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ENVIRONMENTAL ASSESSMENT
INTERIM OPERATIONS PLAN
FOR SUPPORT OF ENDANGERED AND THREATENED SPECIES
JIM WOODRUFF DAM
GADSDEN AND JACKSON COUNTIES, FLORIDA
AND DECATUR COUNTY, GEORGIA

Prepared by

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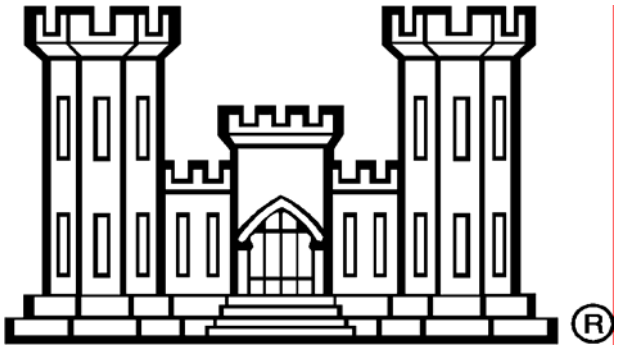
Planning and Environmental Division
Environment and Resources Branch
Inland Environment Team



October 2006

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JIM WOODRUFF DAM

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1. INTRODUCTION:

a. Location: Jim Woodruff Dam is located at the confluence of the Chattahoochee and Flint Rivers and marks the upstream extent of the Apalachicola River Navigation project at Navigation Mile (NM) 106.3. The dam can be located on the Chattahoochee, Florida U.S. Geological Survey quadrangle map (Figure 1), in Gadsden and Jackson Counties, Florida, and Decatur County, Georgia. Jim Woodruff Dam is the most downstream dam on the Apalachicola, Chattahoochee, Flint River (ACF) system (Figure 2). Releases from Jim Woodruff Dam are made to the Apalachicola River, which is free-flowing from Jim Woodruff Dam to the Gulf of Mexico, a distance of approximately 106 miles, through Jackson, Gadsden, Liberty, Calhoun, Franklin and Gulf Counties, Florida.

The proposed action directly impacts flows in the Apalachicola River and utilizes the composite storage of the reservoirs within the ACF system. Therefore the project area includes the ACF system upstream of Jim Woodruff Dam and the Apalachicola River, its distributaries, and Apalachicola Bay downstream of Woodruff Dam.

b. Proposed Action: The proposed action is the Corps' Interim Operations Plan (IOP) for Jim Woodruff Dam, which describes minimum releases and maximum fall rates for releases from the dam to the Apalachicola River in order to minimize or avoid adverse impacts or provide support to endangered and threatened species and critical habitat which occur on the Apalachicola River. The IOP was included in a request to the U.S. Fish and Wildlife Service (USFWS) dated March 7, 2006 to initiate formal consultation on the impacts of existing operations at Jim Woodruff Dam and releases to the Apalachicola River on endangered and threatened species and critical habitat, pursuant to Section 7 of the Endangered Species Act. The IOP is not a new water control plan for Woodruff Dam; it is a definition of discretionary operations within the limits and rule curves established by the existing water control plan. The Corps operates five Federal reservoirs on the ACF as a system, and releases made from Jim Woodruff Dam under the IOP reflect the downstream end-result of system-wide operations as measured by daily releases from Woodruff Dam into the Apalachicola River. The IOP does not address operational specifics at the four federal reservoirs upstream of Woodruff or other operational parameters at these reservoirs, other than the use of the composite reservoir storage of the system and releases from the upstream reservoirs as necessary to assure releases from Jim Woodruff Dam to provide support for and minimize adverse impacts to endangered or threatened species or critical habitat. The IOP specifies two parameters applicable to the daily releases from Woodruff: a minimum discharge in relation to

Figure 1. Jim Woodruff Dam Location

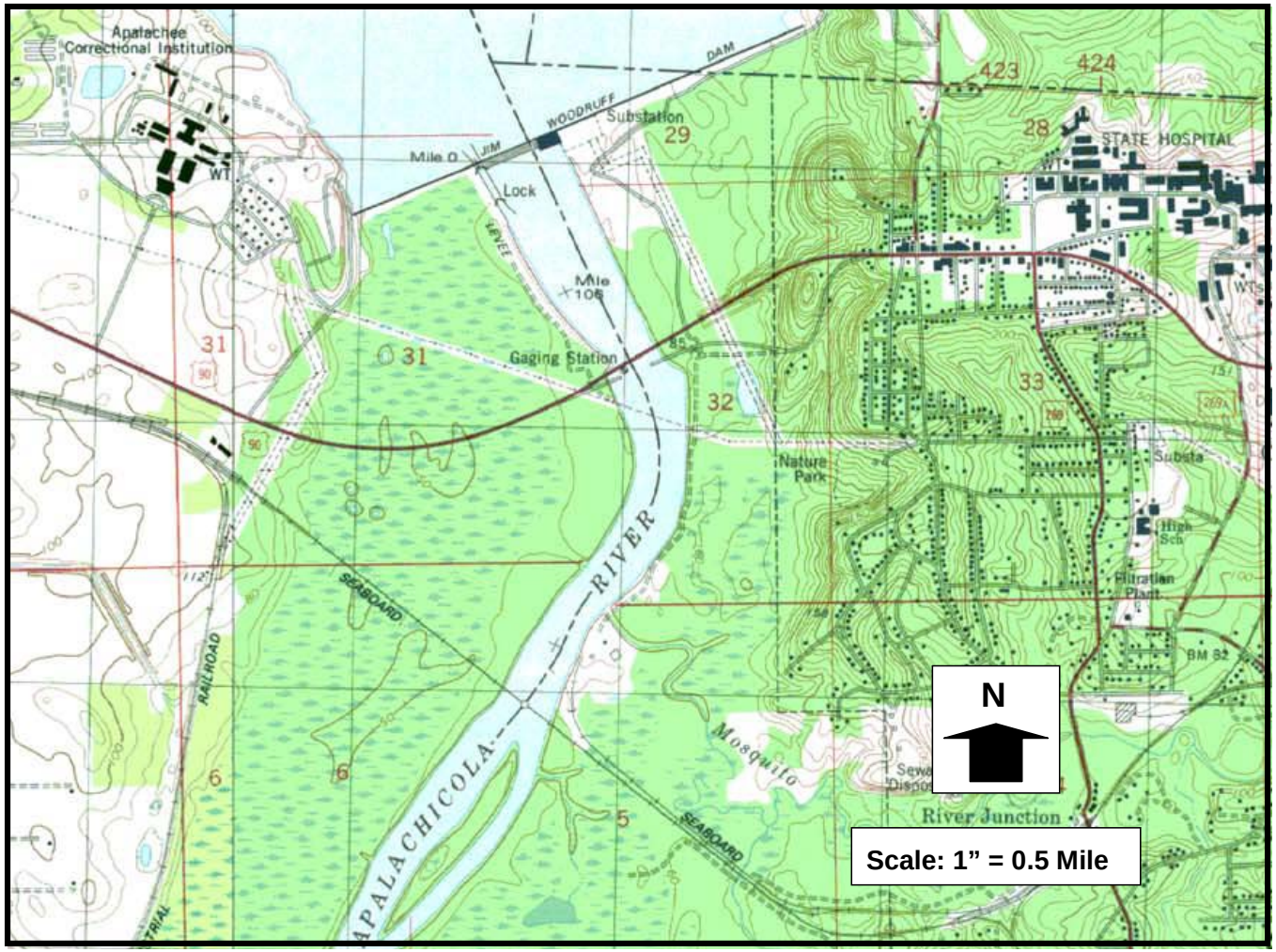
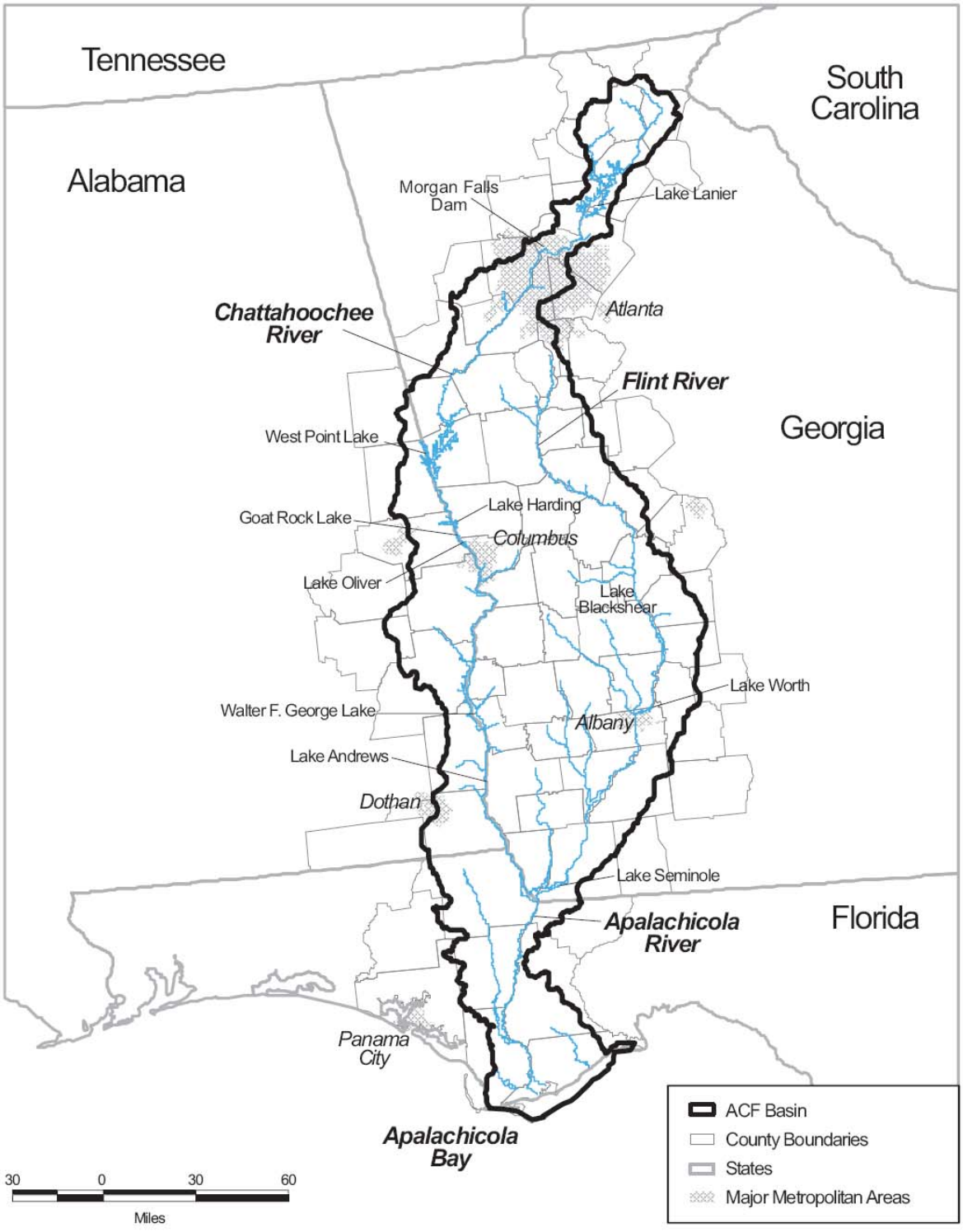


Figure 2. ACF Basin



average basin inflows (daily average in cubic feet per second [cfs]) and maximum fall rate (vertical drop in river stage measured in feet/day). The IOP describes the flow rates as minimum, and not target, releases for Jim Woodruff Dam. Releases are based on the computed 7-day moving average basin inflow, and measured at the Chattahoochee gage immediately downstream of the dam. During wet periods, releases may substantially exceed the IOP values, but during dry periods, releases will more closely match the IOP values in order to conserve reservoir storage for authorized project purposes and future endangered and threatened species needs.

c. Purpose and Need for the Proposed Action: The purpose of the proposed action is to avoid and minimize impacts to the federally threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and federally endangered fat threeridge (*Amblema neislerii*), federally threatened purple bankclimber (*Elliptoideus sloatianus*), and federally threatened Chipola slabshell (*Eliptio chipolaensis*) mussels; and designated Gulf sturgeon critical habitat and proposed critical habitat for the mussels in the Apalachicola River as a result of existing water management operations and releases from Jim Woodruff Dam.

Operations under the interim operations plan will be implemented and continued until such time as additional formal consultation may again be initiated and completed, either in association with the proposed update and revision of water control plans for the ACF system, or sooner if conditions change or additional information is developed to justify a possible revision to operations under the IOP. The most recent approved Water Control Plan for the ACF system is dated 1959. However, a draft Water Control Plan for the ACF was completed in 1989. Since that time, operations have been conducted in accordance with the draft Water Control Plan, with minor adjustments as necessary in recent years to accommodate current needs, such as operations in support of fish and wildlife and endangered and threatened species. Finalizing the 1989 draft water control plan awaits resolution of ongoing litigation filed by the State of Alabama in 1990 in the District Court for the Northern District of Alabama, which is currently the subject of court-ordered mediation. It is expected that any update of water control plans would include formal consultation under Section 7 and additional NEPA documentation regarding system operations. As noted above, the IOP focuses on operations and releases from Jim Woodruff Dam to the Apalachicola River in support of endangered and threatened species and critical habitat. Composite storage available in upstream reservoirs is considered in the IOP, but the IOP does not address detailed operations at Jim Woodruff or the upstream reservoirs. Because the species and critical habitat areas of concern are predominately located only on the Apalachicola River downstream of Jim Woodruff Dam, the primary operational consideration at this time is the timing and quantity of flows released from the dam.

d. Authority: A Federal interest in the Apalachicola-Chattahoochee-Flint River basin dates to the 1800's when river improvements for navigation were authorized under the River and Harbor Act of 1874. The River and Harbor Acts of 1945 and 1946 provided for the initiation of construction of the Apalachicola River navigation project and a series of multipurpose reservoirs on the system. Modifications of this plan have resulted in the completion of five Corps dams in the basin, four on the Chattahoochee River, and one at

the confluence of the Chattahoochee and Flint Rivers. The Buford project was completed in 1956, the Jim Woodruff project in 1957, the Walter F. George and George W. Andrews projects in 1963. The West Point project was completed in 1984 (operations began in late 1974), pursuant to authorization by the River and Harbor Act of 1962 (Title I) and the Flood Control Act of 1962 (Title II). These projects are operated as a system to provide the authorized project purposes of flood control, fish and wildlife conservation, navigation, hydroelectric power, water supply, water quality, and recreation.

The Endangered Species Act of 1973 (P.L. 93-205) requires consultation with the Department of the Interior, Fish and Wildlife Service or the National Oceanic and Atmospheric Administration, National Marine Fisheries Service and provides authority for operating Federal projects to protect endangered and threatened species. The Fish and Wildlife Coordination Act (P.L. 85-624) requires consultation with the Fish and Wildlife Service and State fisheries management agencies regarding project impacts on other fish and wildlife.

2. AFFECTED ENVIRONMENT:

a. General Environmental Setting. The ACF basin drains 19,800 square miles in parts of southeastern Alabama, northwest Florida, and central and western Georgia. About 74 percent of the ACF basin lies in Georgia, 15 percent in Alabama, and the remaining 11 percent in Florida. The basin extends approximately 385 miles from the Blue Ridge Mountains to the Gulf of Mexico and has an average width of approximately 50 miles. The basin covers 50 counties in Georgia, 8 counties in Florida, and 10 counties in Alabama.

The ACF system empties into the Gulf of Mexico. The main tributaries of the basin are the Chattahoochee and Flint Rivers. These tributaries merge at Lake Seminole to form the Apalachicola River near the State lines of Florida and Georgia. The Apalachicola River flows into the Gulf of Mexico at Apalachicola Bay.

The ACF basin is a dynamic hydrologic system containing interactions between aquifers, streams, reservoirs, floodplains, and estuaries. Water resources in the ACF basin have been managed to serve a variety of purposes, including navigation, hydroelectric power, flood control, water quality, fish and wildlife conservation, water supply, and recreation. There are 16 reservoirs on the mainstems of the Apalachicola, Chattahoochee, and Flint Rivers (5 Federal and 11 non-Federal projects), which have altered the natural streamflow and provided potential for water supply improvements and recreational opportunities for the public in addition to other project purposes in these resource areas. The interrelationship between operation of the dams and the resulting river flows has resulted in a highly regulated system over much of the basin. The principle rivers, particularly in the lower half of the basin, receive a substantial contribution of water from groundwater baseflow during dry times (Comprehensive Water Resources Study Partners, 1995).

The ACF basin is characterized by a warm and humid, temperate climate due to its latitude, altitude, and proximity to the Gulf of Mexico. Average annual temperature ranges from about 60^{o} Fahrenheit (F) in the north to 70^{o}F in the south. Average daily temperatures in the ACF basin range from about 40 to 50^{o}F in January to 75 to 80^{o}F in July. Summer temperatures are typically in the 70s to the 90s. Freezing temperatures in winter occur for only short periods (USGS, 1996).

Precipitation is highest at the north end of the basin in the mountains and at the south end of the basin near the Gulf of Mexico. Average annual precipitation is about 60 inches per year at both the north and south ends of the basin. The east-central part of the basin receives less precipitation, with an annual average of 45 inches (USGS, 1996). Precipitation varies substantially on an annual basis, however. Precipitation is generally highest in late winter and early spring, and then again in mid- to late summer, when tropical depressions and tropical storms occasionally track up the basin.

Over half the water that falls as precipitation in the ACF basin is returned to the atmosphere as evapotranspiration (direct evaporation plus transpiration by plants). Evapotranspiration ranges from about 32 to 42 inches of water per year in the ACF basin, generally increasing from north to south (USGS, 1996). Average annual runoff basinwide ranges from 12 to 40 inches (or about 25 to 65 percent of average annual precipitation). Runoff is greatest in the Blue Ridge Mountains and near the Gulf coast (USGS, 1996).

The Corps operates five dams in the ACF River Basin: (in downstream order) Buford, West Point, George, Andrews, and Woodruff. All are located wholly on the Chattahoochee River arm of the basin except the downstream-most dam, Woodruff, which is located immediately below the confluence of the Chattahoochee and Flint rivers and marks the upstream extent of the Apalachicola River. Andrews is a lock and dam without any appreciable water storage behind it, but Buford, West Point, George, and Woodruff dams are impound reservoirs (Lakes Lanier, West Point, George, and Seminole, respectively) with a combined conservation storage capacity (relative to the top of each reservoirs' full summer pool) of about 1.6 million acre-feet (1,049,400 acre-feet at Lanier; 306,100 acre-feet at West Point, and 244,000 acre-feet at W.F. George). Because Jim Woodruff Dam/Lake Seminole is operated as a run-of-river project, only very limited storage is available for support of project purposes. For about half of its length, the Chattahoochee River forms the boundary between Georgia and Alabama. Lake Seminole straddles the boundary between Florida and the southwest corner of Georgia.

The ACF system of reservoirs are operated to provide for the authorized purposes of flood control, fish/wildlife, navigation, hydroelectric power, water supply, water quality, and recreation. In order to provide the authorized project purposes of navigation, certain fish and wildlife needs, hydroelectric power, certain water supply needs, recreation, and water quality; flow must be stored during wetter times of each year, and released from storage during drier periods of each year. Traditionally this means that water is stored in the lakes during the spring, and released for authorized project purposes in the summer

and fall months. In contrast, some authorized project purposes such as lakeside recreation, water supply, and lake fish spawn are achieved by retaining water in the lakes, either throughout the year or during specified periods of each year. The flood control purposes at certain reservoirs requires drawing down reservoirs in the fall through winter months to store possible flood waters and refilling of pools in the spring months to be used for multiple project purposes throughout the remainder of the year. The conflicting water demands on the system require that the Corps operate the system in a balanced operation in an attempt to meet all authorized purposes, while continuously monitoring the total system water availability to insure that minimum project purposes can be achieved during critical drought periods. In order to help do this, the Corps has defined four (4) Action Zones in each of the major ACF storage projects of Buford, West Point, and Walter F. George. Action Zone 1 is the highest in each lake, and defines a reservoir condition where all authorized project purposes should be met. As lake levels decline, Action Zones 2 through 4 define increasingly critical system water shortages, and guide the Corps in reducing flow releases as pool levels drop as a result of drier than normal or drought conditions. The Action Zones also provide a guide to the Corps to help balance the remaining storage in each of the three major storage reservoirs. The following describe each of the authorized project purposes in more detail:

1. Flood Control. Flood control is achieved by storing damaging flood waters, thus reducing downstream river levels below that which would have occurred without the dams in place. Of the five (5) Corps reservoirs, only the Buford (Lake Lanier) and West Point projects were designed with space to store flood waters. In addition to providing for space above the conservation pool to hold flood waters throughout the year, the Buford project is drawn down one (1) additional foot, and the West Point project is drawn down at least seven (7) additional feet beginning in the Fall season, through winter and into the early Spring season to provide additional capacity to protect life and property within the basin.

2. Fish and Wildlife. In addition to providing for minimum flow and water quality releases, the Corps operates the system to provide favorable conditions for annual fish spawning, both in the reservoirs and the Apalachicola River. In most water years (1 October – 30 September) it is not possible to hold both lake levels and river stages at a steady or rising level for the entire spawning period, especially when upstream lakes and/or the Apalachicola River spawning periods overlap. During the fish spawning period for each specific water body, the goal of the Corps is to operate for a generally stable or rising lake level and a generally stable or gradually declining river stage on the Apalachicola River for approximately 4 to 6 weeks during the designated spawning period. When climatic conditions preclude a favorable operation for fish spawn, the Corps consults with the State fishery agencies and the USFWS on balancing needs within the system and minimizing the impacts of fluctuating lake or river levels. These fish spawn operations were incorporated into a draft Mobile District Standard Operating Procedure (CESAM SOP 1130-2-9) in February 2005, following consultation since 2002 with USFWS and state fishery management agencies from Alabama, Florida and Georgia. In addition to fish spawn, the Corps has been in Informal Consultation with the USFWS since 2000, and entered into Formal Consultation on March 7, 2006 regarding

the Gulf Sturgeon and protected mussel species (fat threeridge, purple bankclimber, and Chipola slabshell) in the Apalachicola River. The Corps and the USFWS have agreed since 2004 to implement a low flow operations protocol for the Apalachicola River similar to a "run-of-river" operation. The low flow operations protocol attempts to mimic the hydrologic conditions of a natural flow regime during low flow conditions and thereby minimizes impacts to Gulf sturgeon or protected mussels that occur on the Apalachicola River from falling river stages and discretionary reservoir operations. The low flow operations protocol is implemented whenever it appears that flows on the Apalachicola River are falling or predicted to fall below the levels identified as necessary to support Gulf sturgeon spawning. The low flow operations protocol instituted in 2004 included ensuring that releases to the Apalachicola River approximated or exceeded inflows into the basin whenever basin inflows approached 21,000 cubic feet per second (cfs) or lower during the Gulf sturgeon spawning period. It was also recognized that some reservoir storage should be conserved in the spring months during sustained dry periods in order to provide sustained augmentation flows in support of the needs of protected mussel species during the later summer and fall months, which are typically the driest part of the year. The low flow operations protocol was also implemented when flows approached levels less than 8,000 cfs later in the year in order to minimize the impacts to the mussel species. Following continued consultation with USFWS, the low flow operations protocol was incorporated into the IOP describing operations in support of endangered and threatened species in early 2006, and included in the request dated 7 March 2006 to initiate formal consultation with the USFWS pursuant to the Endangered Species Act.

3. Navigation. The existing project authorizes a 9-foot deep by 100-foot wide waterway from Apalachicola, Florida to Columbus, Georgia, on the Chattahoochee River, and to Bainbridge, Georgia on the Flint River. Conditions on the Apalachicola River have been such in recent years that a 9-foot deep channel has not been available for much of the year. Due to deteriorating channel conditions and limited channel availability during the low flow months, navigation windows were routinely scheduled during the low flow months in the 1990s. Navigation windows were comprised of storing water in the upstream reservoirs for several weeks, and then making increased releases for a 10-day to 2-week period to allow commercial barge navigation to make a round-trip up river for scheduled delivery of commodities. Concerns were raised regarding the fluctuations of both reservoir and river stages associated with navigation window releases, and the continued use of navigation windows became increasingly controversial, especially during sustained low flow periods when observed fluctuations were more extreme. As a result of fluctuating river stages during navigation windows, gradual ramping rates were developed in coordination with the USFWS and Florida Fish and Wildlife Conservation Commission, with the goal to provide for ramping down rates of not more than ½ foot per day during fish spawn activities, and no more than one foot per day during other periods of the year, whenever flows were below 20,000 cfs. The last navigation window was provided in the Spring of 2000, and precipitated complaints that the navigation window was scheduled during the period of fish spawn and had adversely impacted both reservoir and riverine fish spawn activities. No navigation windows have been scheduled since that time, and none are planned in the foreseeable future. Dredging

on the Apalachicola River also was reduced since the 1980s due to a lack of adequate disposal area capacity in certain reaches of the river. No dredging was conducted in 2000 or 2002 due to sustained drought conditions in the basin, and only very limited dredging was conducted in 2001 and then shutdown due to sustained low flow conditions. No dredging has been conducted since that time, for a variety of reasons related to flow or funding levels, and currently has been indefinitely deferred due to denial of a Section 401 water quality certificate from the State of Florida and recent congressional language that limits funding for dredging operations in the ACF basin. The lack of dredging and routine maintenance has led to inadequate depths in the Apalachicola River navigation channel, and commercial navigation has only been possible on a seasonal basis when flows in the river are naturally high, with flow support for navigation suspended during drier times of the year. On a case-by-case basis, limited releases for navigation have been made for special shipments when a determination can be made that other project purposes will not be significantly impacted and any fluctuations in reservoir levels or river stages would be minimal.

4. Hydroelectric Power. The Buford, West Point, Walter F. George, and Jim Woodruff projects include hydroelectric power plants as part of those projects. The total generation capacity of these four (4) ACF plants is 336 megawatts. Through the Department of Energy's Southeastern Power Administration (SEPA), these power plants provide power to over 300 preference customers throughout the Southeastern United States. In 2005, the ACF hydroelectric power plants generated nearly 1.1 million megawatt-hours, enough electricity to supply approximately 110,000 households in the region. Hydroelectric power generation is achieved by passing flow releases to the maximum extent possible through the turbines at each project, even when making releases to support other project purposes. The Buford, West Point, and Walter F. George projects are operated as "peaking plants", and provide electricity during the peak demand periods of each day and week. Because it does not have the ability to store appreciable amounts of flow, the Jim Woodruff plant is operated as a "run-of-the-river" plant where inflows are passed continuously and electricity is generated around the clock. A limited amount of "peaking" occurs at Jim Woodruff for approximately 1 hour per day when releases are less than 16,000 cfs (capacity of the plant). During dry periods, as the lake levels drop below Zone 1, hydroelectric power generation is reduced proportionally as pool levels decline to as low as 2 hours per day generation at each "peaking plant" project during extreme low flow conditions. Peak generation may be eliminated or limited to conjunctive releases during severe drought conditions.

5. Water Supply. Various municipal and industry (M&I) entities withdraw water directly from Lake Lanier and others withdraw directly from the Chattahoochee River downstream of Lake Lanier. Water releases to the Apalachicola River are also impacted by agricultural water withdrawals on the Flint River. Agricultural demands vary depending on the climatic conditions, but are generally 1.5 to 2 times the withdrawals for M&I (USFWS 2006). Water withdrawals within the State of Georgia are made pursuant to water withdrawal permits issued by the Georgia Department of Natural Resources. Previous water supply contracts issued by the Corps for withdrawals from Lake Lanier expired by 1990 and have not been re-issued. The Water Supply Act of 1958 provides

authority for reallocation or addition of storage within Corps reservoirs for water supply, with the cost of storage and associated facilities to be reimbursed by a non-Federal entity via water storage contracts. No storage within the ACF projects is currently allocated to water supply, although there is currently a proposal being considered by the Corps to enter into interim water storage contracts at Lake Lanier for several municipalities and local governments, pursuant to the Southeastern Federal Power Customers, Inc. settlement agreement (1:00CV02954–TPJ), with the potential for the interim water storage contracts to roll over to permanent reallocation storage contracts in the future. The Mobile District has published in the Federal Register on 16 June 2006 a notice of intent to prepare an environmental impact statement (EIS) to address the proposed interim storage contracts. The EIS will address the impacts of the proposed interim storage contracts at Lake Lanier and any changes to project operations at Lake Lanier or the downstream projects required for implementation of the interim storage contracts.

6. Water Quality. Buford, West Point, and Jim Woodruff dams all provide continuous flow releases. Walter F. George has no such minimum flow provision; however, when low dissolved oxygen (DO) values are observed below the dam, spillway gates are opened until the DO readings return to an acceptable level. Occasional special releases are also made at Buford to insure adequate DO and water temperature at the Buford Fish Hatchery located downstream of the dam. Additionally, self-aspirating turbines were recently installed at Buford to improve DO levels downstream. At Buford Dam the small turbine-generator is run continuously to provide a minimum flow from the dam which ranges up to approximately 600 cfs. At West Point Dam, a similar small generating unit provides a continuous release of approximately 675 cfs. In addition to these flows, Buford Dam is operated in conjunction with the downstream Georgia Power Dam at Morgan Falls to insure a minimum instream flow of 750 cfs on the Chattahoochee River at Peachtree Creek to meet State water quality commitments. A 5,000 cfs minimum flow is maintained as a release from the Jim Woodruff Dam to the Apalachicola River, which assures an adequate water supply for downstream industrial use. No water quality problems below Jim Woodruff Dam have been identified in association with project operations.

7. Recreation. All of the Corps lakes have become important recreational resources on the ACF system. Of these projects, Lake Lanier (Buford Dam) is one of the most visited Corps of Engineer lakes in the entire United States with over 7.7 million visitors in 2005. The West Point and Walter F. George lakes had over 3.1 and 3.6 million visitors respectively in 2005 to also rank among the top ten most visited Corps lakes in the United States. In addition, the Jim Woodruff (Lake Seminole) had over 1.2 million visitors in 2005, and the smaller George W. Andrews project 269,000 visitors. A wide variety of recreational opportunities are provided at the lakes including boating, fishing, picnicking, sightseeing, water skiing, and camping. The economic benefits of recreation at the lakes is significant resulting in visitor spending in 2005 of over $125 million at Lake Lanier, $36 million at West Point, and $111 million at Walter F. George. Recreation benefits are maximized at the lakes by maintaining full or nearly full pools during the primary recreation season of 1 May through 8 September. In response to meeting other authorized project purposes, lake levels can and do decline during the

primary recreation period, particularly during drier than normal years. Recreation impact levels have been identified for various lake elevations at each of the reservoir projects (Table 1).

Table 1. Recreation Impact Levels

Corps Project	First Impact Level	Second Impact Level
Lake Lanier (msl)	1066	1063
West Pont (NGVD)	632.5	629
Walter F. George (NGVD)	187	185
Lake Seminole (msl)	76	NA

The first impact level is generally characterized by marginal impacts to designated swimming areas, increased safety awareness regarding navigation hazards, minimal impacts to Corps boat ramps, and minimal impacts to private marina and dock owners. More substantial impacts begin to occur at the second impact level.

b. Significant Resource Description. As described above, the Corps operates the five Federal reservoirs on the ACF as a system, and releases made from Jim Woodruff Dam reflect the downstream end-result of system-wide operations. Therefore, the significant resource description and associated impacts to significant resources sections will primarily focus on the resources in the Apalachicola River and Bay system downstream of the dam. However, a general discussion of the upstream reservoir resources (specifically those related to authorized project purposes) is included also.

1. Fishery Resources. The ACF reservoirs support popular sport fisheries, some of which have achieved national acclaim for trophy-size catches of largemouth bass. Important game species in the Federal reservoirs include crappie, largemouth bass, spotted bass, striped bass, walleye, white bass, gizzard shad, hybrid bass (striped bass-white bass hybrid), threadfin shad, bluegill, and redear sunfish.

Warm water fisheries characterize the Apalachicola River. The Apalachicola River and adjacent floodplain tributaries and distributaries support a remarkable assemblage of freshwater fish species from 22 taxonomic families (Appendix A). Over 180 species of fish have been documented from the river and bay system including eight anadromous species, four endemic species and seven introduced species (NERRS 2005). Anadromous fish species that utilize the river during part of their life cycle include the Gulf sturgeon, Gulf striped bass, Alabama shad, and skipjack herring. The Apalachicola River supports the last remaining native breeding population of the Gulf striped bass. The mouths of cool water springs and other off channel deep-water habitats are used as thermal refugia by the striped bass, and possibly by Gulf sturgeon and other fish species during warm water months. Entrenchment of the river has impacted access to a number of these important refuge areas, especially in the upper river. Approximately 80 to 85 percent of the freshwater fish species collected in the Apalachicola River are known to inhabit floodplain habitats. Numerous species are tolerant of still water habitats and low dissolved oxygen levels and utilize isolated floodplain ponds and disconnected stream

segments in the floodplain during low water conditions. A number of other fish, including suspected host fish for the listed mussels, utilize the inundated floodplain during high water events as habitats for spawning, feeding, shelter from predators, or as nursery grounds (Light et al. 1998).

The Apalachicola Bay estuary is considered one of the most important commercial fishing resources in North America. The primary commercial fishery species in the estuary include American oyster, penaeid shrimp (brown, white, and pink shrimp), blue crab, and estuarine and marine fish species such as striped mullet, speckled trout, menhaden, red drum, flounders and sharks (NERRS 2005). The most abundant of the true estuarine fish species (resident throughout entire life cycle) in the bay estuary is the bay anchovy.

2. Essential Fish Habitat. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) mandates designation and protection of essential fish habitat (EFH). EFH is defined as … "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity." The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. The National Marine Fisheries Service (NMFS) has identified EFH habitats for the Gulf of Mexico in its Fishery Management Plan Amendments. These habitats include estuarine areas such as estuarine emergent wetlands, seagrass beds, algal flats, mud, sand, shell and rock substrates, and the estuarine water column. EFH in the project area includes the Apalachicola River/Bay system up to the limit of permanent fresh water. Species managed by NMFS under the Fishery Management Plan that occur in the area of influence for the project include red drum; gray snapper; brown, white, and pink shrimp; and Gulf stone crab.

3. Wildlife Resources. The wildlife assemblages found in the ACF basin vary greatly with the vegetative community, although some generalist species occur throughout the basin in a number of habitat types. Habitat types within the basin include mixed hardwood forests, rock outcrops, grasslands, longleaf pine-turkey oak sandhill communities, bottomland hardwood forests, and maritime communities.

The Apalachicola River floodplain provides natural habitat to a large number of rare, endangered and endemic plant and animal species. The highest species density of amphibians and reptiles in North America north of Mexico occurs in the basin. The Apalachicola River basin is home to more than 40 species of amphibians and 80 species of reptiles including the southern dusky salamander, the gopher frog, Barbour's map turtle (which is endemic to the Apalachicola River), Apalachicola kingsnake and eastern indigo snake (NERRS 2005).

Mammals are also abundant within the basin and Apalachicola Bay. More than 50 species are found within the area including opossum, bats, shrews, mice, moles, voles, rabbits, foxes, weasels, black bears, mink, bobcats, coyotes, deer, feral pigs, bottlenose dolphin and the West Indian manatee (NERRS 2005).

The bay and surrounding drainage basin also provide some of the most important bird habitats in the Southeastern United States. Close proximity to the Mississippi flyway allows large numbers of birds (over 300 species have been recorded) from both the Midwest and the Atlantic Seaboard to utilize the area during migratory periods (NERRS 2005).

a. Aquatic Fauna: The Apalachicola River basin supports a high species density of aquatic vertebrates requiring freshwater to complete their lifecycles, including aquatic turtles, salamanders, frogs, snakes, and lizards and the American alligator. Invertebrates also comprise a significant percentage of the biomass in the Apalachicola River basin. Sixty species of snails and clams (Edmiston and Tuck 1987) and 15 species of crayfish (Couch et al. 1996) comprise a large percentage of wildlife food. Aquatic insects probably constitute the largest and most diverse group of aquatic invertebrates in the basin. However, research into the aquatic insects is limited and comprehensive data regarding taxa and habitat is not available. The Apalachicola River supports the largest number of endemic freshwater gastropods and bivalves and the largest percentage of endemics in a total mollusc population of any western Florida river drainage (Couch et al. 1996) including several federally listed threatened and endangered species.

As described above, Apalachicola Bay supports an important commercial fishery for American oyster, penaeid shrimp (brown, white, and pink shrimp), and blue crab. The bay accounts for approximately 90 percent of the oysters harvested in Florida. In addition to the commercial value of the oyster itself, the oyster reefs of the Apalachicola Bay estuary support numerous fish and aquatic invertebrates that are important components of the estuarine foodweb.

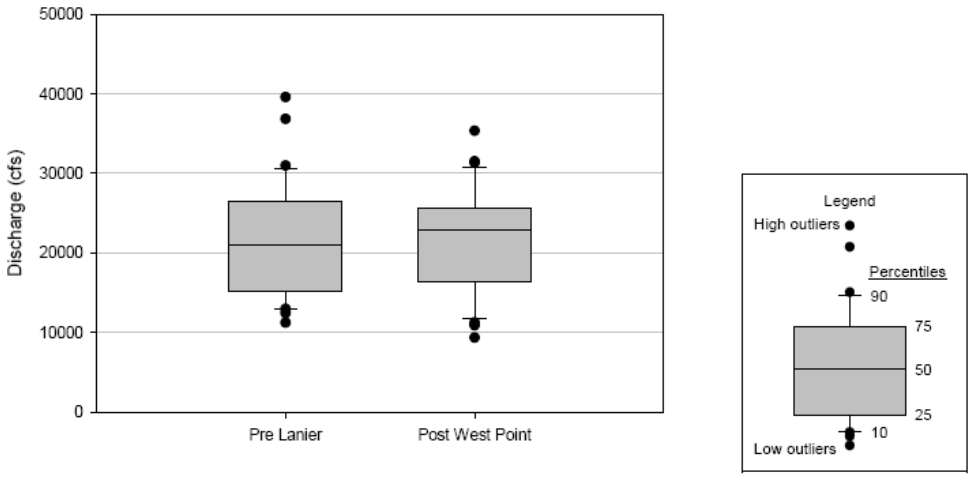
b. Terrestrial Fauna: The Apalachicola River basin supports habitats that range from xeric (such as sandhills and clayhills) to fully inundated. Because the basin exhibits a range of habitats and conditions, the Apalachicola River basin also supports a commensurate variety of terrestrial vertebrates and invertebrates. A list of some of the vertebrate terrestrial species known to occur in the basin is provided in Appendix B.

4. Hydrology. The flow of the Apalachicola River has been altered over time to some degree by land use changes, reservoirs, and various consumptive water uses upstream of Jim Woodruff Dam. The first dam/reservoir completed among the Corps' ACF projects was Buford Dam/Lake Lanier, which began operations in 1956. Therefore the 27-year pre-Lanier flow record of the Apalachicola River's Chattahoochee gage from 1929 to 1955 is used to characterize the pre-impoundment flow regime. The Corps' full complement of ACF projects was not completed until October 1974, when operations of West Point Reservoir began. Therefore the post-West Point years, 1975 to 2005 (31 years) are used to characterize the full history of the present configuration of the Corps' ACF projects. Figure 3 provides an analysis of the annual average discharge for the Apalachicola River during the 1929-1955 pre-Lanier period and the 1975-2005 post-West Point period that suggests the average annual flow prior to the construction of dams

in the ACF basin is comparable to the average annual flow currently experienced (USFWS 2006).

The Apalachicola River experiences seasonal fluctuations in flow associated with rainfall levels. Peak flooding is most likely to occur in January, February, March, and April of each year. Low flow generally occurs in September, October, and November. The distributions of monthly flow for January, June, September, October, and December, are similar in the pre-Lanier and post-West Point periods. Corps water management operations likely account for some of the variation in the other months. The ACF federal reservoirs' are generally drawn down in the fall from summer to winter pool levels. The fall drawdown is a likely explanation for higher flows in November for the post-West Point period.

Figure 3. Average annual discharge (cfs) of the Apalachicola River at Chattahoochee, FL, for the pre-Lanier (1929-1955) and post-West Point (1975-2005) periods.



(Source: USFWS 2006)

In February and March, the average monthly flow is also higher in the post-West Point period. However, this is probably not the result of reservoir project operations since the Corps generally begins refilling reservoirs to summer pool levels sometime in February, which reduces flow to the Apalachicola River. Higher flow during February and March, therefore, is more likely attributable to climatic differences between the two periods. As described above, the average annual flow of the two periods is comparable (Figure 3). Therefore, the post-West Point period must also contain months with lower flow than the pre-Lanier period. These months appear to be April, May, July, and August, which show a generally lower average monthly flow. Lower flow in April and May is potentially attributable to Corps project operations, since the system is generally operated to fill the reservoirs to summer pool levels by the end of May, and this necessarily reduces flow to the Apalachicola. Lower flow in July and August is likely a combination of climatic differences in the two periods, higher consumptive uses, and to some degree, reservoir

operations (USFWS 2006). However, hydrologic patterns vary from year to year and may not conform to the seasonal trends during any given year. The current water control plan requires a minimum flow of 5,000 cfs in the Apalachicola River provided by releases from Jim Woodruff Dam.

5. Water Quality. As stated above, Buford, West Point, and Jim Woodruff dams all provide continuous flow releases to maintain downstream water quality standards. Releases from upstream reservoirs help to maintain sufficient flow for assimilative capacity to handle M&I discharges to the Chattahoochee River. Releases from Buford Dam are made to assist in maintaining a minimum 750 cfs flow on the Chattahoochee River near Peachtree Creek. Occasional releases are made at Walter F. George to correct low DO readings below the dam. Jim Woodruff Dam has a minimum release of 5,000 cfs, which serves in part to meet downstream water quality needs.

According to the FDEP Notice of Intent for FDEP Permit No. 0129424-001-DF (3 December 1998), the majority of the Apalachicola River is designated as Class III waters, which support the designated uses of recreation, and propagation and maintenance of a healthy, well-balanced population of fish and wildlife. The Apalachicola River is also designated as an Outstanding Florida Water (waters of exceptional recreational or ecological significance). Seasonal flooding of the Apalachicola River provides freshwater flows and significant quantities of nutrients and organic matter to the Apalachicola Bay estuary, which are necessary to maintain salinity gradients and support biological productivity within the estuary. The Apalachicola River is a fast flowing river that is turbid due to the load of suspended floodplain materials and upstream agricultural runoff.

Although the State standards adopted consistent with the U.S. Environmental Protection Agency (USEPA) criteria generally represent levels that are safe for sturgeon and mussels, these standards are sometimes violated. Several segments of the Apalachicola and Chipola rivers that are within the project area were included on the 1998 Clean Water Act § 303(d) list of water bodies that fail to fully serve the designated uses (FDEP 1998). The impairments included turbidity, coliforms, total suspended solids, and dissolved oxygen (DO). The 2001 Impaired Surface Waters Rule analysis identifies potential impairments in the same segments for biology, coliforms, DO, and unionized ammonia (FDEP 2003). Mercury-based fish advisories apply to one or more segments of both watersheds, and organochlorine pesticides were found at levels in ACF Basin streams that often exceeded chronic exposure criteria for the protection of aquatic life (FDEP 2002; Frick et al. 1998). Point and non-point source pollution has also contributed to impaired water quality in the Apalachicola River and Chipola River in the project area.

Predominant land uses in the drainage area of the Apalachicola River in Florida include upland forests (53.5 percent), wetlands (30.5 percent), agriculture (8.4 percent), and urban/built-up (2.1 percent). The NWFWMD has completed a study of 12 watersheds in the Apalachicola drainage basin to determine relationships between land use and water quality (Thorpe et al. 1998). Very few water quality differences were noted between silviculture-dominated and naturally forested watersheds. Agriculture-dominated

watersheds showed higher loading than natural and silviculture rates for a number of nutrients, such as unionized ammonia, nitrate-nitrogen, total nitrogen, and total phosphorus (Thorpe et al. 1998).

USGS has recorded water temperature intermittently at the USGS Apalachicola River gage near Chattahoochee, FL. Records were available from 1974-1978 and 1996-1997; however, water temperatures were not available for all of the days in each year. Analysis of this data indicates mean daily water temperatures range from 11^{o} Celsius (C) in the winter to 30^{o} C in the summer.

6. Floodplain/Wetlands. The Apalachicola River's 144,000-acre floodplain is alluvial, broad and flat. The expansive floodplain habitats adjacent to the Apalachicola River provide a source of nutrients to the Apalachicola River and Bay ecosystem, and provide important habitat for various fish species during flooded seasons. One hundred and twenty-one thousand acres are bottomland hardwood forests and tupelo-cypress swamps. Shrub swamps and seasonally flooded basins and flats are other wetland types within the Apalachicola River floodplain. Marsh habitat is restricted to the lower ten (10) miles of the floodplain. The species composition of the floodplain is dependent upon the flooding cycle and changes when the flood cycle is altered or interrupted for a significant period of time. Floodplain connection to the mainstem and periods of inundation are important factors determining the makeup of the floodplain. Construction of the Corps reservoir system in the ACF basin has resulted in changes to the Apalachicola River floodplain, due to the degradation of the upper river channel following construction of the upstream dams, and a gradual deepening and widening of the river channel associated with the navigation channel construction and trapping of sediments in the upstream reservoirs. USGS has estimated the amount of adjacent floodplain habitat connected to the Apalachicola River at various flow levels; and has recently documented the gradual decline in river levels over time following construction of the dams (USGS 1998). According to USGS, channel degradation and erosion has apparently stabilized since the late 1970s, but spring and summer water levels continued to decline in recent decades because of seasonal decreases in flow from the upstream watershed. Less flow during the spring and summer is likely caused by a combination of natural climatic changes and a variety of human activities in the ACF basin, including agricultural irrigation, M&I water use, flow regulation and reservoir evaporation (Light 2006).

Floodplain inundation during the growing season (generally April through October) is critical to the reproduction of many fish species, including some identified host species for the listed mussels. Analysis of the frequency and areal extent of growing-season (April through October) floodplain inundation in the pre-Lanier and post-West Point periods suggests that despite an increase in the annual duration of flows greater than 50,000 cfs during the post-West Point period, the frequency and extent of floodplain inundation during the post-West Point period is decreased relative to the pre-Lanier period, largely due to altered channel morphology. For example, 20,000 floodplain acres were inundated for 32 percent of the growing-season days in the pre-Lanier period, but for only 19 percent of the growing-season days in the post-West Point period (USFWS 2006).

Fish spawning in floodplain habitats requires periods of continuous inundation, because utilization of these floodplain habitats requires time for movement from the main channel into the floodplain, courtship and spawning behaviors, egg incubation, and juvenile growth to a size capable of moving to and surviving in the main channel when water levels recede. An analysis of the maximum floodplain acreage inundated for at least 30 days each year in both the pre-Lanier and post-West Point periods (using a 30-day moving minimum) suggests that inundated floodplain habitat availability during the post-West Point period is substantially less than the pre-Lanier period. In 50 percent of the pre-Lanier years, over 23,500 floodplain acres were inundated for at least 30 continuous growing-season days. The median for the post-West Point period is less than half this amount, about 11,000 acres (USFWS 2006).

7. Threatened and Endangered Species. The USFWS has identified 37 threatened and endangered species (including critical habitat if designated or proposed) that occur in the ACF River Basin (Table 2), and determined that effects of the proposed action are limited to those species that depend primarily on riverine habitat. Operations under the IOP will be conducted within the boundaries of the existing water control plans for the upstream reservoir projects, and will not change the top of the flood control pools, conservation pools, or the rule curves of the upstream projects. Therefore, the proposed action will have no effect or an insignificant effect (*i.e.*, any impacts should never reach the scale where take occurs) on all but the riverine- and estuarine-dependent species. Only the federally threatened Gulf sturgeon and federally endangered fat threeridge, federally threatened purple bankclimber, and federally threatened Chipola slabshell mussels and designated Gulf sturgeon critical habitat and proposed critical habitat for the mussels were identified as potentially being adversely affected by the proposed action. A description of the status and distribution of these species in the project area is provided below. Unless otherwise noted, the source for the threatened and endangered species information is the biological opinion and conference report on the IOP (USFWS 2006).

Two species of sea turtles and the West Indian manatee may sometimes occur in Apalachicola Bay or the lower Apalachicola River; however, any effects of the proposed action to these species would be insignificant also, due to their low numbers and only occasional seasonal residence in the river and bay. Three listed species of fresh water mussels occur in headwater areas upstream of the Corps' ACF projects: the shiny-rayed pocketbook, Gulf moccasinshell, and oval pigtoe. The proposed action will have no effect on these mussels as they occur outside of the project area. Altogether, the proposed action will have either no effect or an insignificant effect on the species listed in Table 1 and these are not further discussed in this environmental assessment.

Table 2. Species and critical habitat evaluated for effects from the proposed action but not discussed further in this Environmental Assessment (USFWS 2006).

Species or Critical Habitat	
Flatwoods salamander (*Ambystoma cingulatum*)	Black-spored quillwort (*Isoetes melanospora*)
Loggerhead turtle (*Caretta caretta caretta*)	Pondberry (*Lindera melissifolia*)
Eastern indigo snake (*Drymarchon corais couperi*)	White birds-in-a-nest (*Macbridea alba*)
Atlantic ridley (*Lepidochelys kempi*)	Canby's dropwort (*Oxypolis canbyi*)
Piping plover (*Charadrius melodus*)	Godfrey's butterwort (*Pinguicula ionantha*)
Bald eagle (*Haliaeetus leucocephalus*)	Harperella (*Ptilimnium nodosum)*
Wood stork (*Mycteria Americana*)	Chapman's rhododendron (*Rhododendron chapmanii*)
Gray bat (*Myotis grisescens*)	Michaux's sumac (*Rhus michauxii*)
Indiana bat (*Myotis sodalis*)	Green pitcherplant (*Sarracenia oreophila*)
West Indian manatee (*Trichechus manatus*)	American chaffseed (*Schwalbea Americana*)
Shiny-rayed pocketbook (*Lampsilis subangulata*)	Florida skullcap (*Scutellaria floridana*)
Gulf moccasinshell (*Medionidus penicillatus*)	Fringed campion (*Silene polypetala*)
Oval pigtoe (*Pleurobema pyriforme*)	Gentian pinkroot (*Spigelia gentianoides*)
Little amphianthus (*Amphianthus pusillus*)	Cooley meadowrue (*Thalictrum cooleyi*)
Apalachicola rosemary (*Conradina glabra*)	Florida torreya (*Torreya taxifolia*)
Telephus spurge (*Euphorbia telephioides*)	Relict trillium (*Trillium reliquum*)
Harper's beauty (*Harperocallis flava*)	

Gulf sturgeon. Prior to completion of Woodruff Dam, Gulf sturgeon were known to migrate to the Flint (Swift *et al.* 1977; Yerger 1977) and Chattahoochee Rivers to spawn (U.S. Army Corps of Engineers 1978). The USFWS has monitored the Gulf sturgeon subpopulation in the Apalachicola River since 1978. Gulf sturgeon have been documented in the main channel of the Apalachicola River from the Woodruff Dam downstream to its mouth, in Apalachicola Bay, and in various tributaries and distributaries to the main channel, such as the Brothers River. Since 1978 the USFWS has captured and tagged 1,515 Gulf sturgeon in the river, mostly in two areas: in the tailrace of Woodruff Dam (965 fish) and in the Brothers River (550 fish) (Wooley and Crateau 1985; Zehfuss *et al* 1999; Pine and Allen 2005). Gulf sturgeon have also been documented in Apalachicola Bay. The Apalachicola Bay is a highly productive lagoon-and-barrier-island complex that encompasses 54,910 hectares, including East Bay, St. George's Sound, Indian Lagoon, and St. Vincent Sound (Seaman 1988). There is very little data on Gulf sturgeon movements and habitat use in this enormous complex. In 1987, 1989, 1990, 1999, and 2000 the USFWS tracked sonic tagged Gulf sturgeon in Apalachicola Bay. Most of the tracking was limited to only a few hours per fish. Habitat preferences within the bay have not been determined.

Gulf sturgeon catch in the Apalachicola River in the early 1900s ranged from about 9,000 to 27,000 kg/year (U.S. Commission of Fish and Fisheries 1902; Huff 1975). The fishery declined to minimal levels by 1970 (Barkuloo 1987), and in 1984, the State of Florida prohibited all Gulf sturgeon fishing (Rule 46-15.01, Florida Marine Fisheries Commission). The Services (USFWS and NOAA) listed the species as threatened in

1991. Studies to estimate the size of the Gulf sturgeon population below Woodruff Dam have been conducted periodically since 1982. Researchers noted that Gulf sturgeon congregated in the area immediately downstream of Woodruff Dam during the summer months, with little movement out of area during their residency, which provided an opportunity for relatively unbiased population estimates using capture/recapture methods. Population sizes from these studies have ranged from a low of 62 fish in 1989 to 350 fish in 2004 (Wooley and Crateau 1985; Zehfuss *et al* 1999; U.S. Fish and Wildlife Service Annual Reports 1983-2005). Recent monitoring of Gulf sturgeon suggests that sturgeon are selecting alternate summer habitats elsewhere in the system, such as the Brothers River. A number of telemetered sturgeon did not migrate upstream to Woodruff Dam in the spring of 2005, and instead entered the Brothers River, remaining there until the fall downstream migration.

The Gulf sturgeon population in the Apalachicola River appears to be slowly increasing relative to levels observed in the 1980's and early 1990's (Pine and Allen 2005).

Fat threeridge. Surveys of the Apalachicola River system, generally suggest that the fat threeridge occurs in a limited range, but within that range, is locally abundant (USFWS 1998; Brim Box pers. comm. with Jerry Ziewitz, USFWS, 1994; Williams pers. comm. with Jerry Ziewitz, USFWS, 2000; Brim Box and Williams 2000; Richardson and Yokley 1996; Miller 1998; and Miller 2000). All recent surveys have reported evidence of recruitment in the main channel of the Apalachicola River (RM44.3 and RM46.8; USFWS unpubl. data 2006), Swift Slough (Williams pers. comm. 2000; EnviroScience 2006a; USFWS unpubl. data 2006), and the Chipola River and Cut (Miller 2005; EnviroScience 2006a; USFWS unpubl. data 2006). Brim Box and Williams (2000), Miller (2005), and EnviroScience (2006) systematically surveyed the Apalachicola River for freshwater mussels; however, due to the nature of the survey techniques, it is easy to miss mussels that may be between survey sites. The fat threeridge has been recently collected from the tailrace of Jim Woodruff Dam (RM106) downstream to RM15.3 on the south end of Bloody Bluff Island (USFWS unpubl. data 2006). The bulk of the survey locations occur between RM60 and RM21. Results of extensive sampling in the Apalachicola system in 2005 confirm that the fat threeridge is locally common in the Apalachicola River from RM44 to RM26, the Chipola River and Chipola Cut, and Swift Slough (EnviroScience 2006a). It was also detected in Kennedy Creek and in the inflow of Brushy Creek Feeder B (EnviroScience 2006a; FWCC 2006). Miller located a healthy population at approximate Navigation Mile 74 (Miller 2005). Of note, the fat threeridge was once abundant at the shoal located near RM105; however, live specimens have not been collected there since 1981 (USFWS, unpubl.data 2006).

The fat threeridge is generally found at water depths less than 5 ft in the Apalachicola River (Miller 2005; EnviroScience 2006a; EnviroScience unpubl data 2006). Surveys by Miller (2005) have found that it was most abundant at depths ranging from 3 to 5 ft (highest abundance at 4 ft). It was much less common in waters deeper than 5 ft and shallower than 3 ft likely resulting from erosional conditions in deeper areas and predation and desiccation in shallower areas (Miller 2005). EnviroScience (2006a) also reported that most fat threeridge occurred in the first 5 m from the bank at depths of less

than 5 ft. Both of these surveys (Miller 2005; EnviroScience 2006a) were conducted at discharges generally greater than 9000 cfs; however, similar trends in mussel depths were reported when flows were much lower (about 5800-6000 cfs). EnviroScience sampled a main channel location (RM46.8) on 7 August 2006, and found that the majority of the fat threeridge sampled occurred at about 3 ft deep and about 99 percent of fat threeridge were found at depths of less than 4 ft (EnviroScience unpubl data 2006). Because the fat threeridge was found at similar depths at various flows, it likely prefers depths of less than 4-5 ft, and moves to maintain these depths in response to changing river stage. As noted above, the fat threeridge is most abundant in the middle reach of the Apalachicola from RM44 to RM26, including the Chipola Cutoff and Swift Slough distributaries. This reach has been undergoing substantial sedimentation morphological changes in recent years, likely due to a combination of cessation of maintenance dredging and an increasing amount of flow diverted from the Apalachicola River down the Chipola Cutoff arm (due to the stream hydraulic characteristics, sediment laden waters continue down the Apalachicola River arm and the "cleaner" water is diverted down the Chipola Cutoff arm).

The exposure of several thousand fat threeridge in the middle reach of the river (RM 50 to RM 40) during the summer of 2006 revealed that the species is far more abundant in this reach than previously recognized. In the summer of 2006, thousands of fat threeridge were exposed in portions of this reach during low flows, which resulted in a die-off on a scale never before observed on the Apalachicola River. The USFWS determined that mussel mortality was due to the combined effects of drought, sediment (and mussel) movement during high flows in previous years, channel instability, and depletions to basin inflow. It was not attributed to water management operations at Jim Woodruff, which at that time had been releasing at least basin inflow in accordance with the low flow operations protocol outlined in the IOP.

Purple bankclimber. Purple bankclimber mussels have been recently collected in the main channel of the Apalachicola River from the Jim Woodruff Dam (RM106) downstream to about RM17.7. They have also been collected in Swift Slough, River Styx, a distributary that flows into Brushy Creek, and the Chipola Cutoff, but not in the Chipola River proper (USFWS, unpubl. data 2006; EnviroScience 2006a; FWCC 2006).

There are no population estimates for the purple bankclimber in the project area or a length-at-age relationship from which to infer population structure, annual survival rates, or year class strength. Like the fat threeridge, most of the sampling has been qualitative and only catch per unit effort (CPUE) data is available. Recent survey data suggest purple bankclimber are perhaps the rarest member of the Apalachicola River mussel fauna. It represented less than 2 percent of the Corps' survey findings from 1996 to 2002 (Miller 2005), and 1 percent of the EnviroScience (2006a) survey findings in 2005, half of which were detected at a single location. The species represented much less than 1 percent of the USFWS survey in 2006 (USFWS unpubl data 2006).

While recent surveys have documented fat threeridge recruitment, there is only one report of a relatively small (size class 75-96 mm) purple bankclimber collected recently in the in

the Chipola Cutoff (EnviroScience 2006a), which suggests either poor reproductive success or sampling methods that are not suited to detecting juveniles of this species. The purple bankclimber is characterized as a species preferring the deeper portions of main channels (often at depths greater than 3 m) in the larger rivers within its range (Brim Box and Williams 2000; EnviroScience 2006a).

Chipola slabshell. Researchers have only recently documented this species in the project area. In 2005, one individual was collected in the Chipola River about 2.3 river miles downstream of its junction with the Chipola Cutoff (EnviroScience 2006a). Eight individuals were collected immediately downstream of Dead Lake (upstream of the Chipola Cutoff) in 1991 (Brim Box and Williams 2000), but before that, the Chipola slabshell was known only upstream of Dead Lake in the Chipola River Basin (all of these accounts are outside of the project area). The USFWS is presently funding a mussel survey to determine the current status and distribution of the Chipola slabshell (and other species) in the Chipola River Basin.

There are no population estimates for the Chipola slabshell in the project area or a length-at-age relationship from which to infer population structure, annual mortality and survival rates, or year class strength. Only one individual has ever been collected in the project area.

8. Historic and Archeological Resources. The Apalachicola River valley is an area rich in cultural history with human occupation currently known to date back almost 11,000 years. The earliest peoples known to settle the area Archaeological research in the area began as early as 1928 with William Bartram's travels along the Northwest Florida coast in the 1770s. Clarence Moore ventured up the Apalachicola River in his boat *The Gopher* in the early 1900s and his documentation of the many mounded earthforms left behind by early populations formed the basis for much of the later research by Gordon Willey, and many surveys and excavations by Florida, Alabama, North Carolina, and Ohio universities as well as work by various cultural resources management (CRM) firms.

Because of the dense and lengthy occupational history of the area there are possibly well over one hundred or more historical and archaeological sites near and along the Apalachicola River that have yet to be recorded between the base of Jim Woodruff Dam and Apalachicola Bay to the south. Of the numbers of sites that are recorded, approximately 23 historical and archaeological sites have been listed to the National Register of Historic Places for Jackson, Gadsden, Liberty, Calhoun, Gulf, and Franklin counties. Overall, the listed properties provide a decent representative sample of the history of life along the river, and the types of resources one can expect to find there.

The Bryan (Great Oaks) Mansion in Jackson County is an antebellum Greek Revival home constructed of flush wood siding in 1857 and an important historical property, as is the Marianna Historic District in Marianna, Florida. Also, the Mill Pond Site also in Jackson County is a Late Mississippian Chatot Indian Village consisting of caves and rockshelters dating just before and at the brink of Spanish exploration in the Americas

(1200-1500 AD). The U.S. Arsenal-Officers Quarters in Gadsden County constructed of brick in 1839 was first constructed to house the Chattahoochee Arsenal, and then became a center for Confederate troop organization during the Civil War. Two impressive sites in Liberty County include the Yon Mound and Village Site, and Torreya State Park. Yon Mound and Village is believed to be a Mississippian Stage site occupied for hundreds of years beginning around 800 AD. The Torreya State Park encloses a time capsule of significant history beginning with several Late Woodland Stage (800-900 A.D.) archaeological sites, as well as the reconstructed Gregory Mansion which overlooks the Apalachicola and was home to a prominent cotton planter beginning in the late 1840's, and finally several Confederate gunpits and earthen parapets used during the Civil War. Franklin County contains some of the earliest recorded archaeological sites in the area, namely the Yent Mound complex, and the Porters Bar site both originally documented by Clarence B. Moore in 1902 during his journeys up the Apalachicola. These two sites are successive occupations spanning from the Early Woodland through the Late Woodland Stages respectively (~300 B.C. – 600 A.D.). Additionally, it is home to Fort Gadsden, originally constructed by the British during the War of 1812, the fort briefly became a settlement of fugitive slaves and a small contingent of Seminole and Choctaw Indians. The Fort was eventually used as a post for the Confederacy during the Civil War until an outbreak of malaria necessitated its abandonment in 1863. Time periods that are known to have had a significant impact on habitation along the southern Apalachicola River but that are not well documented are the Spanish explorations and colonial settlements beginning in the early 1500's through the early 1800's, and then finally the removal of the Indians beginning in 1823. Finally, at least 26 steamboats were reported to have sunk, snagged, or exploded in Florida's portion of the Apalachicola River between the nineteenth and early twentieth centuries.

9. Soils/Sediments. As a sand-bed alluvial river, the Apalachicola is a dynamic system constantly changing by ongoing processes of erosion and sedimentation. The river banks are dominated by cohesive sediments that include large quantities of silt and clay (Lidstone and Anderson, Inc. 1989). The main channel substrate consists primarily of coarse sand and sandy/silt material. Additional substrates in the main channel include limestone bedrock, cobble, gravel, and a consolidated hard clay-like material (generally these substrates are confined to the upper river between RM 86 and RM105).

Soft muddy substrates comprise about 78 percent of the open water zone in Apalachicola Bay, with the remainder divided between oyster reefs and sandy sediments with submerged aquatic vegetation (Livingston 1984).

10. Recreation. The ACF basin contains approximately 2 million acres of public lands and resource protection areas including heavily used federal reservoirs, national forests, national and state parks, and resort communities. The five Corps projects in the basin account for 235,291 total acres of land and water. A wide variety of recreational opportunities are provided at these lakes including boating, fishing, picnicking, sightseeing, water skiing, and camping. As described above, these reservoirs support popular sport fisheries, some of which have achieved national acclaim for trophy-size catches of largemouth bass.

Recreation in the Apalachicola River is based primarily on its warm water fishery. Bass, sunfish and catfish are the preferred game species. Public and private land holdings are located throughout the Apalachicola River basin. Significant portions of the Apalachicola River floodplain are owned and managed as natural resource areas by the NWFWMD; the Florida Fish and Wildlife Conservation Commission (FWCC) (Lower Apalachicola River Basin Environmentally Endangered Lands); U.S. Forest Service (Apalachicola National Forest); Florida Department of Environmental Protection (Three Rivers State Recreation Area, Torreya State Park and the Apalachicola National Estuarine Research Reserve); and The Nature Conservancy (Apalachicola Bluffs and Ravines Preserve, "Garden of Eden"). These publicly held lands include wildlife management areas, reserves, refuges, forests, state parks, recreation areas, conservation lands and special feature sites that are used for hunting, as well as non-consumptive recreational uses such as hiking, nature study, and picnicking.

Apalachicola Bay is part of the Apalachicola National Estuarine Research Reserve and thus provides educational and recreational opportunities as well.

11. Hazardous and Toxic Materials. Almost the entire floodplain of the Apalachicola River Basin is forested. Predominant land uses in the drainage area of the Apalachicola River in Florida include upland forests (53.5 percent), wetlands (30.5 percent), agriculture (8.4 percent), and urban/built-up (2.1 percent). There are very few industrial sites located along the river. An EPA review of published accounts of abandoned contaminated waste sites on the EPA National Priorities List (NPL) indicated that there are no known contaminated sites in the Apalachicola River Basin (USACE 1998 Draft EIS).

3. DESCRIPTION OF THE RECOMMENDED PLAN: The proposed action is the Corps' IOP for Jim Woodruff Dam, which describes minimum releases and maximum fall rates for releases from the dam to the Apalachicola River in support of endangered and threatened species and critical habitat (Gulf sturgeon and fat threeridge, purple bankclimber, and Chipola slabshell mussels). The IOP is not a new water control plan for Woodruff Dam; rather it is a definition of adjustments to existing operations, within the limits established by the existing water control plan, determined through consultation with the USFWS as necessary to support or minimize adverse affects to Federally listed endangered and threatened species and designated and proposed critical habitat for such species. The recommended plan represents the final IOP as proposed by the Corps, with incorporation of the reasonable and prudent measures and the terms and conditions approved by the USFWS in the Final Biological Opinion issued on 5 September 2006. The final IOP was developed following consultation with the USFWS, incorporating the proposed adjustment to minimize impacts on water management and project purposes and to minimize fluctuations in flow on the Apalachicola River and within the critical habitat areas for the listed species. The IOP specifies two parameters applicable to the daily releases from Woodruff: a minimum discharge in relation to average basin inflows (daily average in cubic feet per second [cfs]) and maximum fall rate (vertical drop in river stage [ft/day]). The minimum releases from Woodruff Dam as prescribed by the

IOP are provided in Table 3. These minimum releases vary by basin inflow and by season of the year.

Basin inflow is defined for the IOP as the amount of water that would flow by Woodruff Dam during a given time period if all of the Corps' reservoirs maintained a constant water surface elevation during that period; i.e., basin inflow is river flow without the influence of the Corps' reservoir operations. Basin inflow is estimated daily from a combination of river and reservoir level measurements, mathematical stage/volume/discharge relationships, and operating characteristics of the various water release structures of the dams. Basin inflow is not the natural or "unimpaired" flow of the basin at the site of Jim Woodruff Dam, because it reflects the influences of reservoir evaporative losses, inter-basin water transfers, and consumptive water uses, such as municipal water supply and agricultural irrigation. Basin inflow represents the total amount of water that is available to add to storage in the Corps' reservoirs during a given time period, although the Corps never captures 100 percent of basin inflow in storage due to physical constraints, minimum release requirements at each of the dams, and storage capacity limitations.

The IOP defines high, mid, and low ranges of basin inflow for operational decisions. In the high range, the releases meet at least the defined minimum discharge and any amount of basin inflow in excess of the minimum may be stored. In the mid range, releases are at least 70 percent of basin inflow, but not less than the low-range threshold, and up to 30 percent of basin inflow may be stored. In the low range, releases are at least 100 percent of basin inflow, but not less than 5,000 cfs, and no storage would occur.

The basin inflow threshold levels that separate the high, mid, and low ranges vary by season. The IOP operations and thresholds during March through May are intended to support Gulf sturgeon spawning activities. The March through May threshold between high and mid basin inflow is 37,400 cfs, and the threshold between mid and low basin inflow is 20,400 cfs. The IOP operations during June through February are intended to support the protected mussels, host fish for mussels, and young sturgeon. The June through February threshold between high and mid basin inflow is 23,000 cfs, with a minimum release of 16,000 cfs. The 16,000 cfs minimum release is based on evaluation of spawning and rearing needs for the host fish necessary for mussel reproduction. The June through February threshold between mid and low basin inflow is 10,000 cfs.

The IOP flow rates included in Table 3 are described as minimum, and not target, releases for Jim Woodruff Dam. During a given month and basin inflow rate, releases greater than the Table 3 minimum releases may occur consistent with the maximum fall rate schedule, described below, or as needed to achieve other project purposes, such as hydropower or flood control. During wet periods, releases may substantially exceed the Table 3 values, but during dry periods, releases will more closely match the Table 3 values, as the Corps operates to conserve reservoir storage for authorized project purposes and future endangered and threatened species augmentation flow needs.

The IOP also prescribes maximum fall rates for the releases from Jim Woodruff Dam (Table 4). Fall rate, also called down-ramping rate, is the vertical drop in river stage (water surface elevation) that occurs over a given period of time. The IOP fall rates are expressed in units of feet per day (ft/day), and are measured at the Chattahoochee gage as the difference between the daily average river stage of consecutive calendar days. Rise rates (e.g., today's average river stage is higher than yesterday's) are not addressed in the IOP, only fall rates. Maximum fall rates under the IOP vary according to the flow released from the dam. Lower flows are assigned more gradual fall rates, and higher flows are assigned more rapid fall rates. The intent of the IOP maximum fall rate schedule is to limit the potential for stranding aquatic organisms, including the listed species and host fish for listed mussel species, in areas that become exposed or become disconnected from the main channel during periods of declining flow.

Managing fall rates to conform with Table 4 is a difficult undertaking at Jim Woodruff Dam when flow rates exceed the release capacity of the powerhouse, which is about 16,000 cfs. Releases of greater than 16,000 cfs require the use of spillway gates in addition to the turbines, and require an operator to open or close the gates using a rail-mounted crane on the crest of the dam. One spillgate opening has previously been estimated to result in a change in release of approximately 2,000 cfs or approximately 1 foot per day, more or less. The water discharge openings of the gates are not fully adjustable and inclement weather, floating debris from the reservoir, and other factors often complicate the procedure of opening and closing the gates. Fall rates are relatively more manageable when releases are less than 16,000 cfs and controlled by the powerhouse, but this control is not yet a precise operation. Neither turbine nor gate operations provide for precise flow measurement. For these reasons, a lower and an upper maximum fall rate is given in Table 4 for each release range specified. When conditions allow, fall rates will generally conform to the more gradual (lower) rate in each range, consistent with safety requirements, flood control purposes, and equipment capabilities.

A 7-day moving average of daily basin inflow calculation is used to implement decisions under the IOP and determine the minimum daily release from Jim Woodruff Dam. The 7-day moving average dampens the effects of daily fluctuations in basin inflow and results in less extreme day-to-day changes in the required minimum release from the dam. This dampening should generally, but not always, yield a required minimum release under Table 3 that is also consistent with the Table 4 ramping rate schedule without the release of additional water from storage. To prevent a substantial drawdown of storage due to gradual down ramping while following declining basin inflow, the volume of basin inflow and releases is also monitored. When the volume of releases exceeds the volume of basin inflow during a given period by more than 5 percent, the Corps will adjust subsequent releases to replenish the storage that was used for down ramping. The adjustment will involve delaying and/or reducing an increase in releases during the next period of rising basin inflow. Similarly, if an inadvertent under-release occurs, a subsequent adjustment would involve an increase in releases thereafter to assure a volumetric release equivalent to the computed volume of basin inflow.

A limited hydropower peaking operation occurs at Jim Woodruff Dam when daily average releases are less than the combined capacity of the powerhouse turbines (about 16,000 cfs) in order to deliver extra power during hours of peak demand for electricity. Hydropower peaking involves increasing the discharge for a few hours each day to near the full capacity of one or more of the turbines. These releases are included in the daily average discharge computations for minimum flow requirements under Table 3. The peaks are also included in the stage computations for ramping rate requirements under Table 4; however, Table 4 addresses the difference between the average river stage of consecutive calendar days, not the shorter-term differences that result from peaking operations within a calendar day. The relative drop in river stage from the peak to the base release will vary with different flows, but becomes more pronounced as flows decline, typically not more than 2.5 foot fluctuation per day above the base flow. As average daily releases approach 5,000 cfs, the daily peaking operation will be discontinued in order to maintain instantaneous releases greater than or equal to 5,000 cfs.

Reasonable and prudent measure (RPM) 3 of the incidental take statement for the IOP requires developing a drought provision plan that modifies the IOP to provide a higher minimum flow to the Apalachicola River when reservoir storage and hydrologic conditions permit. Mussel mortality due to low-flow conditions can be minimized by supporting a higher minimum flow when total reservoir storage and/or hydrologic conditions permit. The proposed action uses reservoir storage to support a 5,000 cfs minimum flow in the river when basin inflow is less than 5,000 cfs. However, available data indicates that higher minimum flows are supportable during normal and wet hydrologic periods, and during dry periods when the reservoirs are relatively full. Conversely, during extended drier than normal conditions, it may be prudent to release less water during the spring Gulf sturgeon spawning period in order to store more water so as to insure water is available for augmentation flows later. Additional NEPA analysis and Section 7 consultation under the ESA may be required based on the scope of the changes recommended in the drought provision plan.

4. ALTERNATIVES TO THE RECOMMENDED PLAN:

a. "No Action" Alternative. The CEQ regulations require analysis of the "no action" alternative 40 C.F.R. § 1502.14. Based on the nature of the proposed action, "no action" represents "no change" from the current management direction or level of management intensity. This alternative would represent water control operations at Jim Woodruff Dam without implementation of the IOP. It should be noted that the Corps operations have changed incrementally over the post-West Point period of record, and were documented in a draft water control plan in 1989. Additional incremental changes in water control operations have also occurred since 1989 and are reflected in the "no action" operations and the proposed action. These incremental changes have been considered to be within the range of discretionary operations described in the water control plan, and have not altered the rule curves of the plan. There is no "static" baseline operational measure to compare to during this period. Therefore the Corps selected the low flow operation protocols implemented at Jim Woodruff Dam in 2004

and 2005 as the "no action" alternative. The low flow operations protocols were developed within the constraints of the existing water control plan in order to minimize or avoid adverse impacts or provide support to endangered and threatened species and critical habitat which occur on the Apalachicola River. The protocols were developed and coordinated with the USFWS and FWCC and periodic consultations were conducted with these agencies during the low flow operations to collaboratively agree on the timing and rate of any reductions in releases. This alternative represents the way the Corps was operating at Jim Woodruff in support of downstream endangered and threatened species on the Apalachicola River prior to development of the IOP and initiation of formal consultation.

The low flow operation protocols required that releases from Jim Woodruff Dam would meet or exceed basin inflows whenever basin inflows fell to 20,000 cfs or lower during the spring Gulf sturgeon spawning months (typically March-May). Ramping rates of 0.5 ft per day or less would be imposed whenever flows fell to 16,000 cfs or lower. When flows were between 16,000 cfs and 20,000 cfs, ramping rates between 0.5 ft and 1.0 ft per day would be imposed. A similar low flow operations protocol would be implemented whenever flows approached 8,000 cfs (June-February) or lower in order to protect mussels from exposure, with releases then matched to basin inflows or greater. No additional restrictions on storage were imposed. It should be noted that a 3-day moving average of daily basin inflow calculation was used to implement decisions under the low flow operations protocols and to determine the minimum daily release from Jim Woodruff Dam during this period.

Both the proposed action and the "no action" alternative minimize adverse impacts and provide support to endangered and threatened species and critical habitat occurring in the Apalachicola River. However, the proposed action was determined to more adequately address the needs of the endangered and threatened species (based on Section 7 formal consultation). Discretionary actions taken by the Corps during low flow operations that do not adhere to the IOP could result in a violation of Section 9 of the ESA.

b. Other Alternatives Considered During Section 7 Consultation. It should be noted that the initially proposed IOP included the 3-day average for managing releases to basin inflow as opposed to a 7-day average, an upper flow threshold of 37,400 cfs, and a lower flow threshold of 8,000 cfs for months of June through February. An adjusted IOP included the proposed change to a 7-day average basin inflow and volumetric computations of inflows and releases, and a lower upper flow threshold of 23,000 cfs for June through February. Following completion of formal consultation, USFWS also imposed the RPM2 recommendation to adjust the lower flow threshold for June through February from 8,000 cfs to 10,000 cfs. These alternatives were recommended to facilitate operations and to minimize take of listed species, and have been incorporated in to the final IOP which represents the recommended plan.

Table 3. IOP minimum discharge from Woodruff Dam by month and by basin inflow (BI) rates.

Months	Basin Inflow (cfs)[a]		Releases from Woodruff Dam (cfs)
March - May	High	>= 37,400	not less than 37,400
	Mid	>= 20,400 and < 37,400	>= 70% BI; not less than 20,400
	Low	< 20,400	>= BI; not less than 5,000
June - February	High	>= 23,000	not less than 16,000
	Mid	>= 10,000 and < 23,000	>= 70% BI; not less than 10,000
	Low	< 10,000	>= BI; not less than 5,000

[a] The running 7-day average daily inflow to the Corps ACF reservoir projects, excluding releases from project storage.

Table 4. IOP maximum fall rate for discharge from Woodruff Dam by release range.

Approximate Release Range (cfs)	Maximum Fall Rate (ft/day)[a]
$\geq$ 30,000	Fall rate is not limited.
$\geq$ 20,000 and < 30,000	1.0 to 2.0
> 16,000 and < 20,000	0.5 to 1.0
> 8,000 and $\leq$ 16,000	0.25 to 0.5
$\leq$ 8,000	0.25 or less

[a] Consistent with safety requirements, flood control purposes, and equipment capabilities, the IOP indicates that the Corps will attempt to limit fall rates to the lower value specified for each release range.

5. ENVIRONMENTAL IMPACTS OF THE RECOMMENDED PLAN: The proposed action was designed to minimize adverse effects on listed species to the maximum extent practicable or feasible based on equipment constraints, and safety concerns. Consideration was also given to the need to balance releases to the river with the need to refill or conserve storage in upstream reservoirs in the interest of having adequate storage in later months when augmentation flows may be necessary to protect listed mussel species. The restrictions on amount of refill of reservoirs (i.e., minimum 70 percent release and up to 30 percent refill for middle ranges of basin inflow) were derived based on analysis of historic trend data for years of various flow conditions. HEC-5 model simulations were run for the "no action" and proposed action and graphical representations of the results were generated for various analyses (reservoir elevations and river flows). These figures are provided in Appendix C. The following describes the environmental impacts associated with implementation of the IOP.

a. Physical Impacts. Channel morphology continues to change in the Apalachicola River, and may not reach a dynamic equilibrium in the foreseeable future. Physical habitat conditions in the project area are largely determined by flow regime, and channel morphology sets the context for the flow regime. A recent study by the USGS (Light, 2006) has documented morphological changes in the river since the 1950s resulting in declining river stages, and some significant sedimentation has been observed below the Chipola Cutoff since the effective cessation of dredging in 2000. These impacts have not been attributable to water management operations at Jim Woodruff Dam. Moreover, the influence of the IOP on the Apalachicola River flow regime is not expected to adversely impact stream channel stability; nor alter sand, gravel, or cobble bottom substrate. Therefore, it was determined that the proposed action will not significantly impact physical habitat conditions in the project area including conditions within critical habitat areas.

b. Land Use Changes. Predominant land uses in the drainage area of the Apalachicola River in Florida include upland forests (53.5 percent), wetlands (30.5 percent), agriculture (8.4 percent), and urban/built-up (2.1 percent). The proposed action does not change land use within the project area and will not impact State, area-wide and local plans and programs for land use in the area.

c. Historic and Archaeological Resources. As described above, implementation of the IOP is not expected to impact stream channel stability or alter channel substrates. Therefore, potentially adverse effects to cultural resources, such as increased erosion, increased deposition, and increased access to historic and archaeological sites will not significantly change through implementation of the proposed action. The slower rates of fall included for the mid and lower ranges of flow may actually reduce potential for erosion of the river bed and banks. Therefore, it was determined that there should be no effect on historic or archeological properties listed, eligible for listing in the National Register of Historic Places, or otherwise of historical or archaeological value.

d. Fisheries. The IOP is consistent with the Division Regulation DR 1130-2-16 and

draft CESAM SOP 1130-2-9 regarding project operations in support of reservoir fish management. The goal of the SOP is to manage the reservoir conditions such that they are relatively stable or rising for a minimum 4-6 week period within the principal fish spawning period for each project site; while also providing for relatively stable or gradually declining Apalachicola River stages for a minimum designated period (Table 5). Under the IOP, during higher flow periods, refill of reservoirs may occur and reservoirs may experience relatively steady or rising levels during the fish spawn period. During low flow period, releases would match basin inflows during fish spawn periods and reservoir levels would remain relatively steady, while Apalachicola River stages would be relatively steady to gradually declining. Therefore, these operations would be supportive of both reservoir and riverine fish spawning activities.

Table 5. Project specific principal fish spawning period for operational considerations.

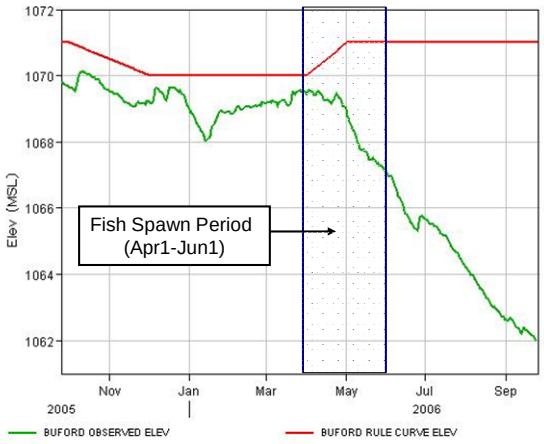
Project	Fish Spawn Period
Lake Lanier	01 Apr – 01 Jun
West Point	01 Apr – 01 Jun
Walter F. George	15 Mar – 15 May
Lake Seminole	01 Mar – 01 May
Apalachicola River	01 Apr – 01 Jun

Extensive drought conditions were experienced during the spring and summer of 2006, at which time, operations were conducted similar to the proposed action. Figure 4 demonstrates that under these low flow conditions, operations in support of reservoir fish still managed to meet the minimum 4 week goal of stable or rising reservoir levels during the principal fish spawning periods at each respective project site. Gradually declining river stages were provided with ramping down rates of 0.5 ft/day or slower.

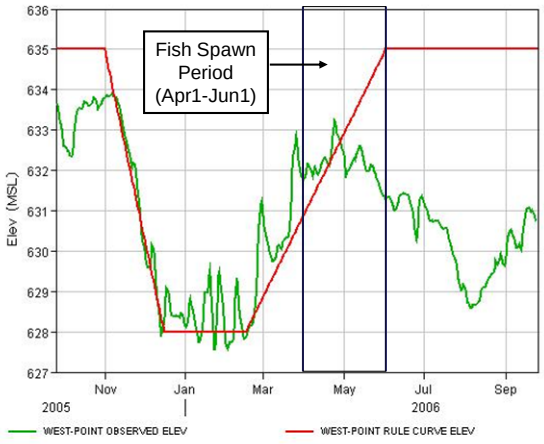
The IOP also provides for thresholds that would provide adequate connectivity to floodplain habitats when water is available, and matching of basin inflow as basin inflows decline. This would assure that the Corps discretionary operations would be supportive of access to floodplain habitat for feeding, spawning, and nursery purposes, and that any impacts to fisheries would be due to declining basin inflows rather than discretionary water management operations. The IOP was designed in part to support Apalachicola River fisheries, specifically Gulf sturgeon and host fish for the listed mussels. As described below, implementation of the proposed action will not significantly impact hydrology or water quality in the project area. Furthermore, aspects of the IOP, such as higher flows during the spring spawning period and increasing the amount and duration of floodplain connectivity to the main river channel during high and low flow conditions may prove beneficial to fisheries resources. Therefore, we determined that fisheries resources in the project area will not be significantly impacted by the proposed action.

Figure 4. Reservoir elevations for water year 2006 at Lake Lanier, West Point, Walter F. George, and Lake Seminole and Apalachicola River flow for calendar year 2006.

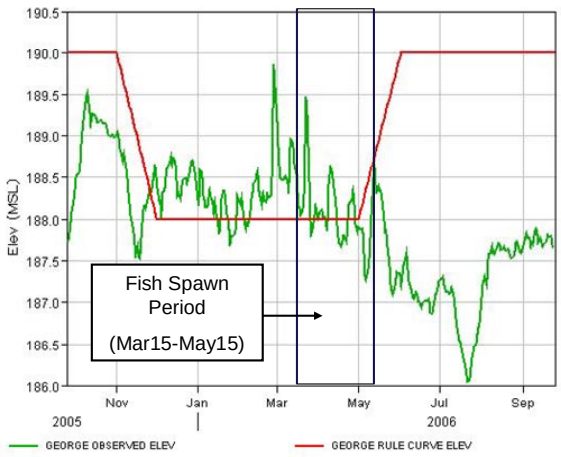
Lake Lanier Water Year 2006



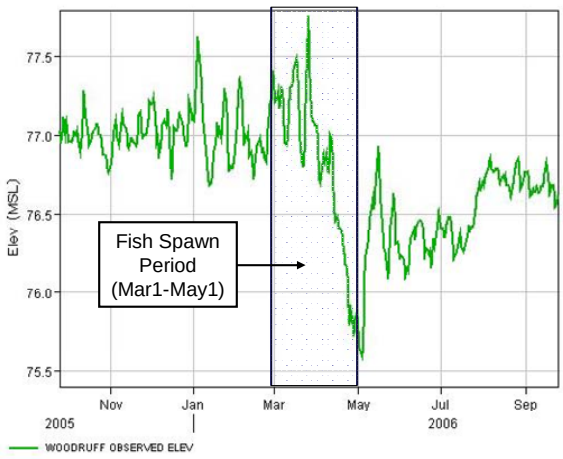
West Point Water Year 2006

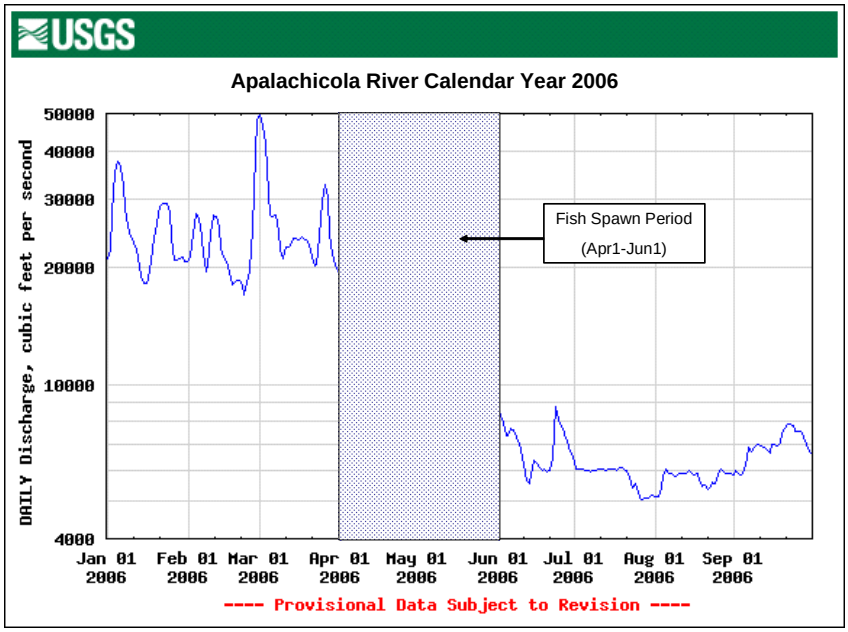


Walter F. George Water Year 2006



Lake Seminole Water Year 2006





e. Essential Fish Habitat. As described below, implementation of the proposed action will not significantly impact hydrology or water quality in the Apalachicola River or Bay. Furthermore, aspects of the IOP, such as higher flows during the spring spawning period and increasing the amount and duration of floodplain connectivity to the main river channel during high and low flow conditions may prove beneficial to primary production and to a lesser degree secondary production in the estuary. Therefore, we determined that EFH in the Apalachicola Bay system will not be significantly impacted by the proposed action.

f. Wildlife. Due to the nature of the proposed action, the evaluation of potential impacts focused on those species associated with aquatic and riparian communities. As described below, implementation of the proposed action will not significantly impact hydrology or water quality in the project area. Therefore, aquatic and riparian habitats supporting wildlife species in the Apalachicola River and Bay system should not be adversely impacted. Certain aspects of the IOP may prove beneficial to wildlife resources, such as increasing the amount and duration of floodplain connectivity to the main river channel during high and low flow conditions. We have determined that aquatic and terrestrial wildlife resources occurring in the project area will not be significantly impacted by the proposed action.

g. Threatened and Endangered Species. On September 5, 2006, the USFWS issued a Biological Opinion and Conference Report based on review of the proposed IOP for the water management operations at Jim Woodruff Dam, and the associated releases to the Apalachicola River, and its effects on the Gulf sturgeon, fat threeridge mussel, purple bankclimber mussel and Chipola slabshell mussel; and habitat designated and proposed as critical habitat for the Gulf

sturgeon and the mussels, respectively, pursuant to Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq*.).

The USFWS identified the following beneficial and adverse affects of the proposed action (Note: the initial proposed IOP contained a lower flow threshold of 8,000 cfs during the months of June through February):

Beneficial Effects:

- Basin inflow augmented when less than 5,000 cfs; no days less than 5,000 cfs.
- Decrease in maximum number of days/year between 5,000 and 8,000 cfs.
- Fewer days when the river falls more than 1 ft/day
- No days when the river falls more than 1 ft/day at flows less than 10,000 cfs
- Increase in Gulf sturgeon spawning habitat availability
- Increase in 30-day continuous floodplain inundation during high flows (greater than 37,400 cfs) and during low flows (less than 16,000 cfs)

Adverse Effects:

- Increase in the number of days when flows are between 8,000 and 10,000 cfs
- An increase in the number of days when the river falls faster than 0.25 ft/day at flows less than 10,000 cfs
- Decrease in 30-day continuous floodplain inundation during moderate flows (16,000 cfs to 37,400 cfs)

After reviewing the current status of the listed species and designated and proposed critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, the USFWS determined that implementation of the proposed IOP would not:

a) jeopardize the continued existence of the Gulf sturgeon, fat threeridge, purple bankclimber, and Chipola slabshell;

b) destroy or adversely modify designated critical habitat for the Gulf sturgeon; or

c) destroy or adversely modify proposed critical habitat for the fat threeridge, purple bankclimber; and Chipola slabshell.

The USFWS does not expect the proposed action will incidentally take any Gulf sturgeon or Chipola slabshell, but that it could result in incidental take of fat threeridge, and purple bankclimber. A description of the potential for incidental take is provided below.

Take of listed mussel species due to the IOP may occur when the Corps is increasing total storage in ACF reservoirs while releasing a discharge that either exposes listed mussels or isolates them from flowing water. The form of this take is habitat modification, *i.e.*, reduced flow when storing basin inflow in federal reservoirs that results in mortality or reduced reproductive success from oxygen stress, temperature stress, and/or increased predation. The take is most likely to occur in depositional microhabitats that become isolated from flowing water when releases from Woodruff Dam are greater than 8,000 cfs and less than 10,000 cfs.

Mussels move in response to changing flow conditions. Flows less than 10,000 cfs occur in almost all years in the Apalachicola River. Natural mortality occurs when mussels are not successful in moving down slope when flows decline and are stranded at higher elevations. During a series of wet years with few or no low-flow events, a fraction of the population may naturally occur at relatively high elevations on the stream bed. Mussels may also be deposited at higher elevations following flood events. Recent data are consistent with both of these explanations for mussel stranding observed on the Apalachicola River during the summer of 2006. Of the stranded mussels USFWS observed in June 2006, 17 percent were found exposed at a stage above the 8,000 cfs level. Adverse effects will occur when low flows follow an extended period without low flows or follow a flood event that reshapes mussel habitat and/or redistributes mussels, such that they are vulnerable to stranding due to declining river stages.

The USFWS has determined that take attributable to the IOP for flows between 8,000 cfs and 10,000 cfs is presently limited to specific areas in the RM 50 to RM 40 reach of the main channel, the Chipola Cutoff, and Swift Slough. A small number of purple bankclimbers may be exposed on the rock shoal at RM 105 as flows decline below 10,000 cfs. However, the expected number of individuals to be taken by the IOP is unquantifiable, for the following reasons:

- The number of mussels in the range of 8,000 to 10,000 cfs depends on flow conditions in the previous months and years, which influence mussel movements and the number vulnerable to stranding in this range.

- The number of mussels in the range of 8,000 to 10,000 cfs depends on the timing, magnitude, and duration of flood events in the previous months and years, which may create and deposit mussels in areas vulnerable to stranding in this range.

- It is not possible to distinguish mortality that occurs in the 8,000 to 10,000 cfs range of stages due to the IOP from that which is not due to the IOP.

The Apalachicola River flows are highly variable. Some variability is natural and not possible to control so that it is unlikely to avoid all incidental take or to predict the amount of take in any given year.

Therefore, USFWS has decided to quantify the incidental take instead in terms of changes in the habitat of the listed mussels. It is anticipated the IOP will reduce flows sometimes in the range of 8,000 to 10,000 cfs when compared to a run-of-river (RoR) operation (i.e, the "no-action"alternative identified in the biological opinion, which differs from the no action alternative described in this environmental assessment). The Corps cannot control or predict the number of days that basin inflow will fall in this range, but can control releases during such times.

Although model results provide the basis for the estimate of anticipated take, the USFWS recognized that differences between modeled and actual operations needed to be analyzed in order to formulate a realistic surrogate measure of take to apply to actual operations. For example, the modeled releases match basin inflow exactly with very precise reservoir operation. In reality, however, such precise management is not achievable due to the uncertainty associated with forecasted flows. Ensuring that releases equal or exceed basin inflow as specified in the IOP is also more difficult because observed basin inflow is substantially more variable day-to-day than the modeled basin inflow, which was the motivation for using a 7-day moving average of basin inflow in the IOP.

USFWS examined the historic basin inflow record (12 May 1975 to 31 December 2001), provided by the Corps, to estimate a real-world equivalent measure of how often to expect actual releases under the IOP to be less than daily basin inflow when daily basin inflow is in the range of >= 8,000 to < 10,000 cfs. Daily basin inflow was in this range for a total of 781 days in this period, averaging about 29 days per year. The reference for the IOP operations is the 7-day moving average basin inflow, which was in the 8,000 to 10,000 cfs range for 1,052 days historically, averaging 39 days per year. The maximum difference within a year between the number of daily basin inflow days and the number of 7-day moving average basin inflow days in this range was also 39 days, which occurred in 1984.

The amount of incidental take anticipated is therefore at most 39 days per year of releases less than daily basin inflow, otherwise consistent with the IOP minimum release and maximum fall rate schedules, when daily basin inflow is in the range of 8,000 to 10,000 cfs. The level of take will be exceeded in the calendar year if the number of days that releases from Woodruff Dam in the range of 8,000 to 10,000 cfs is less than daily basin inflow is 40 or more. Exceeding this level of take would prompt a reinitiation of Section 7 consultation.

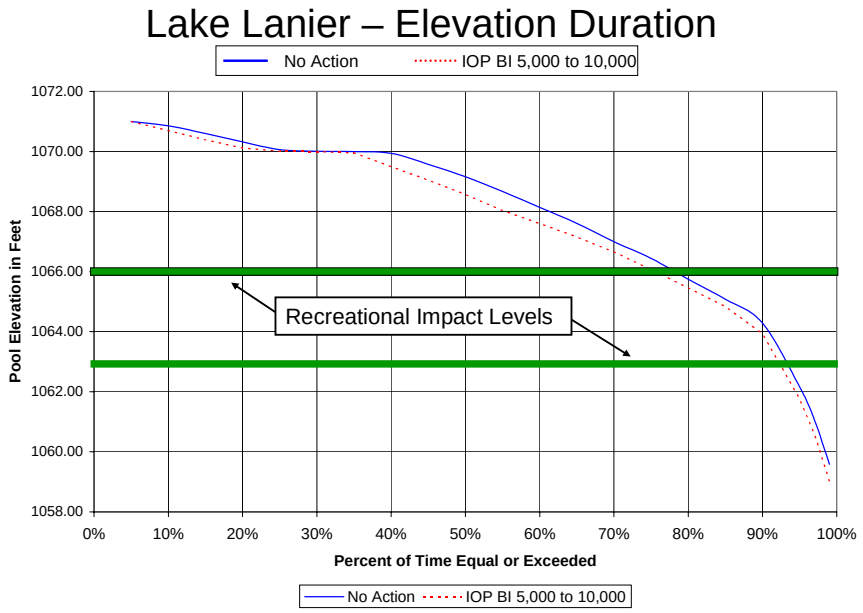
The USFWS also identified reasonable and prudent measures (RPMs) that are necessary and appropriate to minimize the impacts of incidental take of fat threeridge and purple bankclimber mussels. The proposed IOP action addressed in this environmental assessment incorporates these RPM's, specifically, RPM 2 which requires adjusting the lower threshold from 8,000 cfs to 10,000 cfs during June through February. This RPM is designed to avoid and minimize the potential for incidental take as described above. Some take may occur while operating to make releases to match basin inflow based on the 7-day average basin inflow when between 8,000 cfs and 10,000 cfs. However, we have determined that implementation of the proposed action will

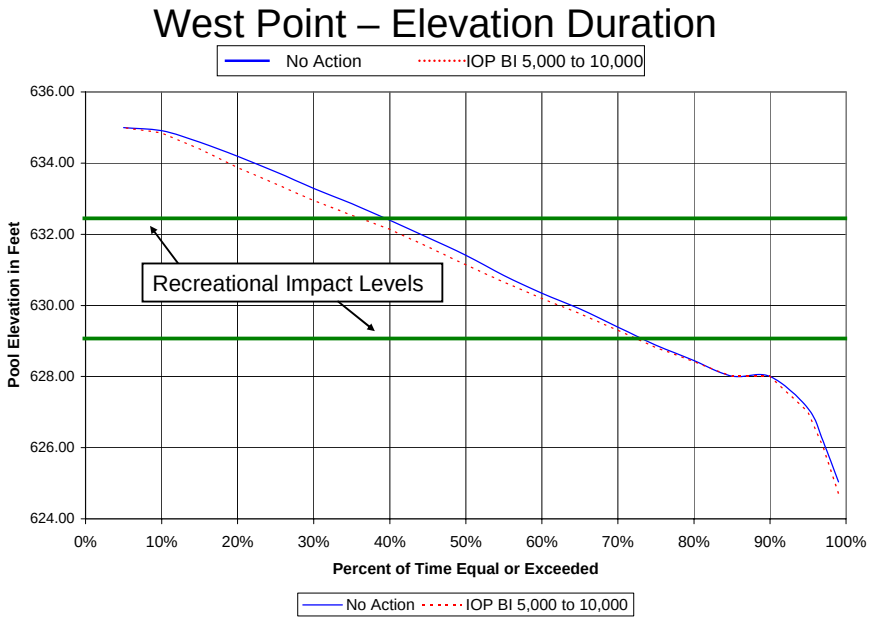
avoid and minimize impacts to mussels to the maximum extent practicable, and will not result in a significant impact to threatened and endangered species occurring in the project area. The IOP has been revised to reflect the revision of the lower flow threshold for the months of June through February from 8,000 cfs to 10,000 cfs.

h. Recreation. Implementation of the proposed action will not significantly impact recreational opportunities at the upstream reservoirs. No adverse impacts on reservoir levels due to IOP operations are identified. Reservoirs may not refill to summer pool elevations during extended dry periods or drought conditions but these impacts can generally be attributed to the declining basin inflows and drought conditions rather than operations under the IOP, since the minimum flows specified in the IOP are consistent with current minimum flows under the existing water control plan or releases made in conjunction with other project purposes (such as releases for hydropower production or water quality demands). Under drought conditions, implementation of the IOP could have temporary impacts during the peak recreational season (typically May – September) resulting from a delay in summer fill operations. However, it will not result in significantly more time that reservoir levels are within the recreational impact elevations (Figure 5). Furthermore, the lakes are managed in a balanced manner that attempts to avoid extreme fluctuations in reservoir levels. The IOP operation is also consistent with support of reservoir fish spawning and Apalachicola fish spawn during spring months, and would benefit sport fish accordingly. Therefore, we have determined that implementation of the IOP will not significantly impact recreation at Lakes Lanier, West Point, George, and Seminole.

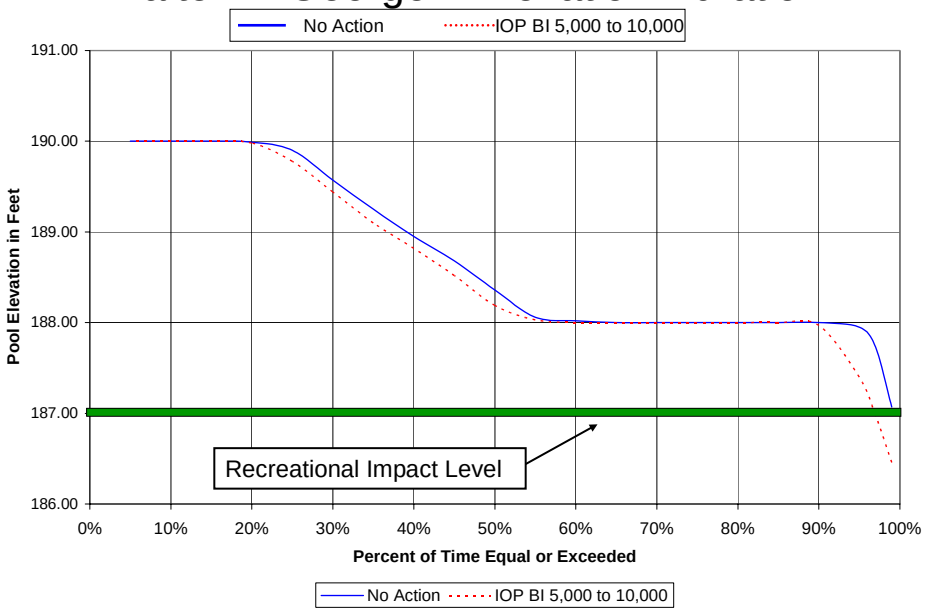
Implementation of the proposed action will not affect recreational opportunities on the Apalachicola River or Apalachicola Bay. The proposed project does not affect any component of the National Wild and Scenic Rivers System; and does not significantly impact any park, parklands, ecologically critical areas or other areas of ecological, recreational, scenic or aesthetic importance. Model results suggest that the proposed action may increase the amount of 30-day continuous floodplain connectivity acreage at high and low flows (USFWS 2006). Therefore, implementation of the IOP will likely benefit a number of sport fish, including suspected host fish for the listed mussels that utilize the inundated floodplain during high water events as habitats for spawning, feeding, shelter from predators, or as nursery grounds.

Figure 5. Recreational impact levels plotted against the elevation duration curves at Lake Lanier, West Point, Walter F. George, and Lake Seminole

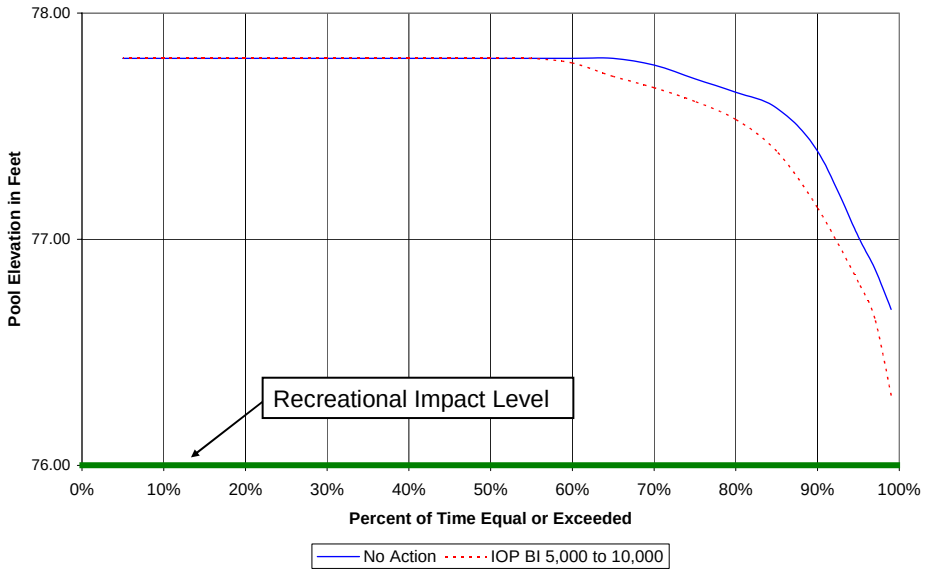




Walter F. George – Elevation Duration



Lake Seminole – Elevation Duration



i. Hydrology. Analysis of the "no action" reservoir levels indicates no significant difference in the pre-IOP operations to operations under the IOP. In most cases, releases during the middle to lower flow ranges approximate basin inflows. Also, reservoir levels in 2006 (operating under the IOP) are higher than those experienced during similar drought conditions in the year 2000 (Table 6).

As described above, the IOP specifies two parameters applicable to the hydrology of the Apalachicola River: daily releases from Jim Woodruff Dam (minimum discharge in relation to average basin inflows) and maximum fall rate (vertical drop in river stage). The minimum releases and fall rate schedules vary by amount of basin inflow and by month and are designed to mimic natural flow to the extent practicable. The IOP describes the flow rates as minimum, and not target, releases for Jim Woodruff Dam. During wet periods, releases may substantially exceed the IOP values, but during dry periods, releases will more closely match the IOP values in order to conserve reservoir storage for authorized project purposes and future endangered and threatened species needs. Implementation of the proposed action will not result in an appreciable change to water quantity in the project area, but could result in minor temporal shifts from historic conditions regarding the volume of water in the Apalachicola River (especially during drier conditions); i.e., somewhat higher flows in spring months and somewhat lower flows in summer to fall months. However, the proposed action does not significantly alter seasonal flows and attempts to mimic natural flow regimes by determining releases to the Apalachicola River based on season and basin inflow. Figure 6 demonstrates that the annual seasonally high flows (generally January – April) and seasonally low flows (generally September – November) are not altered by implementation of the IOP. Therefore, we have determined that implementation of the IOP will not significantly impact the hydrology of the Apalachicola River and bay system, or the upstream reservoirs.

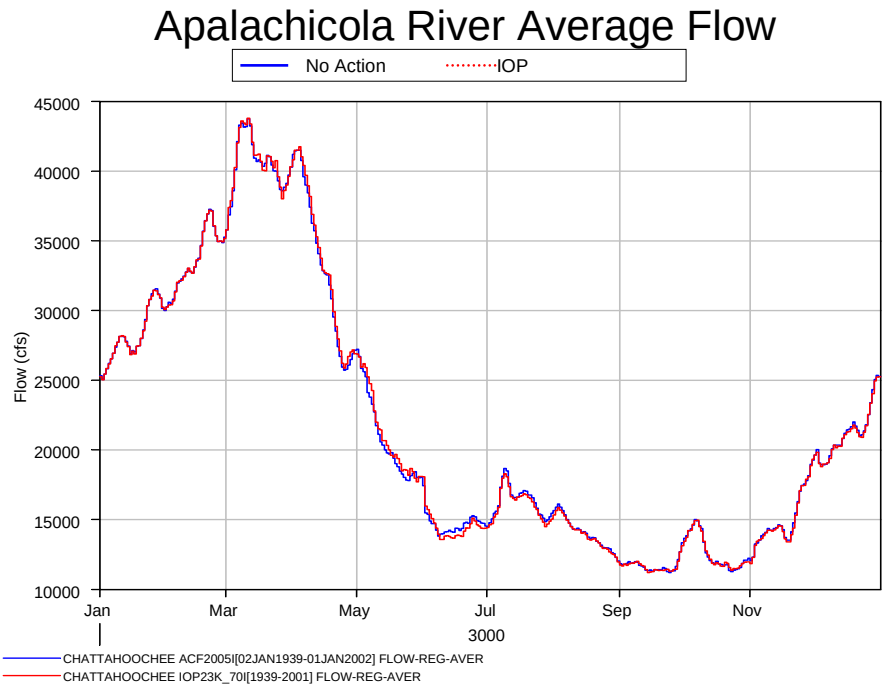
Table 6. Comparison of water year (Oct – Sept) 2000 and 2006 minimum reservoir levels[a].

Project	Water Year 2000	Water Year 2006[b]
Lake Lanier (msl)	1058.62	1061.99
West Point (NGVD)	625.22	627.55
Walter F. George (NGVD)	184.25	186.04
Lake Seminole (msl)	75.16	76.54

[a] Source: http://water.sam.usace.army.mil/acfframe.htm

[b] Water Year 2006 data is incomplete

Figure 6. HEC-5 model simulations for Apalachicola River average flow measured at Chattahoochee gage.



j. Water Quality. As described above, Buford, West Point, and Jim Woodruff dams all provide minimum continuous flow releases to meet State water quality commitments. Walter F. George provides occasional releases, as needed, to maintain acceptable DO values below the dam. Occasional special releases are also made at Buford to insure adequate DO and water temperature at the Buford Fish Hatchery located downstream of the dam. Implementation of the proposed action will not affect water quality releases at these reservoirs. The proposed action will not result in reservoir levels that limit the ability to support water quality releases. Releases from the upstream reservoirs in support of the IOP are able to meet the 750 cfs minimum flow on the Chattahoochee River near Peachtree Creek; provide adequate flows for the estimated assimilative capacity needs on the Chattahoochee River near Coumbus, Georgia; and meet the minimum flow of 5,000 cfs on the Apalachicola River at Chattahoochee gage.

Implementation of the proposed action is not anticipated to significantly alter water quality in the Apalachicola River and bay system. The proposed action does not change the 5,000 cfs minimum release at Jim Woodruff Dam. Furthermore, the proposed action does not alter seasonal flows and attempts to mimic natural flow regimes (especially during drier conditions) by determining releases to the Apalachicola River based on season and basin inflow. Previous studies suggest that maintaining particular levels of discharge at both the low and high flow end of the flow regime are needed to assure that all organisms in the Apalachicola Bay receive the

necessary nutritional and fresh water inputs. However, substantial alteration of flow regime features that may directly relate to primary and secondary production in the bay is not evident in the flow regime under the IOP (USFWS 2006). Therefore, we have determined that implementation of the IOP will not significantly impact water quality in the Apalachicola River and bay system.

k. Water Supply. Implementation of the proposed action will not affect water supply for M&I and agricultural use at the upstream reservoirs or the Apalachicola River. The proposed action will not result in reservoir levels or river levels that limit the ability to support water supply. No water intake structure should become exposed by operation under the IOP. Therefore, we have determined that implementation of the IOP will not significantly impact water supply.

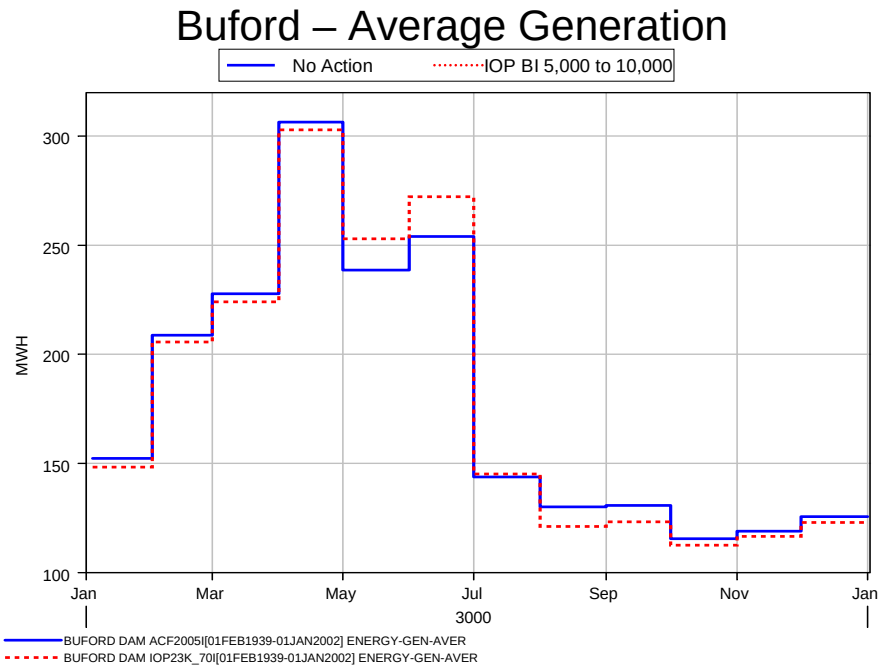
l. Flood Control. Implementation of the proposed action will not affect flood control operations at the upstream reservoirs. The proposed action will not result in reservoir levels that limit the ability to manage flood waters. Therefore, we have determined that implementation of the IOP will not significantly impact flood control.

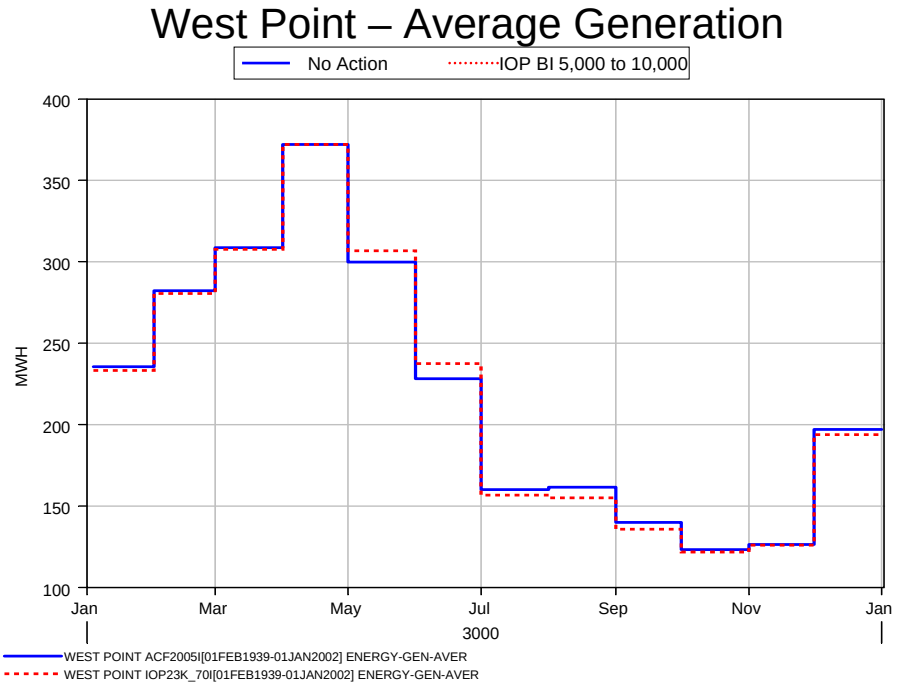
m. Navigation. As described above, navigation channel maintenance dredging on the Apalachicola River has been reduced since the 1980s due to a lack of adequate disposal area capacity in certain reaches of the river. No dredging was conducted in 2000 or 2002 due to sustained drought conditions in the basin, and only very limited dredging was conducted in 2001 and then shutdown due to sustained low flow conditions. No dredging has been conducted since that time, and currently has been indefinitely deferred due to denial of a Section 401 water quality certificate from the State of Florida for dredging operations (previous certification for dredging expired in November 2004, and application for renewal was denied in October 2005). The lack of dredging and routine maintenance has led to inadequate depths in the Apalachicola River navigation channel, and commercial navigation has only been possible on a seasonal basis when flows in the river are naturally high, with flow support for navigation suspended during drier times of the year. On a case-by-case basis, limited releases for navigation have been made for special shipments when a determination can be made that other project purposes will not be significantly impacted and any fluctuations in reservoir levels or river stages would be minimal. Implementation of the proposed action will not affect commercial navigation during seasonally high flows and limited releases for navigation will still be possible when conditions allow. Therefore we have determined that implementation of the IOP will not significantly impact navigation.

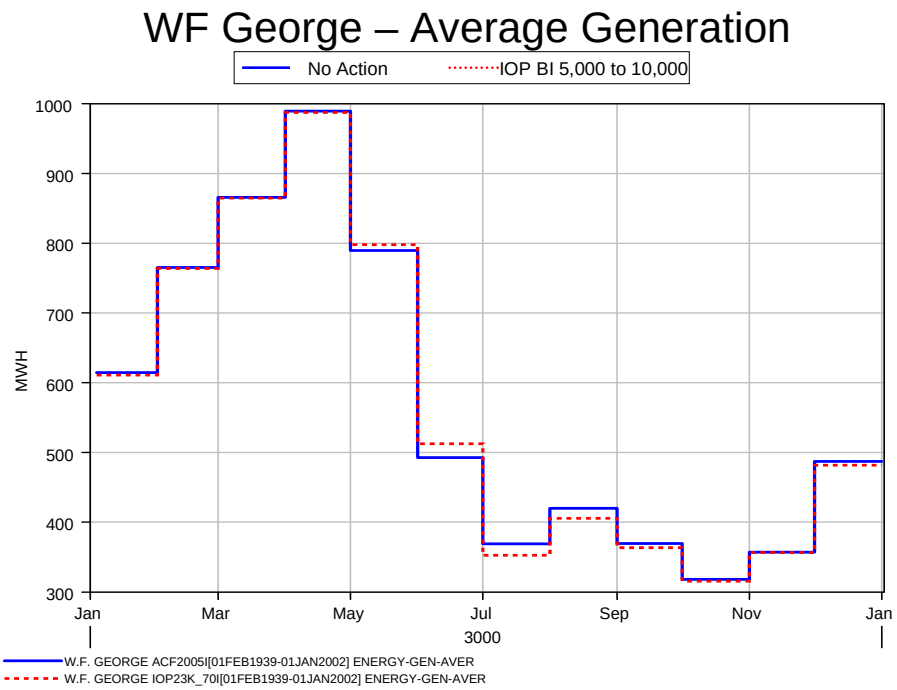
n. Hydropower. As described above, hydroelectric power generation is achieved by passing flow releases to the maximum extent possible through the turbines at each project, even when making releases to support other project purposes. The Buford, West Point, and Walter F. George projects are operated as “peaking plants”, and provide electricity during the peak demand periods of each day and week. Because it does not have the ability to store appreciable amounts of flow, the Jim Woodruff plant is operated as a “run-of-the-river” plant where inflows are

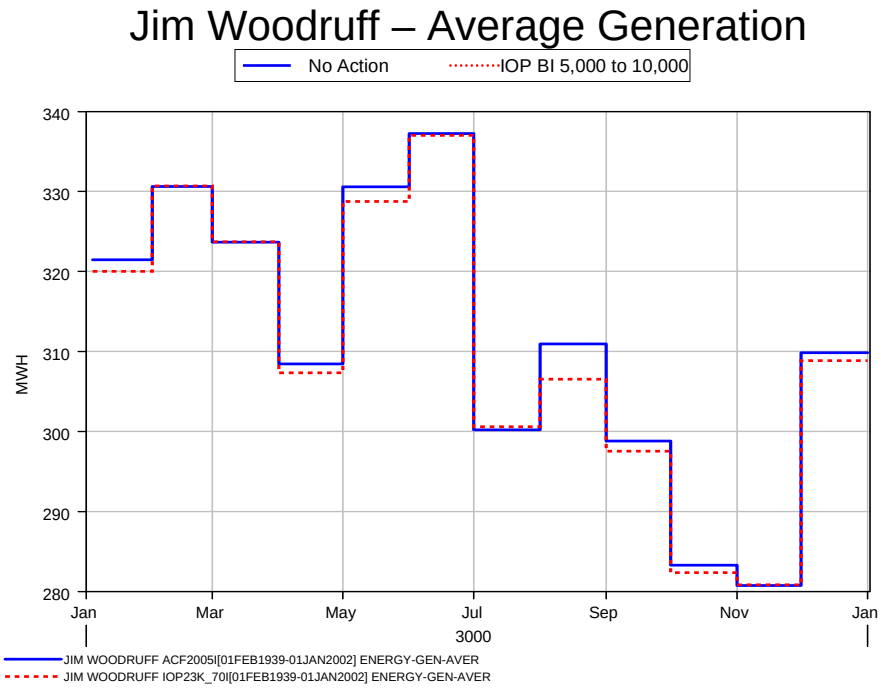
passed continuously and electricity is generated around the clock. Analysis of the average hydropower generation under the "no action" and proposed action operations at Buford, West Point, Walter F George, and Woodruff dams indicates generally similar levels of hydropower generation, and no significant differences were observed (see Figure 7). During dry periods, as the lake levels drop below Zone 1, hydroelectric power generation is reduced proportionally as pool levels decline to as low as 2 hours per day generation at each "peaking plant" project during extreme low flow conditions. Peak generation may be eliminated or limited to conjunctive releases during severe drought conditions. However, these impacts are a reflection of decreasing basin inflows and are not attributable to operations under the IOP. Therefore we have determined that implementation of the IOP will not significantly impact hydropower generation at Jim Woodruff or the upstream dams.

Figure 7. HEC-5 Model simulations showing average generation at Buford Dam, West Point Dam, Walter F. George Dam and Jim Woodruff Dam powerhouses.




West Point – Average Generation
No Action
IOP BI 5,000 to 10,000
400
350
300
250
200
150
100
MWH
Jan
Mar
May
Jul
Sep
Nov
Jan
3000
WEST POINT ACF2005I[01FEB1939-01JAN2002] ENERGY-GEN-AVER
WEST POINT IOP23K_70I[01FEB1939-01JAN2002] ENERGY-GEN-AVER


WF George – Average Generation
No Action
IOP BI 5,000 to 10,000
1000
900
800
700
600
500
400
300
MWH
Jan
Mar
May
Jul
Sep
Nov
Jan
3000
W.F. GEORGE ACF2005I[01FEB1939-01JAN2002] ENERGY-GEN-AVER
W.F. GEORGE IOP23K_70I[01FEB1939-01JAN2002] ENERGY-GEN-AVER



o. Floodplain/Wetlands. Models of the proposed action suggest that implementation of the IOP would not significantly change the amount of non-tidal floodplain acres inundated at various discharges. The modeling also suggests that the proposed action may benefit floodplain habitat and the species that utilize it by increasing the amount of 30-day continuous floodplain inundation during high flows (greater than 37,400 cfs) and during low flows (less than 16,000 cfs). Therefore, we have determined that implementation of the IOP will not significantly impact floodplain and wetland habitats.

p. Aesthetics: The proposed action will not impact aesthetics in the project area.

q. Prime and Unique Farmland: The proposed action will have no effect on prime farmlands or unique agricultural lands.

r. Environmental Justice: Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (11 February 1994) requires that Federal agencies conduct their programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under such programs, policies, and activities because of

their race, color, or national origin.

The proposed project is not designed to create a benefit for any group or individual. The proposed IOP does not create disproportionately high or adverse human health or environmental impacts on any low-income populations of the surrounding area. Review and evaluation of the proposed action have not disclosed the existence of any identifiable minority or low-income communities that would be adversely affected by the proposed action.

s. Protection of Children: The EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (21 April 1997), recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's bodily systems are not fully developed; because children eat, drink, and breathe more in proportion to their body weight; because their behavior patterns may make them more susceptible to accidents. Based on these factors, the President directed each Federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each Federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Implementation of the proposed project does not involve activities that would pose any disproportionate environmental health risk or safety risk to children.

t. Cumulative Impact: The CEQ regulations define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other action." 40 C.F.R. § 1508.7. Actions considered in the cumulative impacts analysis include implementation of the IOP and other Federal, State, Tribal, local or private actions that impact the resources affected by the proposed action. The resources affected by the proposed action are described above and are generally limited to habitat conditions and species closely linked to the flow regime in the Apalachicola River.

Within the project area, various past Federal, State, and private actions have impacted the ACF basin and Apalachicola River habitat and natural flow regime including construction of the Corps' dams, urban development, agricultural activities, navigation channel maintenance dredging and disposal, water withdrawals, and small impoundments. The five Corps' dams continue to affect the Apalachicola River by trapping sediment in reservoirs that would otherwise move as bed load through the system. The interruption of this bed load movement and past navigation channel maintenance dredging and disposal activities have contributed to the altered channel morphology in the project area. Channel morphology sets the context for the flow regime. Urban development and agricultural activities have adversely affected water

quality and riverine and floodplain habitat. The associated water withdrawals have also impacted the flow regime.

Adverse effects to riverine habitat from continued urbanization and agricultural activities in the ACF basin are reasonably certain to occur. However, state and local governments have regulations in place to minimize these effects, including regulations regarding construction best management practices, storm water control, and treatment of wastewater.

Additionally, an increase in net consumptive depletions to water supply are reasonably certain to occur based on increased municipal and industrial (M&I) demands in the ACF basin (particularly in the upper basin) and agricultural withdrawals. The Georgia Environmental Protection Division has determined that the most acres in the basin for which irrigation is economically feasible are already irrigated, and that agricultural demand has likely "plateaued" at close to the year 2000 demands. However, increases in the amount of water applied per acre would occur if the current crops are converted to more water intensive crops. Implementation of the IOP would not contribute to cumulative impacts affecting resources on the Flint River since there are no Corps projects controlling water releases in this system. However, increases in consumptive depletions in the ACF Basin could adversely affect habitat in the Apalachicola River and Apalachicola Bay by further altering the natural flow regime.

Analysis of the historic conditions (1929-1955 pre-Lanier period), current conditions (1975-2005 post-West Point period), and the IOP conditions suggest that operations under the IOP will not significantly alter the Apalachicola River flow regime. As described above, the annual average discharge for the Apalachicola River during the 1929-1955 pre-Lanier period and the 1975-2005 post-West Point period suggests that average annual flow prior to the construction of dams in the ACF basin is comparable to the average annual flow currently experienced. Analysis of the annual average discharge under the IOP indicates that flows are comparable as well. Furthermore, implementation of the IOP may benefit some aspects of the flow regime by more closely matching natural or pre-Lanier conditions. Therefore, implementation of the IOP should not significantly contribute to the cumulative impacts affecting riverine habitat and flow regime in the Apalachicola River or habitat in Apalachicola Bay.

The proposed action incorporates RPM2 in the BO and thus the potential for incidental take related to implementing the IOP has been minimized to the maximum extent practicable. Therefore, implementation of the IOP should not significantly contribute to the cumulative impacts affecting threatened and endangered species occurring in the project area. Impacts to recreation and other authorized project purposes at the five Federal reservoirs were also determined to be minor and therefore would not significantly contribute to cumulative impacts.

6. ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS WHICH WOULD BE INVOLVED SHOULD THE RECOMMENDED PLAN BE IMPLEMENTED:

Any irreversible or irretrievable commitments of resources involved in the proposed action have been considered and are either unanticipated at this time, or have been considered and determined to present minor impacts.

7. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED:

Any adverse environmental effects, which cannot be avoided during implementation of the recommended project, are expected to be minor both individually and cumulatively.

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

The proposed project constitutes a short-term use of man's environment. The proposed action is an interim plan which is a component of the existing water control plan for the ACF basin and Jim Woodruff Dam. It is anticipated that it will be implemented until such time as the existing water control plan is revised or updated and a new Water Control Plan is completed. At that time, additional public coordination, consultation, and NEPA documentation would be prepared for the new water control plan, and elements of the IOP could change at that time. Also, in the event of additional information or changed conditions, consultation would be re-initiated with the USFWS to determine if any additional changes to the IOP would be necessary. At this time we do not have an estimate of when that will occur. As noted in the current Biological Opinion completing formal Section 7 consultation, operations under the IOP are not expected to result in any permanent changes or impacts to listed species, critical habitat for listed species or other project purposes or resources within the basin. The conditions of the Biological Opinion for the IOP also include monitoring and adaptive management, so adjustments could be made in the future, pursuant to additional consultation, in the event any unanticipated impacts are documented.

9. COORDINATION:

Appendix D contains copies of letters, memos, and reports documenting the coordination related to development of the IOP in support of endangered and threatened species. An overview of the coordination is summarized below, and the details of coordination with each specific entity are also provided.

The Corps (Mobile District), has been participating in informal consultation with the USFWS pursuant to Section 7 of the ESA regarding water management operations and releases from Jim Woodruff Dam to the Apalachicola River since 2000. This informal consultation was conducted to determine the potential for impacts on the Gulf sturgeon, and the fat threeridge and purple

bankclimber mussels, and has addressed possible modifications to existing project operations at Jim Woodruff Dam that would minimize or avoid impacts to the federally protected species.

In response to concern expressed by USFWS and state fishery management and staff related to a spring 2000 navigation window and low flow operations in the summer of 2000, a meeting was held on 26 September 2000, with representatives of the USFWS, Florida Fish and Wildlife Conservation Commission, and the Georgia Department of Natural Resources. Appropriate ramping down rates were discussed with recommendations for less than 1.0 foot per day recommended, and a commitment by USFWS to facilitate an update to the reservoir fish management division regulation to allow inclusion of Apalachicola fish spawn considerations was reached. As a result of these discussions, Mobile District has been actively conferring with the USFWS and State fishery agencies on numerous occasions, and adjustments were made in existing operations at Jim Woodruff Dam to support fish spawning activities in both upstream reservoirs and the Apalachicola River, including specific operations in support of Gulf sturgeon spawning activities. Revisions to regulatory guidance and a draft Standard Operating Procedure (SOP) on fish management activities have been developed in consultation with USFWS, and annual coordination meetings are scheduled prior to fish spawning season to assist in planning for water management operations in support of fishery resources during low flow conditions.

In the summer of 2000, continued drought conditions in the ACF basin prompted concern that storage from upstream reservoirs could become depleted to the extent that releases to meet the 5,000 cfs minimum flow on the Apalachicola River could not be sustained indefinitely if dry conditions persisted in the summer and fall months. At that time, Mobile District began to informally consult with USFWS regarding potential for impacts to protected mussels if releases were to be reduced below the 5,000 cfs minimum flow. This would have represented a waiver to the current water control plan, and public meetings were held during the summer of 2000. By letter dated 10 August 2000, USFWS advised that reduction of releases from Jim Woodruff Dam below 5,000 cfs may adversely affect the federally listed mussel species, and requested that formal consultation be initiated pursuant to Section 7 of the ESA in the event the drought contingency measure was pursued. By letter dated 17 November 2000, Mobile District documented the informal consultation activities that had occurred since August 2000 to determine the potential impacts on mussels in the event of possible drought contingency measure to reduce releases to the Apalachicola River below 5,000 cfs. Although the drought contingency measure was no longer being pursued at that time, Mobile District agreed to continue to informally consult and collect data for a biological assessment in the event a similar drought contingency measure was proposed at a future date. The ongoing data collection and informal consultation efforts have resulted in completion of a study of the potential effects of low flow conditions on the protected mussel species. A draft report was submitted to USFWS in January 2006 and included in the 7 March 2006 request to initiate consultation, along with some updated additional data on depth distribution of mussels.

Drought conditions within the ACF basin continued into 2002, and low flow conditions were experienced during the course of fish spawning activities that spring. USFWS notified the

Mobile District by letter dated 11 June 2002, that the low flow conditions had potentially impacted Gulf sturgeon spawning activities. USFWS suggested a meeting to discuss the potential impacts of reservoir operations on fish spawning activities and Section 7 consultation responsibilities relative to the Gulf sturgeon and protected mussel species. Meeting discussions were held on 12 August 2002, and included representatives from USFWS and Florida Fish and Wildlife Conservation Commission. Following this meeting, USFWS and Mobile District developed a strategy and approach for additional data collection and analysis that would be incorporated into a biological assessment of the impacts of low flow operations on the protected species in the Apalachicola River. This biological assessment would assist in determining whether impacts of project operations may adversely affect the Federally protected species and whether formal consultation would be required, pursuant to Section 7 of the ESA.

Follow-on meetings were held with the state fishery agencies from Alabama, Florida and Georgia, facilitated by the USFWS, in order to develop water management operations in support of both reservoir and Apalachicola River fish spawning activities, to include operations in support of the Gulf sturgeon. A revised draft SOP was developed that provided for annual fish management coordination meetings to be held each year prior to commencement of spring fish spawn, in order to discuss fish management needs and to prioritize water management operations. Annual fish management and coordination meetings were held with the USFWS and the state fish management agencies from Alabama, Florida and Georgia in 2003, 2004, 2005 and 2006, during which the current draft SOP on fish management and coordination was developed and implemented for demonstration purposes. During these annual coordination meetings, recommendations for fish spawn management operations within Mobile District reservoirs within the ACF basin were discussed and a coordination mechanism was developed, to support both reservoir fish spawning and riverine fish spawning on the Apalachicola River. The river spawning recommendations included recommendations for support to Gulf sturgeon spawning as well as for other sport/game fish on the river.

Additional information has been collected, in coordination and consultation with the USFWS, to assist in assessing the potential for impact to the listed species. This information includes data on the areal extent and flow/depth distribution relationship of potential Gulf sturgeon spawning habitat in the upper 20 miles of the Apalachicola River and the flow/depth distribution relationship of listed mussels. Low flow operation protocols were coordinated and developed with USFWS and the state fishery agencies and implemented in 2004 and 2005. During the low flow period in the spring of 2004, when basin inflows fell below 20,000 cfs during the Gulf sturgeon spring spawning period, numerous coordination teleconferences and email communications were held between the Corps and the State fish management agencies from Alabama, Florida and Georgia, resulting in the low flow operations protocol, which specified operations releasing the approximate average basin inflow to provide for relatively stable reservoir levels and gradually declining flows on the river during fish spawn months. USFWS determined that operating under the low flow operations protocol, combined with gradual ramping down rates of 0.5 foot per day or less, would avoid impacts to the listed species due to discretionary actions by the Corps since releases would equal or exceed what the normal basin

inflow would provide; and that any impacts to the listed species would be due to the declining basin inflow rather than due to Corps water management operations. Any augmentation of releases above the basin inflow would be considered a benefit to the listed species or mitigation for the declining basin inflow. This low flow operations protocol was also implemented into the early summer months of 2005, as flows continued to decline to levels that could affect mussels on the river (i.e., for flows below approximately 8,000 cfs). The low flow operations protocol was also implemented in the spring of 2005 when basin flows began to decline to levels that could affect Gulf sturgeon spawning habitat.

Mobile District continued informal consultation discussions with USFWS in early 2006 with the intent of identifying operating conditions under which a determination that operations at Jim Woodruff Dam proposed for implementation in 2006 were not likely to adversely affect the threatened Gulf sturgeon, critical habitat for the Gulf sturgeon, and the two listed mussel species. At that time additional information was being developed documenting the quantity of potential sturgeon spawning habitat inundated for various flow levels; and additional information on mussels confirmed that nearly all mussels were located at or below elevations inundated by flows of 8,000 cfs. The 2006 proposed interim operations plan was developed in close coordination with USFWS consistent with the previous low flow operation protocol agreed to and implemented in 2004 and 2005. Based on the data related to flow/depth distribution of sturgeon spawning habitat, the spring spawning threshold for matching releases to basin inflow was set at 20,400 cfs. A similar low flow operations and coordination protocol would be implemented during the other months of the year whenever flows approached 8,000 cfs or lower in order to protect mussels from exposure, with releases then matched to basin inflows or greater.

The USFWS had previously agreed that operating as described above would not represent a discretionary action by the Mobile District that adversely impacts the listed species; that any impacts on the listed species or critical habitat during these described operations would be considered the result of declining basin inflows; and that any augmentation above basin inflows would be considered a mitigative measure to reduce the impacts of declining basin inflows on the listed species or critical habitat. However, based on recently developed data and analysis on sturgeon critical habitat for spawning and the distribution and depth of listed mussels, developed through previous informal consultation efforts, USFWS proposed several additional operating conditions that would be necessary to support the determination of not likely to adversely affect the species. These conditions included limits on ability to refill the reservoirs during the spring refill months (i.e., 90 percent of basin inflows to be released during the months of March through May when basin inflows are between 20,400 cfs and 37,400 cfs, or when flows are less than 37,400 cfs or greater than 9,000 cfs during the months of June through February) which could prevent sufficient refill of reservoir storage during extended dry periods or drought conditions and limit the Corps' ability to augment flows for protection of mussels from exposure, meet other resource needs, or maintain flows above 5,000 cfs for extended periods. More stringent ramping rates were also recommended (i.e., 0.1 foot per day or less) that were not operationally feasible given equipment constraints or operations safety concerns at the dam. Although Mobile District believed operations at Jim Woodruff Dam were conducted in a manner that minimized

impacts to listed species and critical habitat to the maximum extent practicable, the USFWS could not determine that listed species would not be adversely affected by discretionary actions taken by the Mobile District during low flow operations due to the potential trade-offs between managing for Gulf sturgeon and critical habitat needs during the spring months, and managing for augmentation flows in the later summer and fall months to prevent exposure of listed mussel species. Therefore, at the conclusion of informal consultation discussions undertaken with USFWS in early 2006, it was mutually agreed that formal consultation on project operations at Jim Woodruff Dam and the resultant releases to the Apalachicola River would be initiated and an incidental take statement would be issued pursuant to Section 7 of the ESA.

On 7 March 2006 the Corps requested and entered into formal consultation with USFWS under Section 7 of the ESA on our existing operations at Jim Woodruff Dam, and the interim operations plan for Jim Woodruff Dam for the remainder of calendar year 2006 and until formal Section 7 consultation can be completed on our the existing water control plans for the ACF basin.

On 25 April 2006, in response to "lessons learned" during operations under the IOP since March, the Mobile District discussed by telecom with USFWS several possible adjustments to the IOP which would result in reducing over-releases due to rapid fluctuations in basin inflows and the requirement for gradual ramping down rates. These adjustments included the use of a 7-day moving average instead of a 3-day moving average to measure basin inflow, and the concept of the volumetric release to account for compensating possible under-and over-releases from week to week. In addition, possible adjustments and modeling tools were discussed in a 24-25 May 2006 hydrological modeling technical workshop held with representatives from USFWS and the States of Alabama, Florida, and Georgia. Comments received during the workshop and additional comments received by correspondence from the three States, as well as significant stakeholders, were evaluated in conjunction with the "lessons learned" to develop a suggested revised IOP which was submitted to USFWS for consideration on 12 June 2006.

On 6 June 2006, USFWS proposed to list critical habitat for seven listed mussel species, including proposed habitat for the purple bankclimber and fat threeridge mussel on the Apalachicola River, and for the Chipola slabsheel mussel on the lower Chipola River. The Corps letter dated 12 June also included a determination that the IOP should not adversely impact proposed critical habitat for the listed mussels and requested that a determination of impacts to proposed critical habitat be included in the biological opinion on the IOP.

On 28 June 2006, the States of Alabama, Florida and Georgia were provided a copy of the letter dated 28 June 2006 to USFWS granting the request to extend the consultation period to 5 September 2006 in order to consider the impacts of the adjusted IOP. The internet address of the posted modeling information for the adjusted IOP was noted in this correspondence. In addition, modeling information was discussed with technical representatives of each of the States of Alabama, Florida, and Georgia and significant stakeholders during a follow-on hydrological modeling technical workshop held on 12 July 2006 in Columbus, Georgia.

USFWS collected additional information regarding mussels and sturgeon during their preparation of the biological opinion. During June of 2006, basin inflows declined below 8,000 cfs, and numerous listed mussels were observed to be exposed or stranded in the mid-Apalachicola reaches, and mortality of mussels was observed. USFWS documented at that time that mussels were observed at flows between 8,000 cfs and 10,000 cfs, and determined this was an anomalous condition related to significant flood events in the previous years, and progressive sedimentation and channel morphological changes unrelated to water management activities (possibly due to the cessation of routine maintenance dredging during the past few years). However, the State of Florida filed a motion for a Temporary Restraining Order (TRO) in the U.S. District Court, Northern District of Alabama, requesting higher flows be maintained to protect the listed mussels. Following a series of TROs, a temporary settlement agreement was reached that provided for temporary augmentation of flows as requested by the State of Florida pursuant to an established amount of composite storage agreed to by the State of Georgia. This temporary settlement agreement expired on 24 July 2006, and the Corps began operating under the proposed IOP pending completion of the biological assessment.

A Biological Opinion and incidental take statement for the interim operations plan at Jim Woodruff Dam was issued by USFWS on 5 September 2006 (Appendix E). Based on the new information regarding the depth/flow distribution of the listed mussels, the USFWS determined that implementation of the proposed plan could result in incidental take of purple bankclimber, and fat threeridge, for flows between 8,000 cfs and 10,000 cfs. However, it should be noted that implementation of the IOP reduces impacts to these listed species compared to the operations defined in the existing water control plan. A reasonable and prudent measure was included in the Biological Opinion to require that releases match the 7-day moving average basin inflows whenever basin inflows are less than or equal to 10,000 cfs, in order to minimize take of mussels that occur below 10,000 cfs. An incidental takings statement was also included in the biological opinion, including an authorization to "take" mussels for up to 39 days in a calendar year when daily releases are less than daily average basin inflows when flows are between 8,000 cfs and 10,000 cfs. This amount of authorized "take" may occur due to the releases based on a 7-day average flow rather than a daily average flow. Several other reasonable and prudent measures were included, to provide for adaptive management of operations base on any new monitoring or study information, and assessment of trends and factors contributing to the channel morphology changes that may be contributing to mortality of mussels during low flow conditions.

All pertinent information relating to the Section 7 consultation and completion of the Biological Assessment to address the IOP were posted on the Mobile District website. Detailed summary of coordination conducted with the States of Alabama, Florida and Georgia, and significant stakeholders, during development and assessment of the IOP is provided below. All comments were considered in determining whether additional adjustments to the IOP would be pursued and in assessing impacts of the IOP on other project purposes.

a. U.S. Fish and Wildlife Service. Formal Section 7 consultation was requested by letter

to USFWS dated 7 March 2006. USFWS acknowledged receipt of the request by letter dated 9 March 2006, and noted that they considered the letter to include sufficient information for a complete biological assessment and intended to complete formal Section 7 consultation (completion of a biological opinion) by 21 July 2006.

A technical teleconference was held between the Corps and the USFWS on 25 April 2006 to discuss possible adjustments to the IOP based on "lessons learned" during initial operations, in particular shifting releases to a 7-day moving average rather than a 3-day moving average basin inflow, and monitoring for compliance by computing inflows and releases volumetrically . A hydrological modeling technical workshop was hosted jointly by the Corps and the USFWS on 24-25 May 2006 to discuss possible adjustments and appropriate modeling tools to assess impacts. By letter dated 12 June 2006, the Corps submitted a request to USFWS to adjust the IOP accordingly. At that time it was also determined that the adjusted IOP would not likely adversely modify or destroy critical habitat proposed on 6 June 2006 for the listed mussels, and it was requested that a determination of the impact on proposed critical habitat be included in the biological opinion for the IOP.

By letter dated 13 June 2006, the USFWS requested a 45-day extension of the consultation period in order to address the proposed adjustments to the IOP. By letter dated 28 June 2006, the Corps agreed to an extension until 5 September 2006. It was also noted that a follow-on workshop was being scheduled to describe the adjusted IOP, the biological basis of the IOP and updated modeling results. It was also requested that a conference report of the impact on proposed critical habitat be included in the biological opinion for the IOP.

On 12 July 2006, the Corps hosted a follow-on workshop with USFWS, the States of Alabama, Florida and Georgia, counsel and consultants for the States, and significant Stakeholders (Atlanta Regional Commission, Alabama Power Company, Southeastern Power Administration, Montgomery Water Works), to discuss the biological basis of the IOP and modeling conducted to assess impacts.

The draft biological opinion was coordinated by the USFWS with the Corps as it was finalized, and the final biological opinion was issued on 5 September 2006.

b. State of Alabama. Alabama fishery management agency staff participated in meetings related to development of the draft SOP 1130-2-9, and in annual fish management and coordination meetings in 2003, 2004, 2005 and 2006; and also participated in teleconferences in 2004 during which the low flow operations protocol were discussed. A copy of the 7 March 2006 letter requesting the initiation of formal Section 7 consultation on the IOP was provided to the Alabama Department of Conservation and Natural Resources and to Mr. Trey Glenn, Alabama Department of Environmental Management.

By letter dated 15 May 2006 Alabama was invited and attended the 24-25 May hydrological modeling technical modeling workshop.

By letter dated 12 June 2006, Mr. Glenn noted that concerns expressed by the State of Georgia over impacts of the IOP could not be adequately evaluated since their modeling assumptions varied so greatly form those used by the Corps. Mr. Glenn also expressed concern that the ACF reservoirs were not being operated in balance during the IOP operations, requested that an extension be granted of the consultation process and that the Corps provide additional information regarding the impacts of the IOP operation.

A copy of the 12 June 2006 letter describing proposed adjustments to the IOP was provided to Mr. Glenn. A copy was also provided of the letter dated 28 June 2006 granting an extension of the consultation period until 5 September 2006.

By letter dated 7 July 2006, responding to Mr. Glenn's 12 June letter, a summary of proposed adjustments to the IOP was provided, and Alabama was invited to attend the follow-on workshop. Alabama participated in the follow-on workshop on 12 July during which additional modeling results for the adjusted IOP were discussed.

c. State of Florida. Florida fishery management agency staff participated in meetings related to development of the draft SOP 1130-2-9, and in annual fish management and coordination meetings in 2003, 2004, 2005 and 2006; and also participated in teleconferences in 2004 during which the low flow operations protocol were discussed. A copy of the 7 March 2006 letter requesting the initiation of formal Section 7 consultation on the IOP was provided to the Florida Fish and Wildlife Conservation Commission and Ms. Colleen Castille, Florida Department of Environmental Protection (FDEP).

By letter dated 9 March 2006, FDEP-Castille noted that the State of Florida had filed litigation seeking a preliminary injunction against the Corps, requesting that Mobile District initiate formal consultation with the USFWS regarding water management activities and impact on the Gulf sturgeon, and specifically requested that at least 22,000 cfs be released in support of Gulf sturgeon spawning beginning 15 March until the spawning activities are complete. By letter dated 21 March, responding to the 9 March letter, FDEP-Castille was informed that formal Section 7 consultation had been initiated on 7 March 2006, and was presented with the background and summary of the elements of the IOP.

A hearing was held on the preliminary injunction motion on 14 April 2006, and the Florida motion was denied by the U.S. District Court, Northern District of Alabama.

By letter dated 15 May 2006 DEP-Castille was invited and representatives from Florida attended the hydrological modeling technical workshop on 24-25 May 2006. On 5 June 2006, FDEP-Castille, representing the State of Florida, provided specific comments regarding Florida's concerns regarding perceived shortcomings of elements of the IOP, and the opinion that the Corps has discretion to release more than the minimum basin inflows in support of endangered species and critical habitat.

By letter dated 28 June 2006, FDEP-Castille was informed that the consultation period would be extended for a 45-day period, and Florida was invited to attend a follow-on workshop to describe the proposed adjustments to the IOP, the biological basis of the IOP, and modeling being conducted to address impacts of the IOP. Florida representatives attended the workshop on 12 July 2006.

As noted above, in late June 2006, Florida filed a series of TRO's requesting the Corps release higher flows in support of listed mussel species, rather than restrict releases to basin inflows (due to sustained drought conditions, basin inflows had declined to levels below 8,000 cfs and were close to 5,000 cfs). An initial TRO was granted on 23 June, raising the minimum release to 8,000, but then subsequent TRO's ordered a gradual ramping down of flows to 6,000 cfs. A temporary settlement agreement was reached in negotiation between the States of Alabama, Florida and Georgia on 30 June 2006, providing for Florida to request augmentation of flows from an established "environmental storage pool" agreed to by Georgia. Approximately 6,000 cfs was provided until expiration of the settlement agreement on 24 July 2006, at which time the Corps returned to operations under the IOP. A hearing was held for another TRO requested by Florida on 24 July, requesting a minimum flow of 6,300 cfs be maintained; and this request was denied by the court on 25 July 2006, and operations under the proposed IOP continued until issuance of the final Biological Opinion on 5 September 2006.

d. State of Georgia. Georgia fishery management agency staff participated in meetings related to development of the draft SOP 1130-2-9, and in annual fish management and coordination meetings in 2003, 2004, 2005 and 2006; and also participated in teleconferences in 2004 during which the low flow operations protocol were discussed. A copy of the 7 March 2006 letter requesting the initiation of formal Section 7 consultation on the IOP was provided to the Georgia Department of Natural Resources and Dr. Carol Couch of the Environmental Protection Division (GA-EPD).

By letter dated 24 March 2006 to both the Corps and USFWS, GA-EPD-Couch requested to be kept informed of progress in the consultation process, offered to share information to be included in the evaluation of impacts, in particular on Georgia's resources, and requested that they be allowed to review the draft biological opinion. By letter dated 5 May 2006, GA-EPD-Couch forwarded a memorandum summarizing modeling of the IOP conducted by Georgia and

expressed concern that over-releases above the IOP requirements could significantly deplete storage in the ACF reservoirs. GA-EPD-Couch requested copies of the Corps assessment of impacts and additional consultation with USFWS to modify the IOP. By letter dated 15 May 2006, the Corps responded to both the 24 March and 5 May 2006 letters. The Corps noted that its models did not show as severe as impacts as did the Georgia models, questioned the assumptions used by Georgia in their model runs, and acknowledged that additional discussions had been underway with USFWS in order to minimize potential over-releases while still meeting flow needs for the endangered and threatened species. Georgia was invited to attend the hydrological modeling technical workshop on 24-25 May, 2006, which was scheduled to assure that the best modeling tools and appropriate assumptions would be used.

By letter dated 17 May 2006, GA-EPD-Couch provided clarifications of their modeling assumptions, requested that the Corps share their modeling results, and repeated their concerns regarding potential over-releases under the IOP. By letter dated 19 May 2006 the Corps noted that differences in consumptive demands and hydropower firm power demands could produce conflicting modeling result, and noted that these matters could be discussed in the upcoming modeling technical workshop. Georgia provided both biological and modeling experts at the workshop. Copies of the Memorandum for Record of the workshop were provided to Georgia and presentations were posted on the Corps website.

By letter dated 1 June 2006 to the Corps and USFWS, GA-EPD-Couch requested that the Corps reconsider the IOP, confirm that measures would be implemented to mitigate for over-releases associated with the IOP, and requested that an extension of the consultation granted in order to allow for more information on the downstream flow needs for endangered and threatened species and impacts of the IOP operations. By letter dated 2 June 2006 to the Corps and USFWS, GA-EPD-Couch provided additional modeling results showing significant impacts on reservoirs and other project purposes due to operations to meet the IOP and firm hydropower generation. By letter dated 12 June 2006, the Corps responded to both the 1 June and 2 June letters, and noted that differences in modeling conducted by Georgia and the Corps were the result of higher demands used by Georgia for firm hydropower production and agricultural withdrawals on the Flint River, and minimum releases of 90 percent instead 70 percent for the middle flow ranges. It was also noted that adjustments had been made in the proposed IOP to minimize the potential for over-releases, and Georgia was copied on the letter to USFWS dated 12 June 2006 describing the proposed adjustments. GA-EPD-Couch was also informed that the Corps intended to grant the USFWS request for a 45-day extension of the consultation period. The Corps models showed potential impacts on hydropower production and recreation at all reservoirs this year due to sustained drought conditions in the basin, but documented that there should be little impact on the ability to meet water quality, water supply, flood control or fish and wildlife conservation project purposes while operating under the IOP.

By letter dated 2 June 2006 from Governor Perdue to Secretary of the Army Harvey, it was again requested that the Corps modify the IOP to reduce over-releases, and reassess the assumptions in the IOP. It was also requested that an extension of the consultation period be granted in order to allow the Corps and the USFWS to use the best scientific information available in assessing the needs of the endangered and threatened species and the impacts on other water resources.

By letter dated 9 June 2006, GA-EPD-Couch demanded a response by the Corps that modifications to the IOP be made, and requested that the following changes by made: (1) that the Corps store all waters above a basin inflow of 8,000 cfs until reservoirs are refilled; (2) when basin inflows are less than 8,000 cfs only 5,000 cfs should be releases; (3) releases from each reservoir should not exceed inflows to that reservoir unless necessary to meet the 5,000 cfs minimum flow. GA-EPD-Couch demanded a response to these requests by 12 June 2006. By letter dated 12 June 2006, the Mobile District noted that because of ongoing litigation any response must be closely coordinated and that an attempt would be made to respond to the 9 June letter by 14 June 2006. A final response was provided by letter dated 21 June 2006, which summarized adjustments made to the IOP to reduce potential over-releases, and noted that a follow-on workshop would be scheduled to discuss the adjusted IOP and updated modeling of the IOP. The Corps also clarified the hydropower demand used in the Corps models. Georgia technical modelers and biologists attended the 12 July 2006 follow-on workshop.

On 20 June 2006, Georgia filed a complaint in the U.S. District Court, Northern District of Georgia, requesting the Corps be enjoined from implementing the IOP. Florida filed a request for a temporary restraining order on 21 June 2006 in the U.S. District Court, Northern District of Alabama on 21 June 2006, requesting a TRO of the IOP and that minimum releases of 8,000 cfs be imposed. The Georgia litigation has been deferred pending resolution of ongoing litigation in the Alabama District Court.

GA-EPD-Couch received a copy of the letter dated 28 June 2006, granting an extension of the consultation period and noting that a follow-on hydrological modeling workshop would be scheduled. GA-EPD-Couch was also invited to send representatives to the 12 July 2006 workshop, Georgia modelers participated in the workshop and presented additional modeling results and described the assumptions used in their models. Corps modelers also presented updated models of the adjusted IOP and justifications for assumptions used in the models. All presentations for this workshop were posted on the Mobile District website for public review.

By letter dated 28 August 2006 to the Corps and USFWS, GA-EPD-Couch provided a memorandum by Dr. Douglas Peterson (University of Georgia) with his assessment of the 2005 – 2006 Gulf sturgeon spawning data and the assumptions underlying the IOP. GA-EPD-Couch requested these comments be taken under consideration in the Section 7 consultation and any future refinements of the IOP.

e. Southeastern Electrical Power Administration (SEPA). By letter dated 25 May 2006, SEPA expressed concern that they had not been invited to participate in development of the IOP and that the IOP could potentially result in reduced releases for hydropower production. SEPA asked that the impacts on authorized project purposes and upstream stakeholders be addressed, and that lost benefits be compensated. By letter dated 8 June 2006, SEPA expressed concern that they had not been invited to attend the 24-25 May hydrological modeling technical workshop, and requested copies of all information provided and all modeling results. By letter dated 11 July 2006, SEPA was provided a copy of the Memorandum for Record of the 24-25 May workshop, and notified of the FTP site posting current modeling results. SEPA was invited to attend the 12 July 2006 hydrological modeling technical workshop, and attended along with their consultant.

f. Atlanta Regional Commission (ARC). ARC was invited to attend the 12 July 2006 hydrological modeling technical workshop. ARC attended the workshop and their consultant was allowed to provide a discussion of modeling conducted on the IOP and suggested improvements to the modeling. By letter dated 17 August 2006, ARC expressed concern that the Section 7 consultation was being conducted on the IOP rather than beginning consultation on the existing water control plan, that the IOP be in place only until the final biological opinion has been issued, and suggested that they would be providing alternatives for consideration.

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