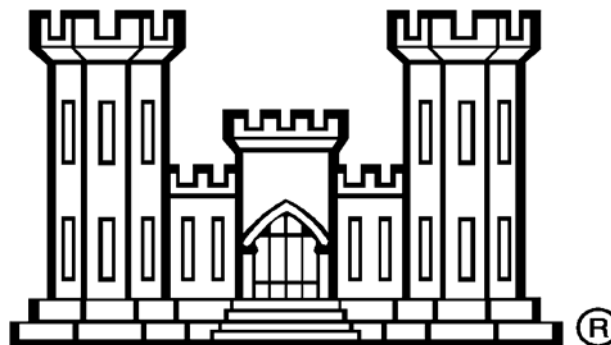


**ENVIRONMENTAL ASSESSMENT
MODIFICATIONS TO THE INTERIM OPERATIONS PLAN
FOR SUPPORT OF ENDANGERED AND THREATENED SPECIES
JIM WOODRUFF DAM
GADSDEN AND JACKSON COUNTIES, FLORIDA
AND DECATUR COUNTY, GEORGIA**

Prepared by

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Planning and Environmental Division
Environment and Resources Branch
Inland Environment Team



March 2007

**ENVIRONMENTAL ASSESSMENT
INTERIM OPERATIONS PLAN
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APPENDICES

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- E-2 Mobile District (CESAM) email to U.S. Fish and Wildlife Service (USFWS), dated 1 November 2006, providing Concept 2 modeling results
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- E-4 CESAM letter to FDEP, dated 6 November 2006, providing status update regarding compliance with RPM3
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- E-17 USFWS email to CESAM dated 21 February 2007, requesting additional information regarding consideration of RPM3 comments and alternatives provided by stakeholders
- E-18 CESAM letter to USFWS dated 23 February 2007, response to request for additional information
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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 is 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 (referred to as “Concept 5” throughout this assessment) is a modification of the Interim Operations Plan (IOP) 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 the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and critical habitat for the Gulf sturgeon; the endangered fat threeridge mussel (*Amblema neislerii*); the threatened purple bankclimber mussel (*Elliptoideus sloatianus*); and the Chipola slabshell mussel (*Eliptio chipolaensis*).

The proposed action 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 Concept 5 reflect the downstream end-result of system-wide operations as measured by daily releases from Woodruff Dam into the Apalachicola River. Concept 5 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. 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. The proposed action 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 measured in feet/day). The proposed action 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 (United States Geological Survey Gage 02358000) immediately downstream of the dam. During wet periods, releases may substantially exceed the Concept 5 values, but during dry periods, releases will more closely match the Concept 5 values in order to conserve reservoir storage for authorized project purposes and future endangered and threatened species needs.

Operations under the proposed action 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. 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 National Environmental Policy Act (NEPA) documentation regarding system operations.

Figure 1. Jim Woodruff Dam Location

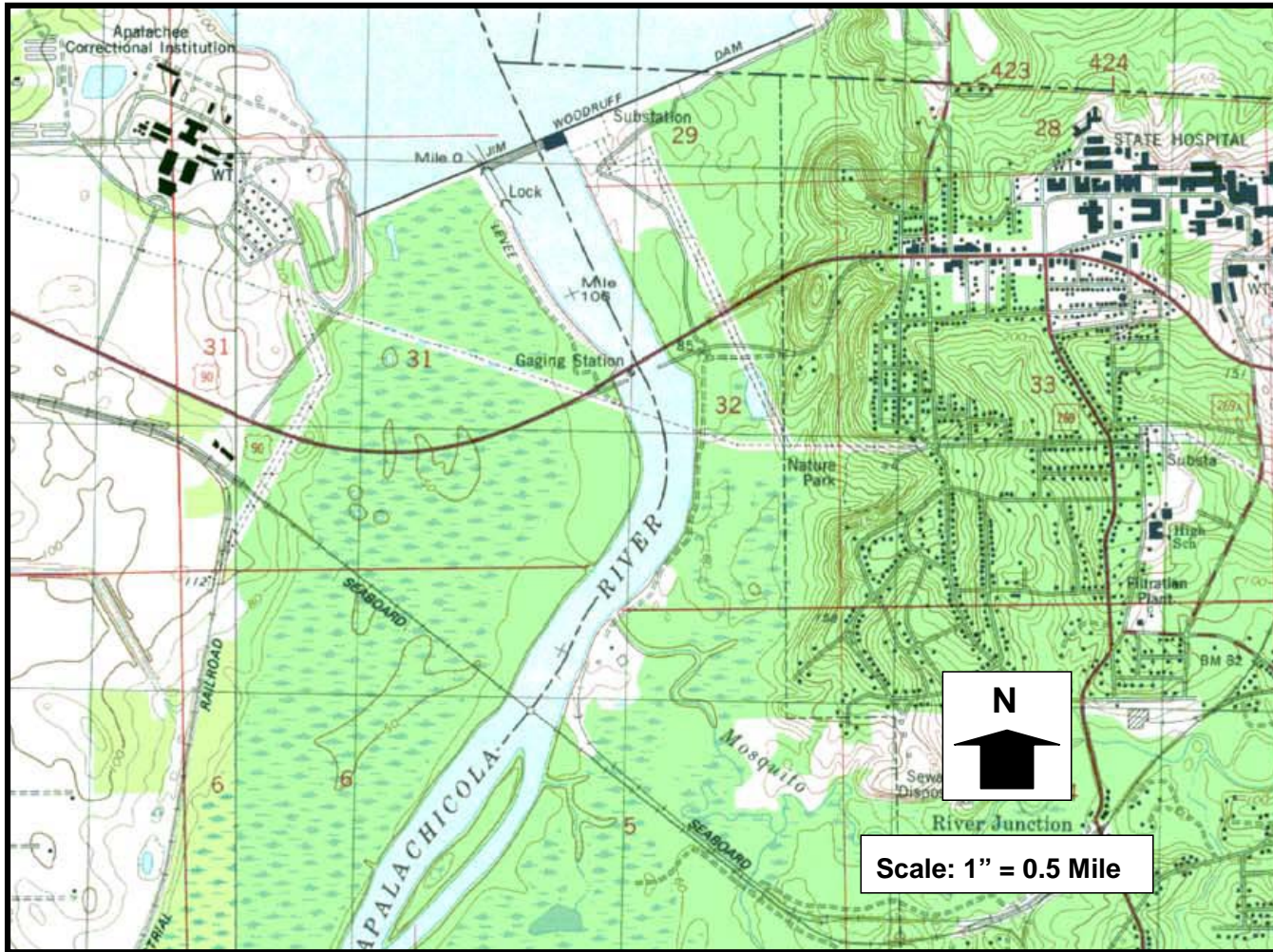


Figure 2. ACF Basin



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 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 in the Apalachicola River as a result of existing water management operations and releases from Jim Woodruff Dam.

A final Biological Opinion (BO) for the Jim Woodruff Dam IOP was issued by the U.S. Fish and Wildlife Service, Panama City Field Office on 5 September 2006, and incorporated additional modifications to the IOP in order to avoid or minimize incidental take of listed mussels. The BO included five reasonable and prudent measures (RPMs) for further limiting the amount of incidental take associated with water management operations at Jim Woodruff Dam. For each of the five RPMs, the BO also included specific terms and conditions which must be met in order to assure compliance with the RPMs. The proposed action (Concept 5) was developed in accordance with RPM3 of the BO, which requires modifying the IOP to provide a higher minimum flow to the Apalachicola River when reservoir storage and hydrologic conditions permit. RPM3 and the associated terms and conditions are described below.

“RPM3. Drought provisions. Develop modifications to the IOP that provide a higher minimum flow to the Apalachicola River when reservoir storage and hydrologic conditions permit.

Rationale. Take of listed species due to the IOP may occur when the Corps is using a portion of basin inflow to increase ACF reservoir storage. The Corps can minimize mussel mortality due to low-flow conditions by supporting a higher minimum flow when total reservoir storage and/or hydrologic conditions permit. As proposed, the IOP uses reservoir storage to support a 5,000 cfs minimum flow. The 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 store more water than allowed under the IOP during certain times of the year to insure minimum water availability later. Possible components and triggers of the drought plan could be, but are not limited to: Corps reservoir action zones, cumulative reservoir storage remaining, total basin inflows, indicators of fish spawn, climatic condition indices, and flow levels at gages downstream of the Chattahoochee gage, such as the gage at Wewahitchka.

a. The Corps, with Service concurrence, shall initiate by January 30, 2007, IOP drought provisions that identify the reservoir, climatic, hydrologic, and/or listed species conditions that would allow supporting a higher minimum flow in the Apalachicola River, and that identify recommended water management measures to be implemented when conditions reach the identified drought trigger point(s).

b. If modifications to the IOP parameters for the months of March through May are adopted as part of the drought provisions, the Corps shall assess potential effects to Gulf sturgeon spawning and floodplain inundation. The Corps shall provide the models and a biological assessment of the effects of the drought provisions on listed species at least 135 days in advance of implementing the drought provisions in order to reinitiate this consultation relative to any proposed changes in the IOP” (USFWS 2006).

By letter dated 26 January 2007, an extension was requested until 28 February 2007 to develop the RPM3 drought provision; and by letter dated 2 February 2007, the USFWS approved the extension. On 16 February 2007, the proposed RPM3 drought provision (Concept 5) was submitted to USFWS. In a letter dated 28 February 2007, the USFWS approved immediate implementation of the proposed action in accordance with the provisions of RPM3 of the BO.

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 detailed description of the environmental setting and significant resources occurring in the project area are available in the ENVIRONMENTAL ASSESSMENT INTERIM OPERATIONS PLAN FOR SUPPORT OF ENDANGERED AND THREATENED SPECIES JIM WOODRUFF DAM (USACE 2006) located in Appendix A.

3. DESCRIPTION OF THE RECOMMENDED PLAN: The proposed action consists of modifications to the IOP for Jim Woodruff Dam to provide a higher minimum

flow to the Apalachicola River when reservoir storage and hydrologic conditions permit in support of endangered and threatened species and critical habitat. The recommended plan represents the final IOP as proposed by the Corps, with incorporation of the RPM3 modifications approved by the USFWS in the letter dated 28 February 2007. The recommended plan 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]), in the same fashion as the IOP; with incorporation of a desired minimum flow (6,500cfs) and the required minimum flow (5,000 cfs), and a drought “trigger” to determine those conditions when the required minimum flow would be more prudent than the desired minimum flow. The drought trigger is based upon Composite Storage within the ACF system.

The minimum releases from Woodruff Dam as prescribed by Concept 5 are provided in Table 1. These minimum releases vary by basin inflow and by season of the year. The proposed action 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 no storage would occur, and releases are at least 100 percent of basin inflow, but not less than the minimum releases of 6,500 or 5,000 cfs based on Composite Storage available in the system. Concept 5 operations and thresholds during March through May are intended to support Gulf sturgeon spawning activities. The 18,000 cfs minimum release is also based on evaluation of spawning and rearing needs for the host fish necessary for mussel reproduction. The Concept 5 operations during June through February are intended to support the protected mussels, host fish for mussels, and young sturgeon.

Concept 5 utilizes the same maximum fall rate schedule described in the IOP and analyzed in the BO (Table 2). 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 Concept 5 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. The maximum fall rates under Concept 5 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 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 2 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 2 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.

Like the IOP, the releases from Jim Woodruff Dam and maximum fall rate schedule prescribed by Concept 5 are determined based on basin inflow. As described in the BO, basin inflow is 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. 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. Basin inflow is not the natural flow of the basin at the site of 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. The consumptive water demands utilized represent an estimate of present levels of the net depletion due to municipal, industrial, and agricultural water uses and evaporative losses from the four largest reservoirs, Lanier, George, West Point, and Seminole. These depletions vary by month and in the case of agricultural demands and reservoir evaporation, also by year (wet, normal, dry). 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.

Table 1. Concept 5 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 | $\geq 35,800$ | not less than 25,000 |
| | Mid | $\geq 18,000$ and $< 35,800$ | $\geq 70\%$ BI; not less than 18,000 |
| | Low | $< 18,000$ | \geq BI; not less than 6,500 (Desired Flow) ^b \geq BI; not less than 5,000 (Required Flow) |
| June - February | High | $\geq 23,000$ | not less than 16,000 |
| | Mid | $\geq 10,000$ and $< 23,000$ | $\geq 70\%$ BI; not less than 10,000 |
| | Low | $< 10,000$ | \geq BI; not less than 6,500 (Desired Flow) ^b \geq BI; not less than 5,000 (Required Flow) |

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

^b Drought Provision: When Composite Storage is within Zones 1 and 2, then the higher minimum release of 6,500 cfs would be maintained. When Composite Storage falls below the top of Zone 3, then release will be reduced to the 5,000 cfs minimum; when Composite Storage is restored to above the top of Zone 2 (i.e., within Zone 1), then the higher minimum release of at least 6,500 cfs would again be maintained. Composite Storage is the combined storage of Lake Sidney Lanier, West Point Lake, and Walter F. George.

Table 2. Concept 5 Maximum Fall Rate for Discharge from Woodruff Dam by Release Range

| Approximate Release Range (cfs) | Maximum Fall Rate (ft/day) |
|---------------------------------|---------------------------------------|
| $\geq 30,000^a$ | Fall rate is not limited ^b |
| $\geq 20,000$ 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.

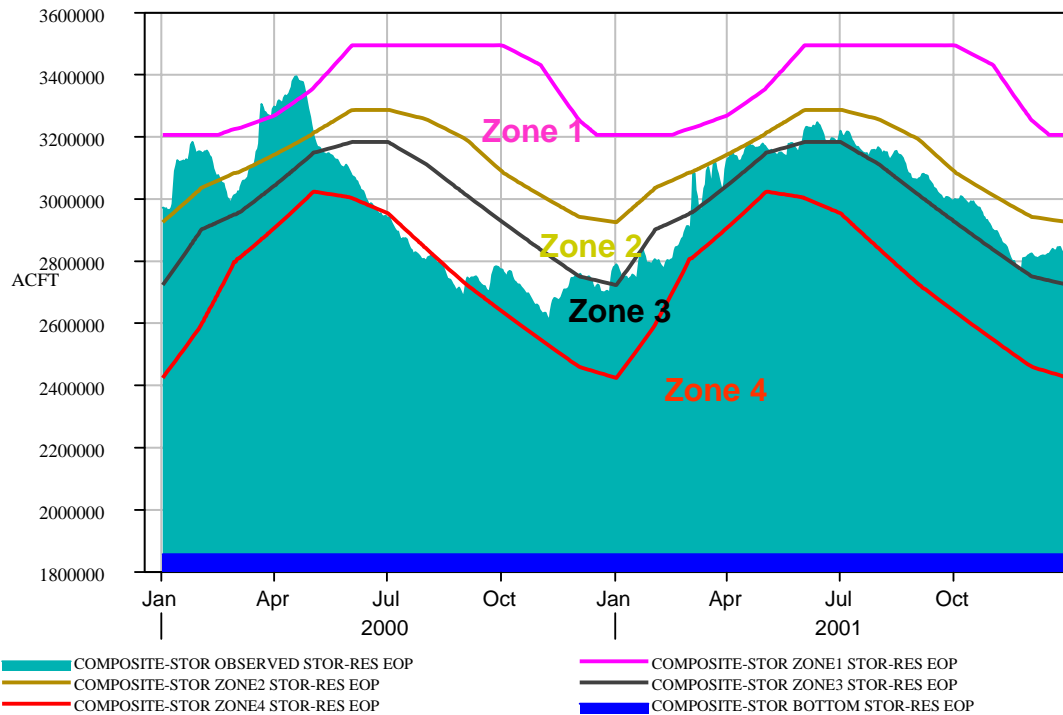
^b For flows greater than 30,000 cfs, it is not reasonable and prudent to attempt to control down ramping rate, and no ramping rate is required.

Consistent with the IOP operational decisions approved in the BO, Concept 5 utilizes a 7-day moving average of daily basin inflow calculation to 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 1 that is also consistent with the Table 2 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.

Concept 5 accomplishes the intent of RPM3 by maintaining a higher desired minimum release of 6,500 cfs from Jim Woodruff Dam during normal to wet flow conditions. However, during sustained dry or drought conditions when maintaining the higher desired flow would significantly threaten storage within the basin, a more conservative drought management operation is “triggered” and the lower required minimum release of 5,000 cfs is maintained consistent with the IOP. The drought trigger is determined by computing the Composite Storage within the three storage reservoirs within the basin. The Composite Storage is calculated by combining the storage of Lake Sidney Lanier, West Point Lake, and Walter F. George. Each of the individual storage reservoirs consists of four Zones. These Zones are determined by the operational guide curve for each project. The Composite Storage utilizes the four Zone concept as well; ie, Zone 1 of the Composite Storage represents the combined storage available in Zone 1 for each of the three storage reservoirs. Figure 3 illustrates the acre-feet of storage available for Composite Zones 1-4 throughout the year. Whenever the Composite Storage falls below the bottom of Zone 2 into Zone 3, the drought trigger dictates a reversion to the required minimum release of 5,000 cfs. The drought management operations maintain a minimum release of 5,000 cfs until conditions improve such that the Composite Storage reaches a level above the top of Zone 2 (i.e., within Zone 1). At that time, the drought management operations are suspended, and the desired higher minimum release of 6,500 cfs is maintained.

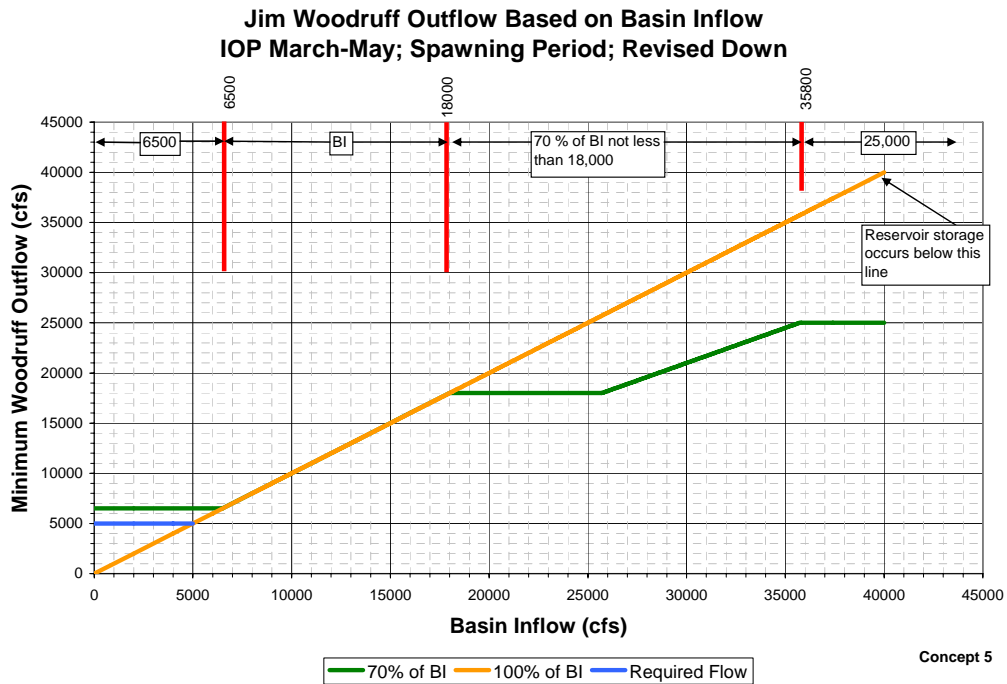
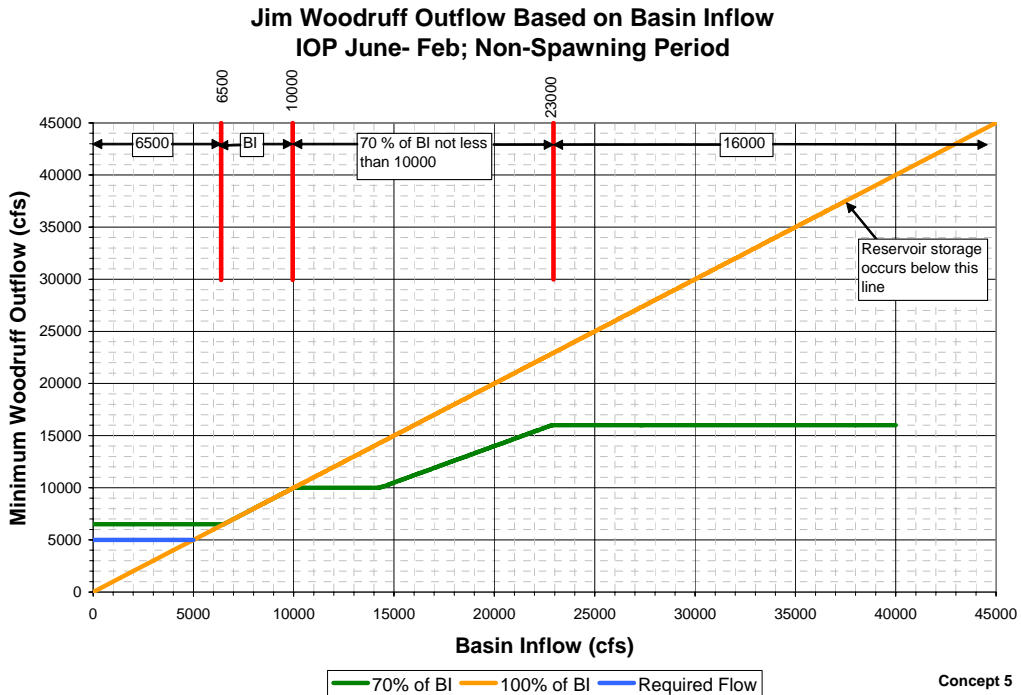
In order for the system to support this modification and support the higher desired flow of 6,500 cfs most of the time, additional reservoir storage during the normal spring filling period is required. Therefore the recommended plan reduces the basin inflow thresholds and associated releases from Jim Woodruff Dam prescribed by the current IOP during the March – May spawning period (Table 1). The upper flow threshold is reduced from 37,400 cfs to 35,800 cfs; and the lower flow threshold is reduced from 20,400 cfs to 18,000 cfs.

Figure 3. Composite Storage and Associated Zones in Acre-Feet



The Concept 5 flow rates included in Table 1 are described as minimum, and not target, releases for Jim Woodruff Dam. During a given month and basin inflow rate, releases will generally be greater than the Table 1 minimum releases consistent with the maximum fall rate schedule due to releases made for other project purposes such as hydropower operations, flood control operations, balancing of reservoir levels, etc. During wet periods, releases may substantially exceed the Table 1 values, but during dry periods, releases will more closely match the Table 1 values, as the Corps operates to conserve reservoir storage for authorized project purposes and future endangered and threatened species augmentation flow needs. Figure 4 provides a graphical representation of the Concept 5 minimum discharge rules from Jim Woodruff Dam during the non-spawning and spawning periods.

Figure 4. Concept 5 Minimum Discharge Rules from Woodruff Dam During the Non-spawning and Spawning Periods



Concept 5, like the IOP, includes a limited hydropower peaking operation 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 1. The peaks are also included in the stage computations for ramping rate requirements under Table 2; however, Table 2 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 6,000 cfs, the daily peaking operation will be discontinued in order to maintain instantaneous releases greater than or equal to 5,000 cfs.

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 the current water control operations at Jim Woodruff Dam (i.e., under the provisions of the IOP as described in the September 7, 2006, letter from the Corps to the USFWS which incorporated the requirements of RPM2 of the BO; requiring a modification of the proposed IOP increasing the lower flow/storage threshold during the June – February period from 8,000 cfs to 10,000 cfs in order to minimize incidental take of mussels).

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 developed under the requirements of RPM3 of the BO and has been determined to more adequately address the needs of the endangered and threatened species (USFWS letter dated 28 February 2007). Discretionary actions taken by the Corps during low flow operations that do not adhere to the recommended plan could result in a violation of Section 9 of the ESA.

b. Other Alternatives Considered. During the development of a plan that meets the intents of RPM3, the Mobile District analyzed several other plans (Concepts 1 – 4), as well as, recommendations from other stakeholders within the basin. However, it was determined that these alternatives failed to effectively meet the intents of RPM3, or would require a change to the existing Water Control Plan. Therefore, these alternatives were removed from further consideration. The following provides a brief summary of the alternatives.

Concept 1 – Concept 1 represents the first iterations of HEC-5 model runs, in an attempt to determine whether a higher minimum flow than 5,000 cfs could be supported. Several higher minimum flows were simulated, including 6,000 cfs, 6,300 cfs, 6,600 cfs and 8,000 cfs. All of these flows demonstrated significant draw downs of the reservoirs during critical drought periods. Therefore, Concept 1 was eliminated as a potential drought provision plan to be implemented in accordance with RPM3 of the BO. Since additional storage in the reservoirs would be necessary to maintain the suggested higher flows, and it was agreed to consider increasing storage options during the Gulf sturgeon spring spawning period in order to provide the necessary additional storage. Based on their recent analysis of spawning behavior and flows in the spring of 2006, the USFWS suggested that an upper basin inflow threshold of 25,000 cfs (below which at least 70 percent of basin inflows would be released and up to 30 percent could be stored); and a lower basin inflow threshold of 16,000 cfs (below which 100 percent of the basin inflows would be released) be modeled to assess the potential for trade-off benefits and/or effects to the species (See Concept 2).

Concept 2 - Concept 2 included the provision to reduce the spring upper flow threshold from 37,400 cfs to 25,000 cfs; and the spring lower flow threshold to 16,000 cfs. HEC-5 models were run for higher minimum flows of 5,800 cfs, 6,500 cfs and 7,000 cfs. The three scenarios modeled are outlined below:

| | <u>Basin Inflow (cfs)</u> | <u>Release</u> |
|---------|----------------------------------|---|
| Mar-May | High $\geq 25,000$ | not less than 25,000 |
| | Mid $\geq 16,000$ and $< 25,000$ | $\geq 70\%$ BI, not less than 16,000 |
| | Low $< 16,000$ | \geq BI, not less than 5,800 (Scenario 1) 6,500 (Scenario 2) 7,000 (Scenario 3) |
| Jun-Feb | High $\geq 23,000$ | not less than 16,000 |
| | Mid $\geq 10,000$ and $< 23,000$ | $\geq 70\%$ BI, not less than 10,000 |
| | Low $< 10,000$ | \geq BI, not less than 5,800 (Scenario 1) 6,500 (Scenario 2) 7,000 (Scenario 3) |

The higher minimum flows identified were based on the flow conditions necessary to provide “flow-through” conditions at Swift Slough and adequate depths at the impacted “hooks and bays” along the main channel of the Apalachicola River. Operational constraints relative to making releases through the powerhouse turbines during low flow conditions were also considered. The modeling results for the three scenarios indicated that (based on composite storage within the basin), there would be shortages for each of the three scenarios during the 2000-2001 drought conditions and in some cases, even the 5,000 cfs minimum flow could not be maintained. Therefore, Concept 2 was eliminated as a potential drought provision plan to be

implemented in accordance with RPM3 of the BO. However, the shortage associated with the 5,800 cfs scenario was relatively small, indicating that a sustained minimum flow close to 5,800 cfs might be sustainable most of the time, but that a drought “trigger” identifying when to revert back to the lower 5,000 cfs minimum flow would be needed during sustained low flow or drought conditions (See Concept 3).

Concept 3 - Concept 3 includes the adjustments of the Spring upper and lower flow thresholds as described in Concept 2, and operate for a higher minimum flow of 6,500 cfs (desired flow) during normal to wetter conditions; with a drought trigger used to determine when the minimum flow would revert back to the 5,000 cfs minimum (required flow) included in the current IOP. The drought trigger was based on the Composite Storage** remaining within the storage reservoirs within the basin. The drought provision concept would provide for release of the desired flow (6,500 cfs) until the composite storage fell below the Zone 3 boundary; at which time the drought trigger would provide for a minimum release of 5,000 cfs. This 5,000 cfs required minimum release would be in place until the composite storage recovered to the bottom of Zone 1, at which time the drought trigger would be de-activated and the desired minimum flow of 6,500 cfs would be re-implemented. The Concept 3 plan modeled is outlined below:

| | <u>Basin Inflow (cfs)</u> | <u>Release</u> |
|---------|----------------------------------|---|
| Mar-May | High $\geq 25,000$ | not less than 25,000 |
| | Mid $\geq 16,000$ and $<25,000$ | $\geq 70\%$ BI, not less than 16,000 |
| | Low $<16,000$ | \geq BI, not less than 6,500* \geq BI, not less than 5,000 |
| Jun-Feb | High $\geq 23,000$ | not less than 16,000 |
| | Mid $\geq 10,000$ and $< 23,000$ | $\geq 70\%$ BI, not less than 10,000 |
| | Low $< 10,000$ | \geq BI, not less than 6,500* \geq BI, not less than 5,000 |

*Drought Provision: When Composite Storage is within Zones 1 and 2, then the higher minimum Release of 6,500 cfs would be maintained. When Composite Storage falls below the top of Zone 3, then Release will be reduced to the 5,000 cfs minimum; when Composite Storage is restored to above the top of Zone 2 (i.e., within Zone 1), then the higher minimum Release of at least 6,500 cfs would again be maintained.

**Composite Storage is the combined storage of Lake Sidney Lanier, West Point Lake and Walter F. George Lake.

The HEC-5 modeling indicated that this concept did not result in significant draw downs of the reservoirs during historic drought flow conditions. Therefore, Concept 3 was evaluated using the same statistical and effects analyses as prepared by the USFWS in the BO. In reviewing these results, it was determined that the Concept 3 plan provided the desired beneficial effects to listed mussels when flows were less than 10,000 cfs. However, it was also determined that the proposed reduction in flow thresholds for spring releases may result in adverse effects to the

listed mussels when compared to the Baseline, Run-of-River (ROR), and IOP conditions by negatively impacting flow regime characteristics relevant to host fish for mussels (floodplain inundation frequency). Therefore, Concept 3 was eliminated as a potential drought provision plan to be implemented in accordance with RPM3 of the BO. The recommended plan is a modification of Concept 3 developed to avoid the adverse impacts associated with Concept 3.

Concept 4 - Concept 4 was developed in conjunction with Concept 3 and includes the Concept 3 operations, with the additional modification that the maximum amount of storage retained when operating between the upper and lower flow thresholds would be increased from 30 percent stored to 50 percent stored. This alternative had not been previously discussed with USFWS, but was presented just to demonstrate whether there would be any additional benefit in storage that could assist in providing a higher minimum flow. The HEC-5 model results suggested that there was no significant benefit in storage by implementing the Concept 4 operations as compared to Concept 3. Therefore, Concept 4 was eliminated as a potential drought provision plan to be implemented in accordance with RPM3 of the BO.

During development of the drought provision plan, other stakeholders within the ACF Basin provided recommendations and suggested plans to Mobile District. These alternatives are described in the letters, reports, and memorandums for record provided in Appendix E. In addition, Appendix E contains a letter dated 23 February 2007 from the Mobile District to the USFWS that provides a matrix describing how the various alternatives were considered during the development of the recommended plan and why they were not further evaluated in this document.

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 (1939-2002). HEC-5 model simulations were run for the “no action” and recommended plan and graphical representations of the results were generated for various analyses (reservoir elevations and river flows). The recommended plan represents a modification of the IOP or “no action” alternative to Concept 5. As an additional comparison for evaluating impacts, we have also included the simulated outputs of the low flow operation protocols implemented at Jim Woodruff Dam in 2004 and 2005 (the “no action” alternative analyzed in the previous EA completed for the IOP). These figures are provided in Appendix B. The following describes the environmental impacts associated with implementation of Concept 5.

a. Physical Impacts. Channel morphology continues to change in the Apalachicola River since construction of the ACF System projects, 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 Concept 5 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 recommended plan 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 Concept 5 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 Concept 5. 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 recommended plan 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 3). Under Concept 5, 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.

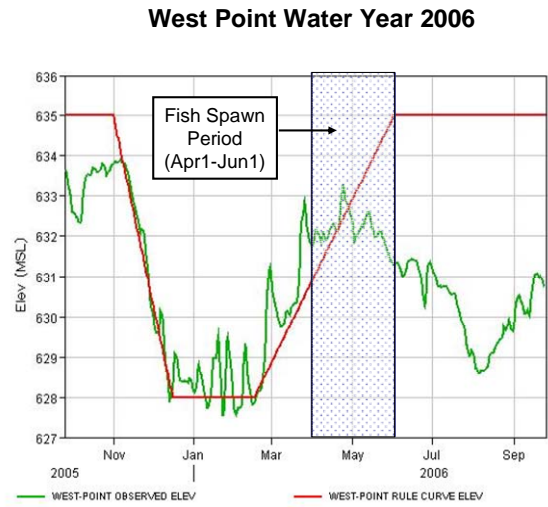
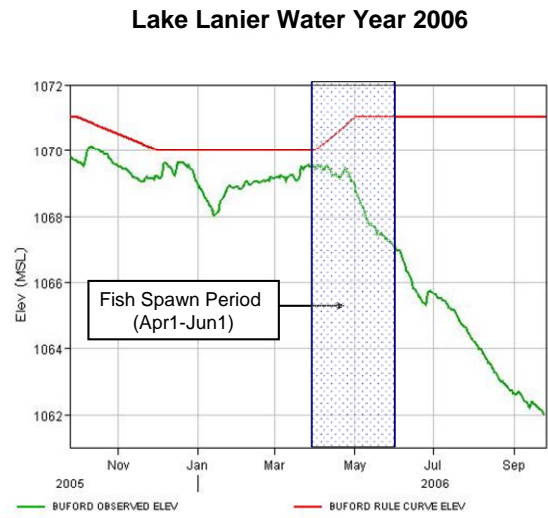
Table 3. Project specific principal fish spawning period for operational considerations.

| 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 |

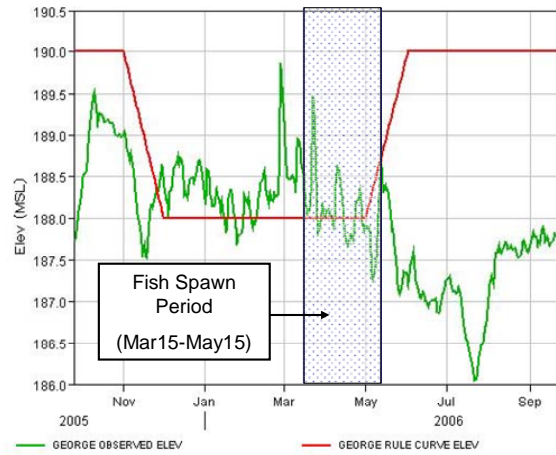
Extensive drought conditions were experienced during the spring and summer of 2006, at which time, operations were conducted similar to the proposed action. Figure 5 demonstrates that under the 2006 low flow conditions, operations in support of reservoir fish still managed to meet the minimum 4 week 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 recommended plan 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. Concept 5 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 recommended plan will not significantly impact hydrology or water quality in the project area. Furthermore, Concept 5 may prove beneficial to fisheries resources since it ensures adequate flows during the spring spawning period. Therefore, we determined that fisheries resources in the project area will not be significantly impacted by the recommended plan.

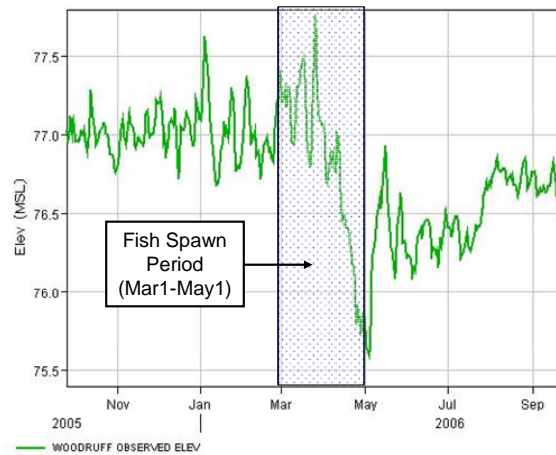
Figure 5. Reservoir elevations for water year 2006 at Lake Lanier, West Point, Walter F. George, and Lake Seminole and Apalachicola River flow for calendar year 2006.

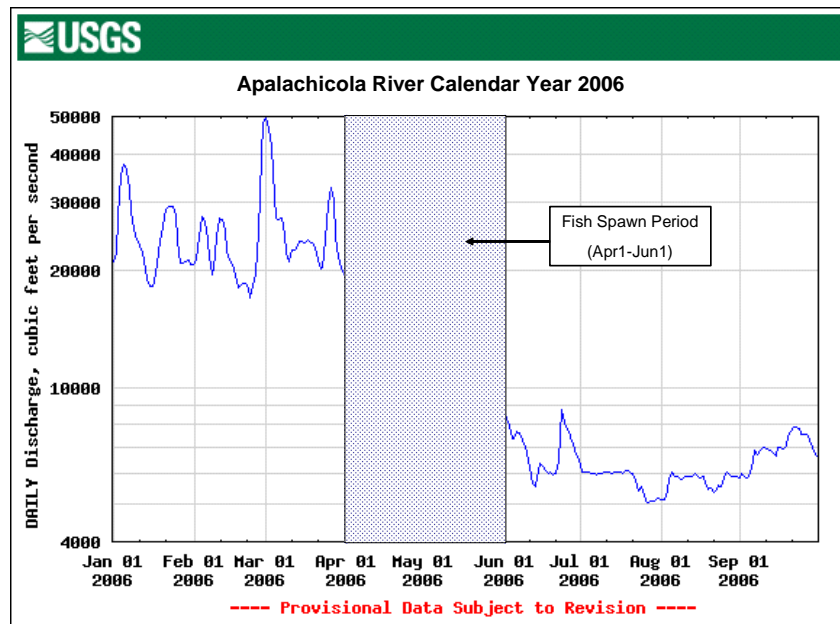


Walter F. George Water Year 2006



Lake Seminole Water Year 2006





e. Essential Fish Habitat (EFH). As described below, implementation of the proposed action will not significantly impact hydrology or water quality in the Apalachicola River or Bay. Furthermore, Concept 5 may prove beneficial to primary production and to a lesser degree secondary production in the estuary since it ensures higher flows during the spring spawning period. Therefore, we determined that EFH in the Apalachicola Bay system will not be significantly impacted by the recommended plan.

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 Concept 5, such as maintaining a flow of at least 6,500 cfs during the majority (95%) of the time may prove beneficial to wildlife resources, since this flow is anticipated to provide “flow-through” conditions at Swift Slough and other off channel distributaries. We have determined that aquatic and terrestrial wildlife resources occurring in the project area will not be significantly impacted by the recommended plan.

g. Threatened and Endangered Species. On 5 September 2006, the USFWS issued a Biological Opinion and Conference Report on the IOP for 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 determined that implementation of the 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.

Furthermore, the USFWS determined that the IOP was not anticipated to incidentally take any Gulf sturgeon or Chipola slabshell, but that it could result in incidental take of fat threeridge, and purple bankclimber. This incidental take 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. However, RPM2 of the BO required a modification to the proposed IOP that eliminated storage if flows were below 10,000 cfs during June through February in order to minimize this potential for take of mussels. The Incidental Take Statement included in the BO allows up to 39 days for releases less than basin inflow when basin inflow is between 8,000 cfs and 10,000 cfs.

Detailed descriptions of the impacts analyses for threatened and endangered species are located in the IOP BO (Appendix C) and the Concept 5 Biological Assessment (BA) provided in Appendix D. As described in the BA, 80% of the sturgeon eggs collected in 2005 and 2006 at the two known Apalachicola River spawning sites (RM 105 and RM 99) were located on hard-bottom habitat inundated to depths of 8.5 to 17.8 feet. By combining the hard bottom area versus discharge relationship with the time series of daily flow values from the various flow regimes we can obtain time series of available habitat area. A frequency analysis (% of days) of these habitat availability time series suggests that the Concept 5 plan is not likely to have an appreciable effect on Gulf sturgeon with regards to this flow-dependent habitat feature. We also computed the maximum amount of habitat inundated to the 8.5 to 17.8 ft depth range for at least 30 consecutive days each year. Another frequency analysis (% of years) was conducted and during approximately 60 percent of the time Concept 5 provides more acres of 30-day continuous habitat in the preferred depth range than either the Baseline or the RoR flow regimes. Despite reducing the March – May minimum discharge thresholds and increasing the associated storage capabilities, the overall effect of the proposed action is beneficial to Gulf sturgeon with respect to the Baseline and RoR conditions for this measure of a flow-dependent habitat feature.

Concept 5 was developed to avoid the adverse impacts associated with Concept 3 regarding flow

regime characteristics relevant to host fish for mussels (floodplain inundation frequency). The recommended plan is a modification of Concept 3 that prescribes 18,000 cfs rather than 16,000 cfs as the basin inflow threshold for the mid-range releases. As described in the BA, we have determined that Concept 5 is not likely to have an appreciable beneficial or adverse effect on Gulf sturgeon and host fish for listed mussels with regards to this flow-dependent habitat feature.

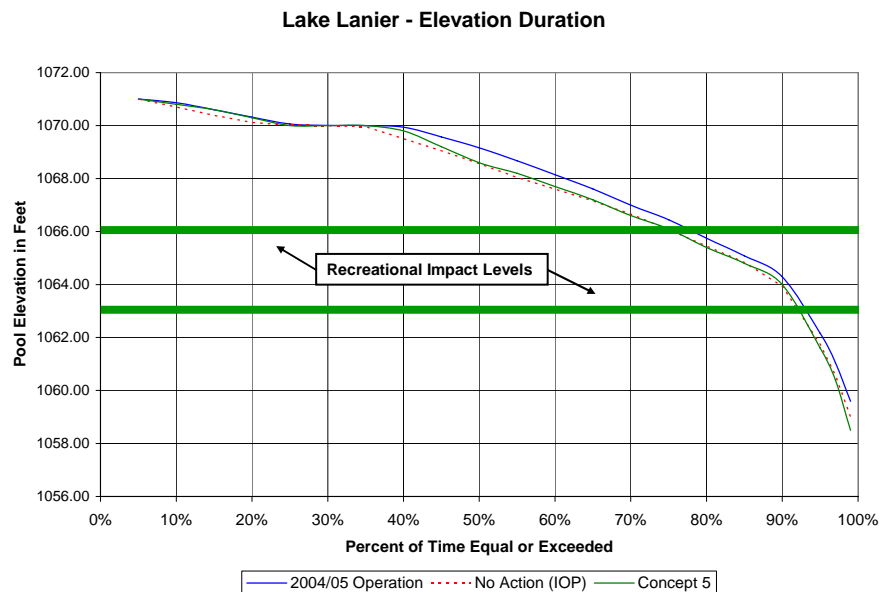
It should be noted that the IOP flow regime generally provided a greater area of floodplain inundation. The loss of this beneficial effect is primarily due to reductions in the flow/storage thresholds during the spring spawning period in order to allow storage in support of augmentation flows during low flow periods for mussels. This tradeoff in benefits was provided by the provisions of RPM3 in the BO. As previously described, during coordination and development of the proposed action, the USFWS recognized that trade offs of these indirect beneficial effects were required in order to facilitate the intent of RPM3, which is to maintain a higher minimum flow on the Apalachicola River during most, but not all low flow periods for the direct benefit of the listed mussels.

By letter dated 28 February 2007, the USFWS determined that implementing Concept 5 is likely to reduce the impacts of incidental take authorized in the BO and will not likely result in any additional impacts to listed species and critical habitats that are significantly greater than those already addressed in the BO. Therefore, we have determined that threatened and endangered species occurring in the project area will not be significantly impacted by the recommended plan.

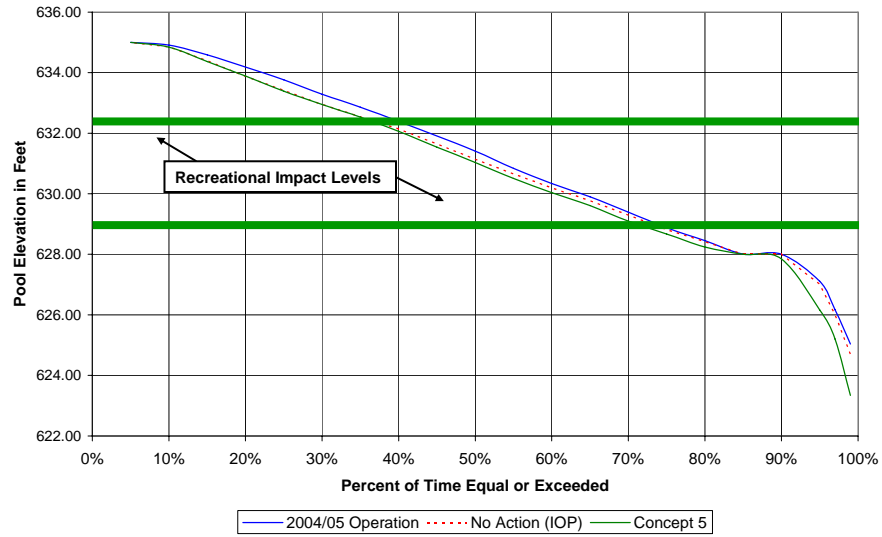
h. Recreation. Implementation of the proposed action will not significantly impact recreational opportunities at the upstream reservoirs. No adverse impacts on reservoir levels due to Concept 5 operations are identified. Reservoirs may not refill to summer pool elevations during extended dry periods or drought conditions but these impacts can generally be attributed to the declining basin inflows and drought conditions or releases made in conjunction with other project purposes (such as releases for hydropower production or water quality demands) rather than operations under Concept 5. The “drought trigger” minimum flow specified in Concept 5 is consistent with current minimum flows under the existing water control plan. Under drought conditions, implementation of Concept 5 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 6). 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. The Concept 5 operation is also consistent with support of reservoir fish spawning and Apalachicola fish spawn during spring months, and would benefit sport fish accordingly. Furthermore, the lakes are managed in a balanced manner that attempts to avoid extreme fluctuations in reservoir levels. Therefore, we have determined that implementation of Concept 5 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. Implementation of the recommended plan is not anticipated to impact 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.

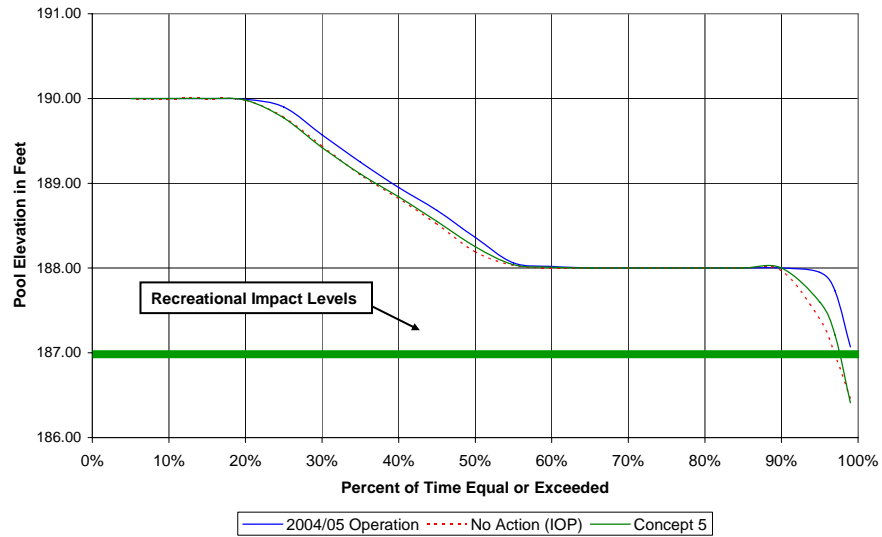
Figure 6. Recreational impact levels plotted against the elevation duration curves at Lake Lanier, West Point, Walter F. George, and Lake Seminole

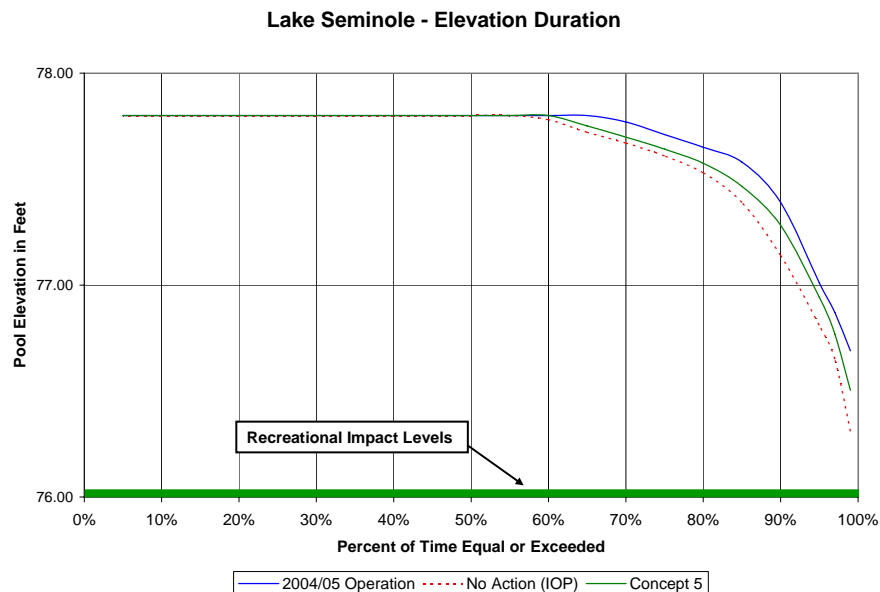


West Point - Elevation Duration



Walter F George - Elevation Duration





i. Hydrology. As illustrated in the simulated elevation duration curves above, implementation of the recommended plan does not result in significantly different reservoir levels. In most cases, releases during the middle to lower flow ranges approximate basin inflows. Also, reservoir levels in 2006 (operating in a manner similar to the recommended plan) are higher than those experienced during similar drought conditions in the year 2000 (Table 4).

As described above, Concept 5 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 prescribed releases are described as minimum, and not target, releases for Jim Woodruff Dam. During wet periods, releases may substantially exceed the Concept 5 values, but during dry periods, releases will more closely match the Concept 5 values in order to conserve reservoir storage for authorized project purposes and future endangered and threatened species needs. Implementation of the recommended plan 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 7 demonstrates that the annual seasonally high flows (generally January – April) and seasonally low flows (generally September

– November) are not altered by implementation of Concept 5. Therefore, we have determined that implementation of the recommended plan will not significantly impact the hydrology of the Apalachicola River and bay system, or the upstream reservoirs.

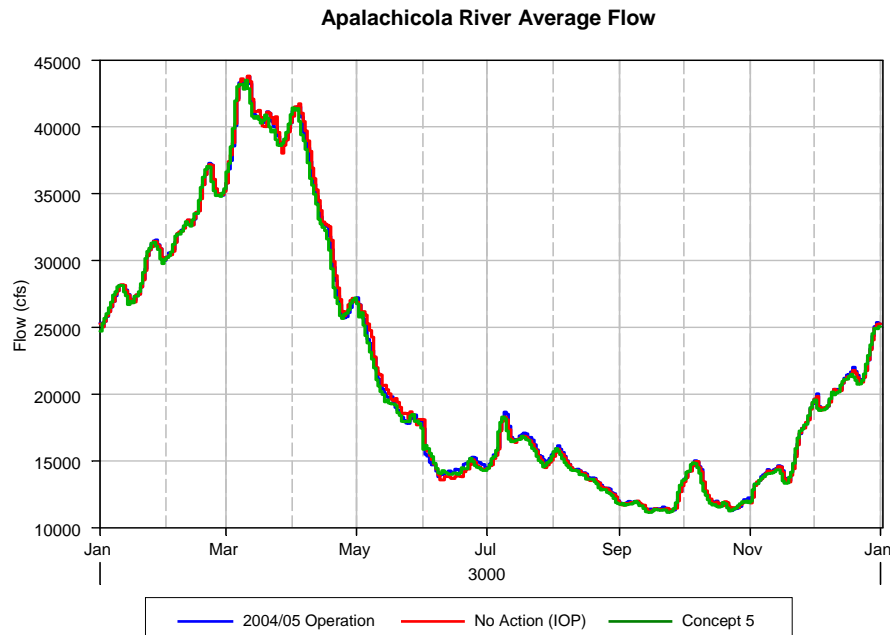
Table 4. Comparison of water year (Oct – Sept) 2000 and 2006 minimum reservoir levels^a.

| 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 7. HEC-5 model simulations for Apalachicola River average flow measured at Chattahoochee gage.



j. Water Quality. 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 Concept 5 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 Columbus, 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, and generally provides a higher desired minimum flow of 6,500 cfs. 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 Concept 5. Therefore, we have determined that implementation of the recommended plan 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 Concept 5. Therefore, we have determined that implementation of the recommended plan will not significantly impact water supply.

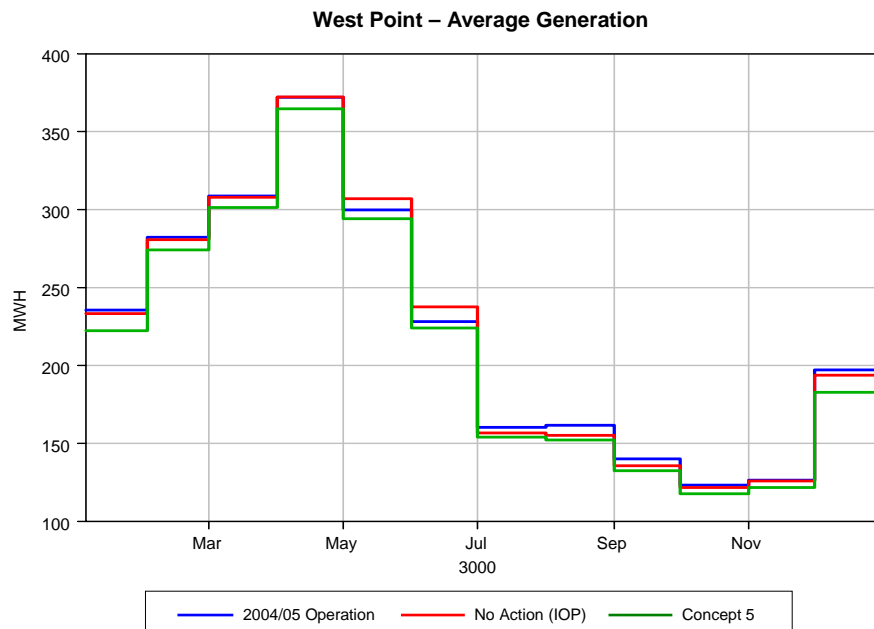
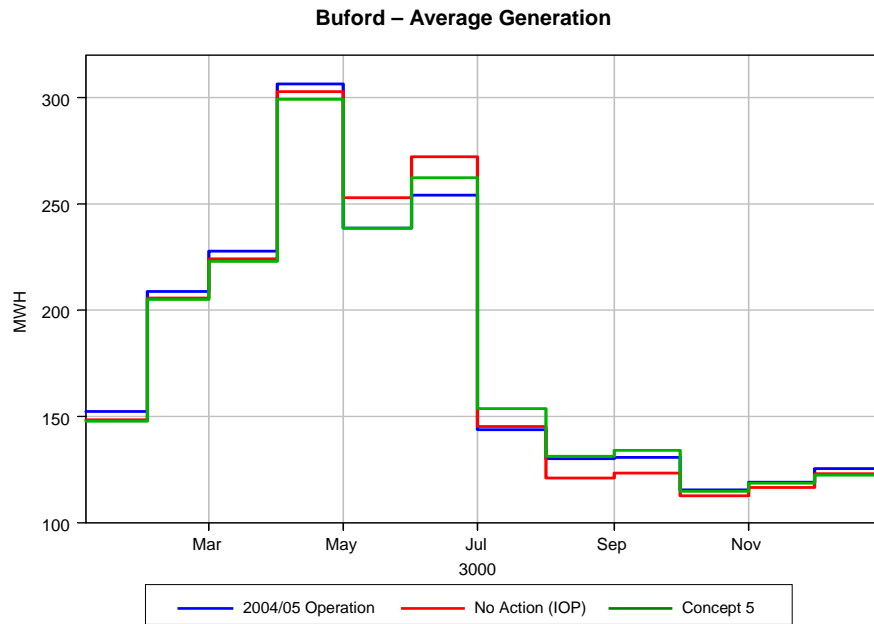
l. Flood Control. Implementation of the proposed action will not affect flood control operations at the upstream reservoirs. The proposed action will not result in reservoir levels that limit the ability to manage flood waters. Therefore, we have determined that implementation of the recommended plan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

m. Navigation. 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 shut down 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

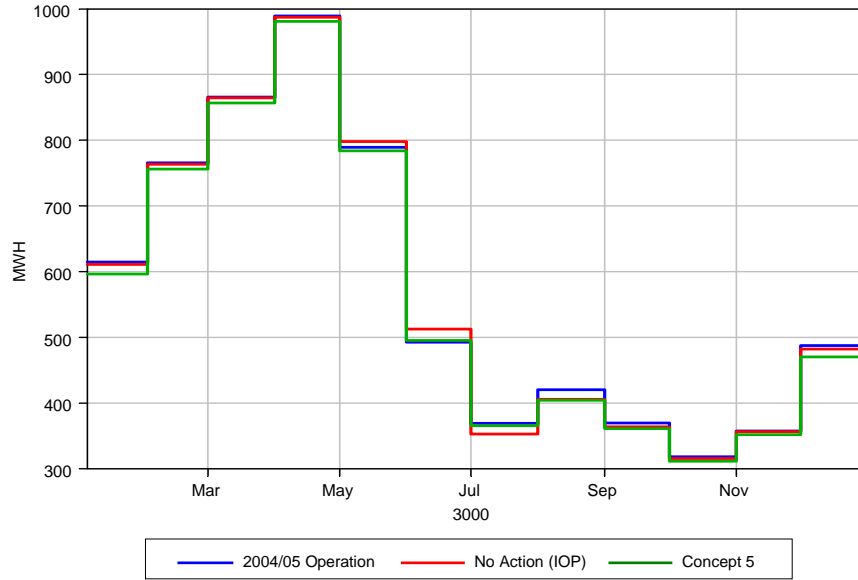
naturally high, with flow support for navigation suspended during drier times of the year. On a case-by-case basis, limited releases for navigation have been made for special shipments when a determination can be made that other project purposes will not be significantly impacted and any fluctuations 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 recommended plan will not significantly impact navigation.

n. Hydropower. 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. However, as described above, 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. 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 8). 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 Concept 5. Therefore we have determined that implementation of the recommended plan will not significantly impact hydropower generation at Jim Woodruff or the upstream dams.

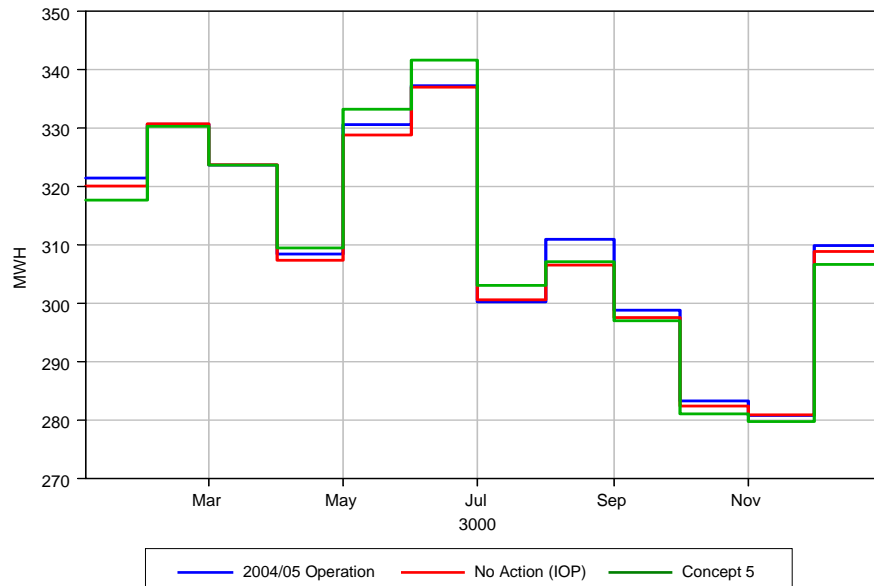
Figure 8. HEC-5 Model simulations showing average generation at Buford Dam, West Point Dam, Walter F. George Dam and Jim Woodruff Dam powerhouses.



W F George – Average Generation



Jim Woodruff – Average Generation



o. Floodplain/Wetlands. Models of the proposed action suggest that implementation of Concept 5 would not significantly change the amount of non-tidal floodplain acres inundated at various discharges (USACE 2007). Therefore, we have determined that implementation of the recommended plan 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 recommended plan 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 recommended plan have not disclosed the existence of any identifiable minority or low-income communities that would be adversely affected by implementation of Concept 5.

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 recommended plan 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 Concept 5 and other Federal, State, Tribal, local or private actions that impact the resources affected by the proposed action. The resources affected by the recommended plan are described in the EA completed for the IOP (USACE 2006) 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 due 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 Concept 5 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 Concept 5 conditions suggest that operations under Concept 5 will not significantly alter the Apalachicola River flow regime. As described in the BO (USFWS 2006), 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 Concept 5 indicates that flows are comparable as well (USACE 2007). Furthermore, implementation of Concept 5 may benefit some aspects of the flow regime by more closely matching natural or pre-Lanier conditions. Therefore, implementation of the recommended plan 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 RPM3 in the BO and thus the potential for incidental take related to implementing Concept 5 has been minimized to the maximum extent practicable. Therefore, implementation of the recommended plan 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 only 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 Concept 5 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 Concept 5 would be necessary. At this time we do not have an estimate of when that will occur. As noted in the current BO completing formal Section 7 consultation and the letter approving the Concept 5 modifications to the IOP,

operations under the recommended plan 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 BO 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 E contains copies of letters, memos, and reports documenting the coordination related to development of Concept 5 in support of endangered and threatened species. An overview of the coordination conducted with the USFWS, States of Alabama, Florida and Georgia, and significant stakeholders, during development and assessment of the recommended plan is summarized below. All pertinent information relating to the Section 7 consultation and completion of the Biological Assessment to address Concept 5 (including copies of all presentations, modeling assumptions, letters, and memorandums for record) has been posted throughout the coordination process on the Mobile District website at:

<http://www.sam.usace.army.mil/ACF.htm>

All comments were considered in determining whether additional adjustments to the recommended plan or IOP would be pursued and in assessing impacts of the recommended plan on other project purposes.

During the 26 October 2006 semi-annual/planning meeting, USFWS suggested that the Corps investigate whether a higher minimum flow than the 5,000 cfs specified in the IOP could be sustained year-round if there were opportunities to provide for additional storage during the spring spawning months (March – May) to support future augmentation releases for the higher minimum flows. The higher minimum flow identified for further consideration under the RPM3 drought provision were based on the flow conditions necessary to provide “flow-through” conditions at swift Slough and adequate depths at the impacted “hooks and bays”; as well as operational constraints while making releases through the powerhouse turbines during low flow conditions. Three scenarios were identified for further modeling and evaluations initially: alternative minimum flows of 5,800 cfs, 6,500 cfs and 7,000 cfs. In order to provide for additional storage during the March-May timeframe, it was agreed to consider lowering the upper threshold to 25,000 cfs (below which at least 70 percent of basin inflows would be released and up to 30 percent could be stored); and lowering the lower threshold to 16,000 cfs (below which 100 percent of the basin inflows would be released). The Corps agreed to model these three scenarios as a screening tool to see if the system could support the higher minimum flows and/or if these adjustments would provide any meaningful benefits in providing higher support flows for mussels. The Corps agreed to provide feedback on the model results to USFWS in November, and then meet again on 6 December 2006 to discuss any additional adjustments or concepts for a drought provision that could be implemented by 30 January 2007.

The Corps provided modeling results to USFWS on 1 November 2006 for the above three scenarios (based on composite storage within the basin), which indicated that there would be shortages for each of the three scenarios, although the shortage for the 5,800 cfs scenario would be small. This indicated that a minimum flow close to 5,800 cfs might be sustainable, but that a drought “trigger” would likely be required for this or higher minimum flow scenarios to indicate when the lower 5,000 cfs minimum flow would be prudent during sustained low flow or drought conditions. It was agreed the Mobile District would attempt to define a drought trigger, and that the results of further considerations and modeling would be discussed with USFWS during a meeting on December 6, 2006.

During the development of the drought trigger plan the Mobile District and USFWS were presented with suggested concepts for drought provision operations from other stakeholders within the basin. On 1 November 2006, the Florida Department of Environmental Protection (FDEP) requested a status of Corps efforts to develop the RPM3 drought provision and a meeting with their modelers regarding any proposed provision. By letter from Mobile District dated 6 November 2006, the FDEP was informed that preliminary discussion and modeling had begun in consultation with USFWS, and that both agencies had agreed the first step was to investigate whether possible reductions in spring releases would provide sufficient composite storage to allow sustained higher releases in the summer months during drought conditions. It was noted that additional modeling would be conducted prior to an early December meeting with USFWS. Also under consideration was a possible workshop with ACF basin stakeholders, to be held before the end of the year, during which preliminary modeling results and suggested drought provisions could be discussed. It was also noted that the Corps intended to identify proposed components of a drought provision by the end of January, as required by the terms of RPM3; and that revisions to the spring release schedule or other elements of the IOP may require completion of additional Section 7 consultation prior to implementation under the IOP.

During November, the Corps was also approached by the Atlanta Regional Commission (ARC), regarding their suggestions for a drought provision or other modification to the IOP.

In order to facilitate the development of a drought provision operation pursuant to the requirements of RPM3, share information on concepts being considered by Mobile District and USFWS, and to solicit input from the interested stakeholders, a Drought Provision Workshop was coordinated. On 27 November 2006, an announcement was sent to the States of Alabama, Florida and Georgia, Federal agencies and other stakeholders regarding a Drought Provision Workshop to be held on 13 December 2006, in Columbus, Georgia.

During the 6 December meeting with the USFWS, the Mobile District presented several drought trigger concepts. Based on the preliminary modeling results presented, Concept 3 was selected as the drought provision plan to be carried forward for further consideration and described in detail at the Drought Provision Workshop.

The Drought Provision Workshop was held on 13 December and attendees included Federal, State, and local stakeholders within the ACF Basin. During the workshop, the Corps presented several concepts that had been considered (Concepts 1 through 4), with Concept 3 selected as the drought provision plan to be described in detail (including preliminary modeling results) for further consideration. Concept 3 is comprised of operating in conformance with a modification of the IOP to lower the upper and lower flow thresholds for the March – May spawning period to 25,000 cfs and 16,000 cfs, respectively, as shown in the below table. Under normal to wet flow conditions, a higher minimum release of 6,500 cfs would be maintained. However, during sustained dry or drought conditions, a more conservative drought management operation would “trigger” the reversion to the lower minimum release of 5,000 cfs. The drought trigger would be determined by computing the Composite Storage within the storage reservoirs within the basin. Whenever the Composite Storage falls below the bottom of Zone 2 into Zone 3, the drought trigger would dictate a minimum release of 5,000 cfs. The drought provision would maintain a minimum release of 5,000 cfs until conditions improve such that the Composite Storage reaches a level above the top of Zone 2 (i.e., within Zone 1). At this time, the drought provision would be suspended, and the higher minimum release of 6,500 cfs would be maintained.

Other stakeholders making presentations regarding suggestions for a drought provision, or information to be considered in development of a drought provision, included the State of Georgia Environmental Protection Division (GA-EPD) and ARC. The memorandum for record of the workshop was provided to all workshop participants on 15 December 2006, and copies of all presentations, modeling assumptions, and the memorandum of the workshop were posted on the Mobile District website at.

Participants in the workshop were requested to submit any additional comments on the proposed drought provision or suggestions for alternatives not later than 10 January 2007 so they may be considered prior to submittal of a drought provision on 31 January 2006.

Additional comments on the proposed drought provision were received from Gwinnett County, Georgia by letter dated 5 January 2007; from the GA-EPD by letter dated 9 January 2007; from the ARC by letter dated 10 January 2006; from the Southeastern Power Administration (SEPA) by letter dated 10 January 2006; and from the FDEP by letter dated 16 January 2007. FDEP provided additional comments on the ARC and Georgia proposed concepts by letter dated 29 January 2007. Copies of this correspondence are provided in Appendix E and are also posted on the Corps webpage. The Corps and USFWS reviewed these comments to determine whether elements of the suggestions and concepts presented could provide some benefits in developing a drought provision. Upon review of the stakeholder’s alternative concepts for a drought provision or alternative concepts for the IOP the Mobile District determined that each of the suggested concepts as a whole would constitute a change to the water control plan. The intent of the IOP and the RPM3 drought provision is to identify adjustments to water management operations within the constraints of the existing water control plan that would support or minimize harm to the federally protected endangered and threatened species and critical habitat for those species.

Therefore, the concepts presented by the stakeholders that represented changes to the existing water control plan, would more appropriately be addressed in proposals to update the water control plans at a future date. However, it should be noted that Concept 3 did address many of the concerns expressed by the other stakeholders, such as providing for higher flows for mussels most of the time, using some degree of storage for flow support; storing additional water during the spring refill months; and basing operational decisions on available water within the system (taking into account both basin inflow and available storage).

On 26 January 2007, the Corps completed the modeling and evaluation of the Concept 3 drought provision proposal using the same statistical analyses and effects analysis as prepared by the USFWS in the BO. In reviewing these results, it was determined that the Concept 3 plan would provide the desired beneficial effects on low flow conditions, providing for fewer years when flows were between 5,000 cfs and 7,000 cfs, higher sustained flows for mussels more of the time than the IOP during low flow conditions between 8,000 cfs and 10,000 cfs. However, it was determined in consultation with USFWS that the proposed reduction in spring releases provided lower frequencies and shorter durations of floodplain inundation for certain flow conditions which may produce adverse effects on host fish for mussels. Therefore, USFWS could not reach a determination that the proposed drought provision would result in a “not likely to adversely affect” determination for habitat for host fish for mussels. As a result, formal Section 7 consultation with the USFWS would be required for further consideration of the Concept 3 drought provision. However, it appeared that additional adjustments to the proposed drought provision could be made that may remove this potential for adverse effect. These possible adjustments were discussed with USFWS and it was agreed that they should be further investigated. The additional modeling and evaluation of the effects of possible adjustments to the Concept 3 drought provision could not be completed by 30 January 2007. However, it was anticipated that a drought provision could be identified, modeled, evaluated and implemented prior to the 2007 sturgeon spawning period.

Based on the new information that was developed during the informal consultation discussions related to development of the drought provision, USFWS agreed that it was appropriate to continue efforts to identify an acceptable drought provision that could be implemented for the 2007 spring season. By letter to the USFWS dated 30 January 2007, the Mobile District requested an extension until 28 February 2007 in order to complete the necessary modeling and evaluations of the proposed adjustments to the proposed RPM3 drought provision. By letter dated 2 February 2007, the USFWS granted the extension until 28 February 2007. By letter dated 31 January 2007, the Mobile District submitted the fiscal year 2006 Annual Report to the USFWS, which summarized the status of compliance with the terms and conditions of the BO.

The Mobile District completed the necessary evaluations in a biological assessment of the effects of an RPM3 drought provision, and submitted the Concept 5 plan for consideration by the USFWS on 16 February 2007. Concept 5 was developed to minimize and avoid the adverse effects associated with Concept 3. The Concept 5 plan is similar to Concept 3 with the exception

of increasing the spawning season lower threshold flow from 16,000 to 18,000 cfs. The USFWS requested additional information regarding Corps consideration of additional stakeholder comments resulting from the 13 December 2007 drought provision workshop; and this information was submitted to USFWS on 23 February 2007. By letter dated 28 February 2007, USFWS approved the recommended plan submitted as the RPM3 drought provision for implementation on 1 March 2007. Copies of this correspondence are also provided in Appendix E and have been posted on the Mobile District webpage

As described in the 23 February 2007 submittal to USFWS, additional comments and suggested alternative concepts for an RPM3 drought provision submitted by others will continue to be carefully reviewed and evaluated. However, it was not possible to complete careful review and formulate a revised drought provision incorporating their suggestions prior to 1 March 2007. In addition, many of the suggestions would require a modification to the current ACF water control plans and cannot be considered as part of this action. If subsequent review demonstrates that elements of the concepts appear to offer benefits to the current IOP or RPM3 drought provision, future adaptations or adjustments to the IOP or drought provision may be proposed, consistent with the provision for adaptive management specified in RPM1. However, any proposal that results in a significant change to the modified IOP, requires changes to the existing Water Control Plan, or produces adverse effects when considering the evaluation criteria used in the BO would likely require the re-initiation of formal consultation under Section 7 of the ESA. Likewise, additional NEPA analysis may be required based on the scope of any future adaptations or adjustments to the IOP or drought provision plan.

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