerning the statement, please call Mr. Walt Kolb at (904) 488-2401. Please check the appropriate box below, attach any comments on your agency's stationery and return to BIGR or telephone "no adverse comments" by the above due date.

On that date, we intend to consider all review comments received and develop a state position on the project. In both telephone and written correspondence please refer to the above SAI number.

Sincerely,

Ed Maroney

Chief
Bureau of Intergovernmental Relations

Enclosure

****

TO: Bureau of Intergovernmental Relations

FROM: Division of Economic Development

SUBJECT: DEIS Review and Comments

✓ No Comments

Comments Attached

Reviewing Agency: Department of Commerce

Signature: [signature] I-39

Date: 8/8/75

Florida Department of Transportation

Haydon Burns Building, 605 Suwannee Street, Tallahassee, Florida 32304, Telephone (904) 488-8772

REUBIN O'D. ASKEW
GOVERNOR

TOM WEBB, JR.
SECRETARY

August 29, 1975

nc
9/6

Mr. E. E. Maroncy, Chief
Bureau of Intergovernmental Relations
Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32304

Dear Mr. Maroney:

Subject: Draft Environmental Impact Statement
Lake Seminole and Jim Woodruff Lock and Dam
Alabama, Florida, and Georgia
Operation and Maintenance
Mobile District Corps of Engineers

SAI 76-0135

We have reviewed the transportation aspects of the subject statement and have no adverse comments.

We appreciate the opportunity to comment at this early date.

Very truly yours,

RAY G. L'AMOREAUX, DIRECTOR
DIVISION OF PLANNING AND PROGRAMMING

W. N. Lofroos, P. E.
Chief, Bureau of Planning

WNL:RFK:jsb

cc: Messrs. E. W. Lee, W. R. Pitts

STATE OF FLORIDA

Department of State

THE CAPITOL
TALLAHASSEE 32304

BRUCE A. SMATHERS
SECRETARY OF STATE

ROBERT WILLIAMS, DIRECTOR
DIVISION OF ARCHIVES, HISTORY, AND
RECORDS MANAGEMENT
(904) 488-1480

August 11, 1975

IN REPLY REFER TO:

Mr. E. E. Maroney, Chief
Bureau of Intergovernmental Relations
Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32304

Re: SAI 76-0135E; Lake Seminole and Jim Woodruff Lock and Dam, Operation and Maintenance.

Dear Mr. Maroney:

We have reviewed the above draft statement with respect to archaeological, historical and National Register properties and have the following comments.

The statement notes that an archaeological and historical survey of the basin was performed before flooding, and that no sites are listed on the National Register of Historic Places. Site location and assessment data have been published in reports and supplied to the Corps. These should be referred to before additional land clearing or disturbance is begun. Since the impact statement is administrative in nature, and no actual construction or modification is intended, we have no adverse comment.

The opportunity to comment is appreciated.

Sincerely,

Robert Williams
Director

RW/Msh

Office of Planning and Budget

Executive Department

James T. McIntyre, Jr.
Director

GEORGIA STATE CLEARINGHOUSE MEMORANDUM

TO: Mr. Lawrence R. Green, Chief
Planning Division
Department of the Army
Mobile District, Corps of Engineers
Post Office Box 2288
Mobile, Alabama 36601

FROM: Charles H. Badger, Administrator
Georgia State Clearinghouse
Office of Planning and Budget,

DATE: September 30, 1975

SUBJECT: RESULTS OF STATE-LEVEL REVIEW

Applicant: Department of the Army

Project: Draft EIS, Lake Seminole & Jim Woodruff, (Reply SAMPS-EE)

State Clearinghouse Control Number: 75-07-22-02

The State-level review of the above-referenced document has been completed. As a result of the environmental review process, the activity this document was prepared for is recommended for further development with the following recommendations for strengthening the project:

Paragraph 2.12 - The discussion of gravel mining and any related environmental impact from mining operations should be discussed in greater detail due to previous discussions of the subject and requests for thorough impact evaluation prior to any new permits being issued.

Paragraph 2.24 - This paragraph lists impoundments upstream from Lake Seminole as a cause for decreased turbidity in the lake and projects that future impoundments will continue to cause a decrease in turbidity, which may permit aquatic plants to spread into greater areas than now infested. This is not likely, in that future impoundments on the Chattahoochee and Flint Rivers are not probable.

Paragraph 2.77 - The reference to "Chehaw State Park" should be corrected in that the park is now operated by Dougherty County as a local park rather than a unit of the State Park system.

Paragraph 2.86 - The questions of water level fluctuation and relative impacts on the various users of the lake should be taken into greater consideration in the dicussion of alternatives to the current manner of operation of the project.

Paragraph 2.90 - 2.91 - Discussions regarding the difficulty of maintaining adequate channel depth should include an anlaysis of economic justification, needed to cause the necessary time and money to be dedicated to continual maintenance dredging on the river. Based upon such an analysis of the project, a valid discussion could then be made regarding continual expenditures of public funds to maintain adequate channel depths.

Paragraph 4.20 - Statements such as those made here regarding enhancement of sand and gravel operation seem to conclude that operations such as these should be continued. This assumption may not be valid and should not be made prior to completion of the enviornmental impact statement (EIS) on such actions which is being prepared in conjunction with the EIS for operation and maintenance of the existing projects on the Apalachicola, Flint and Chattahoochee rivers.

Paragraph 6.01 - 6.03 - These alternatives to the project should receive much more analysis and consideration than is indicated by the space alloted to them in this document. In addition to the alternatives discussed in this document, the various alternative uses which could possibly be the primary objective of operation of the project should be more seriously analyzed.

The following State agencies have been offered the opportunity to review and comment on this project:

Attorney-General
Assistant Attorney-General, Natural Resources Division
Department of Community Development
Department of Natural Resources, inclusive of
historical and archaeological sections
Department of Transportation
State Waterways Commission
Office of Planning and Budget ,Executive Department

cc: Ray Siewert, DNR
Gary Midkiff, OPB

Enclosure: Review comments prepared by the Southwest Georgia APDC, dated 7/24/75

Date: July 24, 1975

Office of Planning and Budget
Intergovernmental Relations Division
State Clearinghouse
270 Washington Street, S. W.
Atlanta, Georgia 30334

FROM: Name: Carroll Underwood

Title: Projects Officer

Regional Clearinghouse: Southwest Georgia Planning and Development Commission

SUBJECT: PROJECT NOTIFICATION AND REVIEW

Applicant: Mobile Corps of Engineers

Project: Draft, E.S., Lake Seminole and Woodruff Lock and Dam

State Clearinghouse Control Number: 75-07-22-02

Regional Clearinghouse Staff Contact: D.L. Shalmy

The Regional Clearinghouse has reviewed the Summary Notification for the above project.

As a result of the review it has been determined that the proposed project is in accord with regional and local plans, programs and objectives as of this date. You should now complete and file your formal application with the appropriate Federal agency(s). A copy of this form must be attached to your application.

If you have any questions, please contact the clearinghouse staff member named above, who will be pleased to assist you.

Comment:

This project is in conformity with local and areawide plans.

Copy to State Clearinghouse

State of Georgia
BUREAU OF STATE PLANNING AND COMMUNITY AFFAIRS

Form RC-A95-4
(May 70)
SPB-70-4-70

UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

GAINESVILLE, FLORIDA 32601

THE HERBARIUM
DEPARTMENT OF BOTANY
209 ROLFS HALL

8 August 1975

Mr. Lawrence R. Green
Chief, Planning Division
Corps of Engineers
P.O. Box 2288
Mobile, Alabama

re: SAMPD-EE

Dear Mr. Green:

Mr. David Hall has called to my attention your draft environmental statement of the Lake Seminole area, and has pointed out that the source of the data given you calls for a change, as follows:

paragraph 2.20

line 5 change "Institutipn's" to "Institution's"

line 9 change "Dr. David Hall (etc.)" to "Dr. Daniel B. Ward, taxonomist with the Agricultural Experiment Station, University of Florida"

line 26 change "Torreya takifolia" to "Torreya taxifolia"

This is a most interesting and informative document. Thank you for sending us a copy.

Sincerely,

D. B. Ward

Daniel B. Ward
Professor and Curator

I-45

THE UNIVERSITY OF ALABAMA
COLLEGE OF ARTS AND SCIENCES
UNIVERSITY, ALABAMA 35486
PHONE: (205) 348-7774

EOLOGICAL RESEARCH

DRAWER BA

July 28, 1975

Mr. Lawrence R. Green, Chief
Planning Division
Mobile District
U.S. Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36601

Dear Mr. Green:

SUBJECT: Draft Environmental Statement: Lake Seminole and Jim Woodruff Lock and Dam, Alabama, Florida, and Georgia (Operation and Maintenance)

In response of your letter of July 18, 1975, requesting our review and comment on the above project, I would like to make the following comments and recommendations:

1. I could find no mention of any reference to archaeological or historical sites within the specified project area. However, since this statement covers operation and maintenance of an existing project the destruction of archaeological sites may not have been considered.

2. From a maintenance viewpoint, I would recommend an archaeological survey to be conducted along the shore lines of the existing reservoir. Significant archaeological/historical sites recorded should be protected by rip-rap, signs, etc. to protect them against erosion due to lake fluctuation and/or vandalism. Both factors are a constant threat to the destruction of marginal shoreline sites.

3. I noticed that this impact statement covers expansion of new recreational facilities. These specific areas should be investigated for the presence of archaeological sites prior to construction of new facilities.

4. As an ongoing part of the operation and maintenance of this reservoir, I recommend that the operating personnel be aquainted with various state and federal laws protecting historic sites and properties from treasure seekers and vandalism.

I trust this information will be of assistance to you. Should you need additional information, please let me know.

Sincerely,

Carey B. Oakley

Carey B. Oakley, Director
Office of Archaeological Research

I-46

APPENDIX

B

Photo 1. Pine Flatwoods, recently burned. March 6, 2009.

Photo 2. Pine flatwoods, increased oak density. March 6, 2009.

Photo 3. Mixed wetland forest. March 6, 2009.

Photo 4. Freshwater marsh. March 6, 2009.

Photo 5. Shoreline habitat, facing west from existing boat ramp. March 6, 2009.

Photo 6. Existing boat launch. March 6, 2009

APPENDIX

C

[redacted]

From: [redacted]
Sent: Friday, August 12, 2011 10:03 AM
To: [redacted]
Subject: Reynolds Landing

[redacted]

The Service has reviewed the information you provided via email on August 8, 2011, on the proposed Reynolds Landing Development Plan located in Seminole County, GA. Based on the information provided, the proposed action is not expected to significantly impact fish and wildlife resources under the U.S. Fish and Wildlife Service jurisdiction. If you have any questions or need additional information please feel from to contact me at [redacted]

[redacted]
USFWS
West GA Ecological Services Sub Office
P.O. Box 52560
Ft. Benning, GA 31995
[redacted] ax)

APPENDIX

D

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

DAN FORSTER
DIRECTOR

July 12, 2011

[redacted]
Project Scientist
Cardno ENTRIX
2420 Lakeshore Drive, Suite 100
Tallahassee, FL 32312

Subject: Known occurrences of natural communities, plants and animals of highest priority conservation status on or near Reynold's Landing, Seminole County, Georgia

Dear Mr. Dickey:

This is in response to your request of June 16, 2011. According to our records, within a three-mile radius of the project site there are the following Natural Heritage Database occurrences:

GA *Ameiurus serracanthus* (Spotted Bullhead) [HISTORIC] on site in Lake Seminole
Carex decomposita (Cypress-knee Sedge) 0.2 mi. S of site
Cp xeric broadleaf decid.-needleaf ever. forest (Sand Ridge Forest) approx. 2.0 mi. NW of site
US *Drymarchon couperi* (Eastern Indigo Snake) [HISTORIC] approx. 2.5 mi. W of site
Elimia albanyensis (Black-crest Elimia) approx. 2.0 mi. NE of site in Spring Creek
GA *Gopherus polyphemus* (Gopher Tortoise) approx. 2.0 mi. E of site
GA *Gopherus polyphemus* (Gopher Tortoise) approx. 2.0 mi. NE of site
GA *Gopherus polyphemus* (Gopher Tortoise) approx. 2.5 mi. NE of site
GA *Gopherus polyphemus* (Gopher Tortoise) approx. 3.0 mi. E of site
GA *Graptemys barbouri* (Barbour's Map Turtle) approx. 1.0 mi. E of site
GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 1.0 mi. S of site
GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 1.5 mi. S of site
GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 2.5 mi. E of site
US *Hamiota subangulata* (Shinyrayed Pocketbook) [HISTORIC?] approx. 3.0 mi. NE of site
Physostegia leptophylla (Narrowleaf Obedient Plant) approx. 1.0 mi. S of site
US *Picoides borealis* (Red-cockaded Woodpecker) approx. 1.5 mi. E of site
Utterbackia peggyae (Florida Floater) approx. 2.0 mi. NE of site in Spring Creek
Lake Seminole WMA [GA DNR] approx. 1.0 mi. E of site
Seminole SP [GA DNR] approx. 3.0 mi. W of site
Silver Lake WMA [GA DNR] approx. 2.0 mi. E of site
Spring Creek [High Priority Stream] approx. 1.5 mi. E of site

* Entries above proceeded by “US” indicates species with federal status (Protected, Candidate or Partial Status). Species that are federally protected in Georgia are also state protected; “GA” indicates Georgia protected species.

Recommendations:

We have records of some aquatic species of concern within Lake Seminole. We also have records of several federally listed species within three miles of the proposed project. Section 9 of the Endangered Species Act states that taking or harming of a listed species is prohibited. We recommend all requestors with projects located near federally protected species consult with the United States Fish and Wildlife Service. For southeast Georgia, please contact Strant Colwell (912-265-9336, ext.30 or Strant_Colwell@fws.gov). In southwest Georgia, please contact John Doresky (706-544-6999 or John_Doresky@fws.gov). In north Georgia, please contact Robin Goodloe (706-613-9493, ext.221 or Robin_Goodloe@fws.gov).

We also have records of nesting Bald Eagles (*Haliaeetus leucocephalus*) within three miles of the proposed project. Although Bald Eagles are no longer considered an endangered species, they are still protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act and the Georgia Endangered Species Act. These Acts continue to protect bald eagles from potentially harmful human activities. For more information on how to prevent impacts to bald eagles that could violate the Eagle Act, download the National Bald Eagle Management Guidelines:
http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf

This project has the potential to negatively impact aquatic habitats in Lake Seminole. Conduct activities from a stable stream bank or reinforced platform that does not cause degradation or destabilization of stream banks. We recommend that stringent erosion control practices be used during construction activities and that vegetation is re-established on disturbed areas as quickly as possible. Silt fences and other erosion control devices should be inspected and maintained until soil is stabilized by vegetation. Please use natural vegetation and grading techniques (e.g., vegetated swales, turn-offs, vegetated buffer strips) that will ensure that the project area does not serve as a conduit for storm water or pollutants into the stream during or after construction. No uncured concrete or water used to facilitate curing should be discharged directly into the lake, curing water should be pumped into filter bags (i.e., "dirt bags") or detention basins before coffer dams or other diversion structures are dismantled. These measures will help protect water quality in the vicinity of the project. For further information on potential impacts to aquatic species and habitats, please consult with [redacted] and [redacted] aquatic staff in our office.

Please be aware that this project occurs near Spring Creek, a high priority stream. As part of an effort to develop a comprehensive wildlife conservation strategy for the state of Georgia, the Wildlife Resources division has developed and mapped a list of streams that are important to the protection or restoration of rare aquatic species and aquatic communities. High priority waters and their surrounding watersheds are a high priority for a broad array of conservation activities, but do not receive any additional legal protections. We now have GIS ESRI shapefiles of GA

high priority waters available on our website (http://www.georgiawildlife.com/content/displaycontent.asp?txtDocument=89&txtPage=13). Please contact the Georgia Natural Heritage Program if you would like additional information on high priority waters.

NEW - Data Available on the Nongame Conservation Section Website - NEW

NEW Georgia protected plant and animal profiles are available on our website. Originating with the State Wildlife Action Plan, a strategy guiding conservation in Georgia, the accounts cover basics like descriptions and life history, as well as threats, management recommendations and conservation status. Visit http://www.georgiawildlife.com/node/2223?cat=6.

By visiting the Nongame Conservation Section Website you can view the highest priority species and natural community information by Quarter Quad, County and HUC8 Watershed. To access this information, please visit our GA Rare Species and Natural Community Information page at: http://www.georgiawildlife.com/conservation/species-of-concern?cat=conservation

An ESRI shape file of our highest priority species and natural community data by quarter quad and county is also available. It can be downloaded from: http://georgiawildlife.com/sites/default/files/uploads/wildlife/nongame/zip/gnhpds.zip

Disclaimer:

Please keep in mind the limitations of our database. The data collected by the Nongame Conservation Section comes from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by our staff biologists. In most cases the information is not the result of a recent on-site survey by our staff. Many areas of Georgia have never been surveyed thoroughly. Therefore, the Nongame Conservation Section can only occasionally provide definitive information on the presence or absence of rare species on a given site. Our files are updated constantly as new information is received. **Thus, information provided by our program represents the existing data in our files at the time of the request and should not be considered a final statement on the species or area under consideration.**

If you know of populations of highest priority species that are not in our database, please fill out the appropriate data collection form and send it to our office. Forms can be obtained through our web site (http://www.georgiawildlife.com/node/1376) or by contacting our office. If I can be of further assistance, please let me know.

Sincerely,

Katrina Morris
Environmental Review Coordinator

APPENDIX

E

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

February 14, 2011

[redacted] P. [redacted]
Chief, Environment and Resources Branch
Department of the Army
U.S. Army Engineer District, Mobile District
Corps of Engineers
P.O. Box 2288
Mobile, Alabama 36628
Attn: [redacted]

RE: Proposed Property Lease to Construct 4-Lane Boat Launch & Upgrade Facilities, Spring Creek Park, Donalsonville
Seminole County, Georgia
HP-110214-001

Dear Mr. Bradley:

The Historic Preservation Division (HPD) has reviewed the information submitted concerning the above referenced project. Our comments are offered to assist the US Army Corps of Engineers (USACE) and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information provided, HPD concurs that no archaeological resources or structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP) will be affected by the proposed undertaking, as defined in 36 CFR Part 800.4(d)(1).

This letter evidences consultation with our office for compliance with Section 106 of the NHPA. If we may be of further assistance, please do not hesitate to contact me a[redacted]r via email at [redacted]

Sincerely,

[redacted]
Environmental Review Coordinator

cc: Paul Forgey, Southwest Georgia RC