

**Jim Woodruff Dam Interim Operations Plan Biological Opinion  
Annual Report  
31 January 2008**

This annual report summarizes efforts that have been taken and the status of compliance with the terms and conditions since issuance of the BO on 5 September 2006, with emphasis on those activities that occurred during Calendar Year 2007.

**Background:** On 7 March 2006, the U.S. Army Corps of Engineers, Mobile District, submitted a request to initiate formal consultation pursuant to Section 7 of the Endangered Species Act (ESA) regarding the impact of releases from the Jim Woodruff dam to the Apalachicola River on Federally listed endangered or threatened species and critical habitat for those species. Operations regarding releases to the Apalachicola River were described in an Interim Operations Plan (IOP) for Jim Woodruff Dam, since consultation on the overall project operations for the Apalachicola, Chattahoochee, Flint Rivers (ACF) system would be deferred until future efforts to update the water control plans and basin manual for the system. Species of concern include 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 (*Elliptioideus sloatianus*); and the Chipola slabshell mussel (*Elliptio chipolaensis*). A final Biological Opinion (BO) for the Jim Woodruff Dam IOP was issued by the U.S. Fish and Wildlife Service (USFWS), Panama City Field Office on 5 September 2006. By issuance of the final BO, USFWS authorized a specific amount of incidental take of mussels associated with water management operations under the IOP, in the form of a surrogate measure of potential take. The surrogate measure in the Incidental Taking Statement is represented by the number of days releases from Jim Woodruff Dam, as measured on the Apalachicola River at the U.S. Geological Survey (USGS) Chattahoochee, FL river gage, are less than the daily basin inflow, when the daily basin inflow is between 8,000 cfs and 10,000 cfs. This determination of potential for take is based on the findings in the BO that the IOP operations may result in an increase in the number of days, when flows are between 8,000 cfs and 10,000 cfs, that releases under the IOP would be less than daily basin inflow due to managing releases using a 7-day average of the basin inflow. An authorized 39 days per calendar year of "potential take days" was included in the BO. The BO also included five reasonable and prudent measures (RPMs) for limiting the amount of incidental take associated with water management operations and 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.

#### **OPERATIONS AND CONSULTATION CONDUCTED IN 2007**

**Volumetric Balancing Accounting System:** Volumetric balancing is an integral component of the IOP, where credits for releases due to ramping down restrictions that are greater than required under the IOP flow threshold rules, and under-releases due to physical operational constraints, are balanced to assure that the IOP rules as closely as practicable and that the specified volumes of releases are made over time. In the Spring of 2007, significant volume

credits had been accumulated during drought conditions, and debits or “under-releases” were being made to bring the volumes of releases into balance. Florida Department of Environmental Protection (FDEP) expressed concern that volumetric balancing was inappropriately being used and resulting in under-releases being made during the fish spawning season (March and April), as noted in a 19 April 2007 notice of intent to sue directed to the Secretary of the Army, U.S. Army Corps of Engineers and USFWS. The USFWS and Mobile District had already begun discussions to clarify volumetric balancing operations at that time, but began to intensively consult in order to develop a comprehensive and transparent accounting system for tracking and timing of credits and debits of volumes. By letter dated 16 May 2007, Mobile District provided an updated volumetric balancing accounting system, demonstrated the status of credits in both the previous and updated accounting system, and noted that the volumetric accounting balance would be “zeroed out” and restarted under the new accounting system effective 1 May 2007. By letter dated 11 June 2007, FDEP filed a second notice of intent to sue questioning the validity of the volumetric balancing operations and updated accounting system. On 2 August 2007, FDEP filed a letter to USFWS providing their own assessment of volumetric balancing credits in accordance with the updated accounting system and asserted that Mobile District had been misapplying credits under the system. By letter dated 6 November 2007, Mobile District provided an assessment and review of the FDEP assertions, and concluded that FDEP had demonstrated a misunderstanding of the purpose and intent of volumetric balancing, and had misapplied credits and debits in the accounting system. Mobile District intends to continue to use the updated volumetric balancing accounting system in providing for operations under the IOP as appropriate. The volumetric balancing accounting system was temporarily suspended upon implementation of the Exceptional Drought Operations as described below. A copy of the status of volumetric balancing credits for the accounting system effective 15 November 2007 is enclosed. At that time, a balance of approximately 11,500 day-second-feet had been accumulated since 1 May 2007. A graphical presentation showing the daily releases measured at Chattahoochee gage compared to the 7-day basin inflow made under the IOP operations and continuing under the Exceptional Drought Operations throughout 2007 and into January 2008 is also enclosed.

**Exceptional Drought Operations and Amended Biological Opinion in 2007:** In response to extreme and sustained drought conditions developing throughout the year 2007, the Mobile District proposed temporary modifications to the IOP in order to conserve storage within the basin in order to prepare for sustained drought conditions predicted to extend into the spring and summer of 2008. In September 2007, Mobile District began intensive informal consultation discussions with the USFWS to consider possible modifications to the IOP as drought contingency measures. On 17 October 2007, via email correspondence with USFWS, it was agreed that the Mobile District would use accumulated volumetric balancing credits (approximately 12,000 day-second-feet) to store inflows greater than 5,000 cfs in the event of beneficial rainfall in the basin, in order to minimize drain on composite storage within the basin. On 19 October 2007, Mobile District proposed to temporarily suspend until 1 March 2008 the down-ramping restrictions in the IOP in order to minimize use of storage following rain events in the basin. During this suspension, releases from Jim Woodruff Dam would be made to match the rate of fall of basin inflow. USFWS concurred with this suspension of down-ramping restriction on 19 October 2007, with the understanding that any mussels that previously occurred in areas inundated by flows greater than 5,000 cfs had most likely already suffered mortality from the

sustained drought conditions, and Gulf sturgeon were in process of migrating to the Gulf waters and would likely not return to the river habitat areas until after 1 March 2008.

Following additional informal consultation discussions, Mobile District then submitted an Exceptional Drought Operations (EDO) plan in a request to the USFWS for the re-initiation of formal consultation on 1 November 2007, including temporary suspension of the IOP storage constraints, down ramping restrictions, and temporary reductions in the minimum flow release to 4,150 cfs. This request included a biological assessment of the anticipated impacts of the EDO. On 7 November 2007 Mobile District provided an amendment to the EDO, including incremental reductions in the minimum flow release from 5,000 cfs to 4,750 cfs, 4,500 cfs and 4,150 cfs. USFWS responded on 15 November 2007 with an amended Biological Opinion, which included several revisions and additional conditions to the five RPMs in order to minimize incidental take of mussels due to implementation of the EDO.

The Amended Biological Opinion approved incremental reductions in the minimum flow to 4,750 cfs based on the proposed EDO trigger (Composite Storage Zone 4); and to 4,500 cfs provided an appropriate incremental trigger is identified. USFWS determined that additional formal consultation would be required to determine whether the incremental reduction to 4,150 cfs would not likely jeopardize the listed mussel species. A specific trigger for the incremental reduction to 4,500 cfs was to be identified by 7 December 2007; and a trigger for the next incremental reduction to 4,150 cfs would be developed in formal consultation with the USFWS, with a proposed trigger to be identified by 15 April 2007. The Amended Biological Opinion would expire on 1 June 2008, subject to additional consultation to extend it beyond that date.

The conditions for implementing the EDO were determined to be met on 16 November 2007, at which time Mobile District made the first incremental reduction in minimum releases to 4,750 cfs, as measured by the Chattahoochee gage. Mobile District, along with representatives from USFWS and the U.S. Army Corps of Engineers Engineering Research Development Center (ERDC), conducted monitoring during 16-21 November 2007 for incidental take of mussels in conformance with the terms and conditions of the Amended Biological Opinion.

On 21 November 2007, Mobile District submitted a proposed incremental trigger for the 4,500 cfs reduction in minimum flow based on status of inflow conditions within the lower Chattahoochee basin and Flint River basin. Based on additional consultation discussions with USFWS, the 4,500 cfs trigger was revised to also include an additional element relating to the status of composite storage, and the revised trigger was submitted on 7 December 2007 in conformance with the terms and conditions of the Amended Biological Opinion.

On 1 December 2007, conditions were still in place under the EDO to support reduced minimum flows of 4,750 cfs (basin composite storage was still within Composite Storage Zone 4). However, due to rainfall received in the basin since mid-December 2007, releases to the Apalachicola River have been greater than 5,000 cfs due to necessary head limit releases at Walter F. George and Jim Woodruff dams. On 1 January 2008, the composite storage within the basin was within Composite Storage Zone 3, under which conditions the minimum flow

requirement returns to 5,000 cfs. Another re-evaluation of the status of basin conditions and the appropriate EDO operation will be made on 1 February 2008.

**Description of the EDO:** The EDO represents a temporary modification to the IOP during the severe and sustained drought conditions and is based on the status of composite storage in the basin. The EDO relaxes storage restrictions of the IOP until composite storage has recovered sufficiently to return to the previous IOP operations. The EDO would be implemented once composite storage falls from Zone 3 into Zone 4; at which time all storage constraints and down-ramping restrictions are suspended, and the minimum flow release is reduced to 4,750 cfs. If drought conditions continue and result in continued depletion of storage within the ACF basin reservoirs, an additional incremental reduction in minimum flow to 4,500 cfs would occur once the following trigger conditions are met:

a. Cumulative Annual Basin Inflow above Walter F. George Dam < 5<sup>th</sup> Percentile Historic Flows: This trigger represents a measure of the amount of inflow received in the three storage reservoirs in the basin, Lake Lanier, West Point Lake and Walter F. George Lake. The trigger is a cumulative annual value designed to capture the importance of sustained low flows on reservoir storage and recovery. Coupled with the Composite Storage Trigger described in paragraph c. below, this trigger indicates a prolonged and sustained reduction in inflows to the storage reservoirs meriting further outflow reductions.

b. Monthly Basin Inflow above the Newton Gage on the Flint River < 5<sup>th</sup> Percentile Historic Flows: This trigger represents the flow contribution of the uncontrolled Flint River. When combined with the Composite Storage Trigger described in paragraph c. below, and cumulative annual basin inflows on the Chattahoochee River less than the 5<sup>th</sup> percentile of historic flows described in paragraph a. above, flows less than the 5<sup>th</sup> percentile on the Flint River represent a continuation of critically low inflows and result in further rapid depletion of the remaining basin storage to meet the downstream flow requirements below Jim Woodruff Dam.

c. Composite Storage Trigger Zone for 4,500 cfs Incremental Reduction in Flow: In addition to the above two components, a third component to the trigger has been identified to reflect that the resulting impact on Composite Storage has reached critical levels, meriting the next incremental reduction in releases. As shown on the enclosed figures, the Composite Storage Trigger Zone is the combined Composite Storage volumes resulting from Lake Lanier/Buford Dam being at the top of Zone 4, and both the West Point and Walter F. George projects being at the bottom of Zone 4/top of inactive storage. This represents a storage condition equivalent to all three reservoirs being within drought management conditions (Zone 4), and all flows in support of meeting the downstream minimum releases being drawn from Lake Lanier.

An evaluation of the status of basin conditions is conducted at the first of each month to determine whether the trigger components have been met. When the above three components are all met, then a determination is made on whether and when the trigger for an incremental reduction to 4,500 cfs release would be exercised. This determination may consider other relevant information, including recent climatic and hydrologic trends and forecasts of climatic and hydrological conditions, or other critical basin needs or anticipated impacts. Additional

releases above the minimum flow would be made as necessary to maintain head limits or due to other operational constraints, as has occurred during recent rainfall events when the releases resulted in flows over 5,000 cfs. Under the EDO, once triggered the 4,500 cfs minimum flow would be maintained until Composite Storage is restored from Zone 4 into Zone 3, at which time EDO operations would return to the 5,000 cfs minimum flow. Discontinuation of the EDO would occur once Composite Storage is restored from Zone 3 into Zone 2, at which time the operations would return to those specified under the IOP.

## **STATUS OF COMPLIANCE WITH TERMS AND CONDITIONS OF THE BIOLOGICAL OPINION AND AMENDED BIOLOGICAL OPINION**

As noted above, the USFWS issued an amended Biological Opinion on 15 November 2007 to address concerns related to implementation of the EDO, which represents a temporary modification to the IOP. The terms and conditions of the original BO for the IOP were included in the Amended BO, along with highlighted text indicated new or revised conditions for the Amended BO. (Excerpts of the Amended BO terms and conditions are included below for easy reference) In order to be exempt from the prohibitions of section 9 of the ESA, the Mobile District must comply with the following terms and conditions, which implement the reasonable and prudent measures described in the BO and Amended BO. These terms and conditions are mandatory. However, the studies and other outreach programs in the RPMs and conservation measures are also subject to the availability of funds from Congress. The Corps will exercise its best efforts to secure funding for those activities. In the event the necessary funding is not obtained to accomplish the RPM activities by the dates established in the BO, the Mobile District will reinitiate consultation with USFWS as necessary. (*Note: New or revised conditions included in the Amended BO dated 15 November 2007 are shown below in italics. Most of the referenced documents have previously been provided to the USFWS and are posted on the Mobile District Website at the following location: <http://www.sam.usace.army.mil/ACF.htm>.)*)

**Adaptive management (RPM1).** Identify ways to minimize harm as new information is collected.

**Rationale.** Additional information will be collected about the listed species and their habitats in the action area, water use upstream, and climatic conditions. This information needs to be evaluated to determine if actions to avoid and minimize take associated with the Corps' water management operations are effective or could be improved.

**a.** The Corps shall organize semi-annual meetings with the Service to review implementation of the IOP and new data, identify information needs, scope methods to address those needs, including, but not limited to, evaluations and monitoring specified in this Incidental Take Statement, review results, formulate actions that minimize take of listed species, and monitor the effectiveness of those actions.

**STATUS:** In discussions with USFWS, it was recommended that a semi-annual meeting be held in the early fall of each year (preferably in August); and in the late winter or early

spring prior to initiation of fish spawn activities (preferably in February). Since the BO was issued in September 2006, the first semi-annual meeting was held at the USFWS Panama City Field Office on 26 October 2006. At this meeting, the Corps and USFWS discussed current water management operations in support of the listed species, a draft plan and schedule for implementing the RPMs and terms and conditions, and confirmed the monitoring plans being implemented to track potential taking days. The next semi-annual meeting was held on 1 March 2007. A copy of the Memorandum for Record of this meeting is attached. Discussions focused on evaluating volumetric balancing operations for flows below 10,000 cfs and reviewing the volumetric balancing accounting system; possible additional modifications to the IOP that would further minimize harm to species; consideration of possible additional modifications for drought contingency operations, including possible forecasting methods; possible additional flow/velocity studies below Jim Woodruff Dam and salinity studies for Apalachicola Bay. Planning discussions were also directed toward a future workshop with river morphology and sediment specialists and malacologists to assist in addressing the requirements of RPM5 and RPM5 below.

A second semi-annual meeting was held on 25 September 2007. Following a summary of the status of compliance with the terms and conditions of the BO, discussions proceeded toward the severity of the 2007 drought conditions, concern that conditions may be developing toward a multi-year drought, and additional modifications to the IOP that may be necessary in order to be able to continue to provide augmentation flows at or above 5,000 cfs. Modifications that would increase opportunities for conserving or increasing storage in the upstream reservoirs were considered and it was determined that intensive informal consultation discussions and modeling of various possible hydrological scenarios would be performed to assist in developing a drought contingency operation to address a possible multiple year drought. A copy of the Memorandum for Record of this meeting is attached.

b. The Corps shall assume responsibility for the studies and actions that both agencies agree are reasonable and necessary to minimize take resulting from the Corps' water management actions.

**STATUS:** Suggestions for conduct of studies and actions described in the BO were discussed at the semi-annual/planning meetings on 26 October 2006, 1 March 2007, and 25 September 2007. The Corps accepts responsibility for those reasonable and necessary actions, subject to authority and funding limitations. Due to budget constraints (the Corps has been operating under limited Continuing Resolution Act funding for all of Fiscal Year 2007, and these funding continued into FY2008), implementation of some of the activities requiring additional studies or procurement of other services may be delayed or deferred until funding is available. However, all the actions related to project operations and that can be accomplished within current funding levels are being implemented. Available funding in FY2007 provided for funding of limited mussel depth distribution studies and cursory sediment/morphology studies and a workshop in the summer of 2007, and development of a mussel monitoring plan. Funding available in FY2008 will allow continuation of mussel monitoring study designs and mussel

distribution studies, and refinement of additional study designs as required in the below RPMs. Additional funding will be used for in-house support to model alternatives and continue compliance actions required under the RPMs.

c. The Corps shall evaluate refinements to predictive tools.

**STATUS:** The Mobile District is actively pursuing two actions that will assist in the use of predictive modeling tools. These include the extension of the unimpaired flow dataset for the Apalachicola-Chattahoochee-Flint River (ACF) basin from 2001 through 2004. In the event additional demand data can be obtained from the States of Alabama, Florida and Georgia, attempts will be made to further extend the unimpaired flow dataset through 2005. The other action being pursued is to update the predictive hydrological model from HEC-5 to HEC-ResSim. The ResSim model will be more flexible, and can be programmed to run model simulations with if/then/else statements. It is anticipated that the ResSim model and the extended unimpaired flow data set would be used as a base for analyses incorporated into the Environmental Impact Statement (EIS) for proposed Interim Water Storage Contracts at Lake Lanier, and any future EIS to address updates or revisions to the existing water control plans. The Hydrological Engineering Center (HEC) is still testing the new HEC-ResSim model. The model currently reflects the original IOP operation, and will need to be updated to reflect the final BO operations and the recently approved RPM3 and EDO modifications. It is still planned to use the updated ResSim model to assist in evaluations associated with the Lake Lanier Interim Storage Contracts and other future consultations associated with updates to the water control plans. HEC-5Q water quality model is also being adapted by the HEC to assure that it is compatible with outputs from the ResSim model.

The Mobile District has also investigating the use of the Apalachicola Bay 3-D Hydrodynamic model in the evaluations programmed for the EIS for the proposed Lake Lanier Interim Storage Contracts as well as future updates to the water control plans. This model can provide predictive measures for both circulation and salinity within the bay, and could therefore provide a measure of changes in salinity in sturgeon feeding areas due to potential changes in flow into the bay. However, it appears that the State of Florida will not make this model available for use by the Corps due to ongoing litigation between the parties. Therefore, Mobile District has investigated the potential of use of an alternative model developed for TMDL studies of Apalachicola Bay in conjunction with additional essential fish habitat studies by NOAA. If the Interim Storage Contracts at Lake Lanier would result in substantive changes in IOP operations and potential changes in freshwater flows, this model could assist in the required Section 7 consultation regarding potential modifications to sturgeon habitat in Apalachicola Bay and the estuarine channel areas.

USFWS has also noted that very few Gulf sturgeon have been observed moving into the river during the month of March over the past couple of years when intensive monitoring was conducted. This could potentially indicate that March may be too early for the implementation of sturgeon spawning operations. However, we may want to monitor in

the future for better sturgeon migration data before proposing any changes in operation dates.

USFWS recommends additional flow/velocity studies be conducted at the sturgeon spawning areas immediately below Jim Woodruff Dam in order to build the information based used in future consultations. The Mobile District has flow/velocity meters on hand that could be used to measure velocities at particular sites and depths, as determined necessary. The Mobile District is currently planning to work with the U.S. Geological Survey to prepare an updated flow/stage rating table relating to releases from the dam later this spring. Additional flow/velocity data may be able to be collected during the flow rating study, and this information could then be used to assist in future consultations regarding project operations.

d. The Corps shall provide an annual report to the Service on or before January 31 each year documenting compliance with the terms and conditions of this Incidental Take Statement during the previous federal fiscal year, any conservation measures implemented for listed species in the action area; and recommendations for actions in the coming year to minimize take of listed species.

**STATUS:** The first annual report was submitted to USFWS on 31 January 2007 and summarized status of compliance with terms and conditions of the BO since September 2006 and listed those RPM actions programmed for implementation in FY 2007 and 2008. This report represents the second annual report summarizing accomplishments in 2007, status of compliance with the terms and conditions of the BO and Amended BO, and those RPM actions programmed for 2008.

*e. The Corps shall provide by email or electronic means to the Service on a monthly basis any data relative to the criteria or triggers developed in RPM6 and the status of the hydrology of the system including composite system storage.*

**STATUS:** On 16 November 2007, a determination was made that composite system storage was in Zone 4 and the criteria and triggers in the EDO were met to justify implementation of the EDO and a reduction in flows to 4,750 cfs. The information relaying the system status was included in the Environmental Assessment and Finding of No Significant Impact signed on 16 November 2007, and Mobile District was in telephonic and email coordination with USFWS on this effort, which necessitated implementation of incidental take monitoring of mussels conducted by both agencies during 16 – 21 November 2007. In accordance with the EDO, a determination would be made on the first day of each month to determine the status of the basin relative to triggers under the EDO, and the forecast hydrological and climatic conditions for the upcoming month, in order to determine the appropriate operations under the EDO. By letter dated 7 December 2007, USFWS was notified that a determination was made that composite storage remained in Zone 4 and that the triggers for an additional incremental reduction to 4,500 cfs were met. However, immediately following this notice to USFWS, rainfall in the basin prevented lowering of flow below the 4,750 cfs and additional rainfall in the basin by mid-December raised flows above 5,000 cfs. Due to head-limits



at Jim Woodruff, releases throughout the remainder of December were above 5,000 cfs. On 3 January 2008, system composite storage had recovered to within Zone 3, releases above 5,000 cfs were being made, and it appeared that flows above 5,000 cfs would be maintained for some time due to head limits at Jim Woodruff and Walter F. George dams due to rainfall received in the basin. Under the EDO criteria it was therefore determined that a minimum flow of 5,000 cfs would be maintained, and all other EDO provisions relating to conservation of storage would remain in effect. This information was relayed by email to USFWS on 3 January 2008. On 30 January 2008, composite storage remained in Zone 3, and average flows at the Chattahoochee gage for the month of January had been approximately 15,000 cfs. It was anticipated that composite storage would remain in Zone 3 past 1 February 2008, and therefore February operations will continue under the EDO with a minimum flow of 5,000 cfs. Email notice to USFWS was provided on 30 January 2008.

**RPM2. Adjust June to February Lower Threshold to 10,000 cfs.** Replace the proposed 8,000 cfs threshold in the IOP with a threshold of 10,000 cfs.

**Rationale.** Mussels may be in vulnerable areas where take may occur when flows are less than 10,000 cfs. Not increasing reservoir storage when basin inflow is 10,000 cfs or less from June to February will avoid and minimize the potential for take in the zone of 8,000 to 10,000 cfs.

a. The Corps shall immediately release the 7-day moving average basin inflow, but not less than 5,000 cfs, when the 7-day moving average basin inflow is less than 10,000 cfs for the months of June to February, and shall incorporate this revision into the IOP table of minimum discharges. *This condition was fulfilled.*

**STATUS:** The Mobile District implemented the requirements of RPM2 immediately upon issuance of the BO. Whenever the 7-day basin inflow is less than 10,000 cfs, at least basin inflow but not less than 5,000 cfs will be released. A copy of the revised IOP table was provided to USFWS by letter dated 7 September 2006 and was posted on the Mobile District website: <http://www.sam.usace.army.mil/ACF.htm>. A revised IOP table was developed in conformance with the RPM3 Drought Provision described below, and the revised operation table was also posted on the Mobile District website in March 2007, although the revised RPM3 operations made no adjustments to the June through February operations under the IOP. Mobile District provided operations and releases from Jim Woodruff Dam consistent with the applicable IOP tables until the fall of 2007. However, due to exceptional drought conditions experienced in the basin throughout 2007, an EDO was developed and implemented on 16 November 2007. Since that time, IOP storage constraint and other provisions were temporarily suspended and operations have been conducted consistent with the EDO provisions. Due to sustained drought conditions, releases under the IOP since May 2007 had been at or near 5,000 cfs for the majority of the time, and it was determined that mussels previously occurring in areas inundated by flow of 8,000 cfs and 10,000 cfs had already been adversely affected or extirpated by the extended drought flows. As noted above, this condition is considered fulfilled by previous actions.

**RPM3. ~~Drought~~ Higher Minimum Flow 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~~ *higher desired minimum flow* provisions that identify the reservoir, climatic, hydrologic, and/or listed species conditions that would allow supporting a higher *desired* 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). *This condition was extended to February 28, 2007 and fulfilled.*

b. If modifications to the IOP parameters for the months of March through May are adopted as part of the ~~drought~~ *higher desired minimum flow* 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 reinstate this consultation relative to any proposed changes in the IOP. *This condition was fulfilled.*

**STATUS:** Discussions on an appropriate RPM3 drought provision began during the initial semi-annual meeting on 26 October 2006, and details of the various alternatives explored and modeled are summarized in the 31 January 2007 annual report. These efforts included holding a technical modeling workshop to address a possible drought provision held in Columbus, GA on 13 December 2006, and consideration of suggested alternative drought provision concepts presented by various stakeholders, including the States of Florida and Georgia, and Atlanta Regional Commission. Comments on the Corps proposed RPM3 drought provision presented at the 13 December 2006 workshop were accepted through 10 January 2007.

The purpose of the RPM3 drought provision was to attempt to provide higher minimum flows when hydrological and climatological conditions would permit in order to further minimize harm to mussels and mussel habitat during the lower flow months of the year.

On 26 January 2007, the Mobile District 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 plan presented at the December 2007 workshop 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 appears that additional adjustments to the proposed drought provision could be made that may remove this potential for adverse effect. Therefore additional modeling and assessment of the evaluation criteria would need to be completed for an adjusted conceptual drought provision plan. It was clear that additional time would be required. Therefore, by letter dated 30 January 2007 Mobile District requested an extension of the due date until 28 February 2007, which was granted by USFWS by letter dated 2 February 2007. On 16 February 2007, Mobile District submitted a biological assessment of the revised RPM3 drought provision for consideration by USFWS. As requested by USFWS, Mobile District provided by letter dated 23 February 2007 additional information regarding consideration of stakeholder comments on the proposed RPM3 drought provision. By letter dated 28 February 2007, USFWS approved the proposed RPM3 drought provision for implementation on 1 March 2007.

In the 15 November 2007 Amended BO, USFWS modified this condition to define it as a higher minimum flow provision, rather than a drought provision. This was because RPM3 provision actually identifies when basin conditions would allow a higher desired minimum flow to be provided, and those drought conditions when the lower 5,000 cfs minimum flow would be more prudent. It does not represent a drought contingency operation plan. The EDO was developed later in the fall of 2007 as an exceptional drought management plan.

The RPM3 higher desired minimum flow provision 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 18,000 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. Modifications were also made to the lower the flow/storage thresholds during the spring months in order to accommodate additional storage that could potentially provide for the higher desired minimum flows later in the year.

	<u>Basin Inflow (cfs)</u>		<u>Release</u>
Mar-May	High	≥ 35,800	not less than 25,000
	Mid	≥ 18,000 and <35,800	≥ 70% BI, not less than 18,000
	Low	<18,000	≥ BI, not less than 6,500 (desired flow) ≥ BI, not less than 5,000 (required flow)
Jun-Feb	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 6,500 (desired flow) ≥ BI, not less than 5,000 (required flow)

\*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.

As noted above, this condition is considered to have been fulfilled.

**RPM4. Sediment dynamics and channel morphology evaluation.** Improve our understanding of the channel morphology and the dynamic nature of the Apalachicola River.

**Rationale.** The dynamic conditions of the Apalachicola need to be evaluated to monitor the zone at which take may occur and to identify alternatives to minimize effects to listed mussels in vulnerable locations. Both sediment transport and channel morphology need to be considered to provide a basis for predicting changes in morphology that may affect the relative vulnerability of mussels to take due to the IOP. The amount of mussel habitat and thus IOP-related take depends on channel morphology. This evaluation will inform alternatives that may be considered under RPM1 and RPM3.

- a. In coordination with the Service, and other experts jointly identified, the Corps shall evaluate before March 30, 2007, the current status of sediment transport and channel stability in the Apalachicola River as it relates to the distribution of listed mussels and their vulnerability to low-flow conditions. The goals of the evaluation are to identify:
  - 1) feasible water and/or habitat management actions that would minimize listed mussel mortality;
  - 2) current patterns and trends in morphological changes; and
  - 3) additional

information needed, if any, to predict morphological changes that may affect the listed mussels. This evaluation shall be based on available information and tools and best professional judgment. *This condition was extended to August 30, 2007 and fulfilled.*

**STATUS:** The Mobile District draft plan presented to USFWS on 26 October 2006 recommended that a river sedimentology and/or geomorphology experts be procured to assist in identifying trends occurring on the Apalachicola River and recommendations for actions that could be taken or additional studies that could assist in development of actions that might minimize continued degradation of mussel habitat. Possible sources of expert services were discussed including: the U.S. Army Corps Engineer Research and Development Center (ERDC) in Vicksburg, MS, possible 3<sup>rd</sup> party private consultant that reviewed the previous Simon and Li report on the Apalachicola River; a potomologist from St. Louis District or other similar expertise from Missouri River or other Corps Districts; or those involved in the Lidstone and Anderson report on the ACF. It was recommended that the Mobile District provide an expert from ERDC and/or a private consulting geomorphologist or Corps potomologist. USFWS also recommended inclusion of the USGS geomorphologist from Denver, CO (Kirk Vincent) that worked with USGS on the recent study on declining river levels on the Apalachicola River. The Mobile District would fund services for the ERDC, other Corps, and/or private consultant; and USFWS would fund the services of USGS (another DOI agency). It was recognized that funding constraints (with the Corps operating under Continuing Resolution Authority funding constraints for most of FY 2007) could delay initiation or completion of this action. It was agreed to revisit the funding situation in January 2007, at which time the need for further consultation with USFWS regarding the due date would be determined.

By letter dated 31 January 2007, the Corps requested an extension of the deadline to 30 August 2007. This schedule would provide for consideration of the panel report at the semi-annual meeting with USFWS in August 2007.

Preliminary discussions continued during the 1 March 2007 semi-annual meeting to plan for the selection of river experts to assist in meeting the intent of RPM4. Three possible river experts were identified: David Biedenharn, former sediment/hydraulics specialist from ERDC; Michael Harvey, renowned river morphologist from Musseter Engineering firm; and Kirk Vincent, research river geomorphologist from USGS. USFWS agreed to confirm whether the USFWS would fund the USGS participation on the panel; and the Mobile District agreed to fund the other two panelists. It was tentatively agreed that a 3-day meeting of the river experts would serve as a “kickoff” meeting of the panel, with Day 1 to brief the panelists on the problems and issues; Day 2 to visit the river and identified vulnerable areas for mussels; and Day 3 to discuss the next steps. A follow-on meeting would also be scheduled to present the report/view/recommendations of the river specialists. Mobile District agreed to prepare a draft Scope of Work (SOW) and coordinate the SOW with the USFWS before awarding task orders. USFWS SOW with USGS would be similar to the Mobile District SOW. It was agreed to schedule a teleconference(s) to further discuss once funding was procured.

By letter dated 30 March 2007, the USFWS granted the extension and requested a status update and schedule for completion of the evaluation. By letter dated 11 May 2007, the Corps provided the status update and schedule.

The USGS geomorphologist was unable to participate due to workload constraints, but the two specialists procured by the Mobile District (David Biedenharn and Michael Harvey) were able to participate, as well a contract malacologist familiar with the Apalachicola River mussel habitat requirements (Drew Miller, former ERDC malacologist). A reconnaissance field trip was conducted on 20-21 June 2007 with Corps, USFWS, and the three contract personnel (Geomorphologist, River Engineer, and Malacologist). The field trip included a boat tour of the entire river with specific focus on mussel habitat characteristics and apparent river sediment and morphological trends that could affect mussel habitat characteristics. The trip proved to be very educational and insightful for all participants based on feedback. A workshop with the river and mussel specialists was held in Mobile on 14-15 August 2007 to discuss the findings of the subject matter experts and identify additional studies needed to further refine our understanding of the sediment dynamics and channel morphology of the Apalachicola River. Following the workshop, the Corps completed the evaluation based on the findings of the experts and submitted the report along with the individual reports of the sediment/morphology and mussel specialists to the USFWS on 30 August 2007. Evaluation of information gleaned from the river field trip and follow-on workshop will be used to assist in designing appropriate follow-on studies of river trends and required mussel monitoring plans. As noted above, this condition is considered to be fulfilled.

**RPM5. Monitoring.** Monitor the level of take associated with the IOP and evaluate ways to minimize take by studying the distribution and abundance of the listed mussels in the action area.

**Rationale.** Take needs to be monitored monthly to insure that the level of take identified in the biological opinion is not exceeded. As natural conditions change, the populations of the species need to be assessed and the amount of take evaluated relative to any new information. Since this is an interim plan and there will be additional consultations on the overall operations of the ACF project for flood control, water supply contracts, hydropower, and navigation, the monitoring information is needed to prepare the biological assessments for these future consultations.

a. The Corps shall monitor the number of days that releases from Woodruff Dam (daily average discharge at the Chattahoochee gage) are less than the daily basin inflow when daily basin inflow is less than 10,000 cfs but greater or equal to 8,000 cfs. If the total number of days of releases in this range in a calendar year is projected to exceed the total number of days of daily basin inflow in this range by more than 39, the Corps shall reinitiate consultation immediately.

**STATUS:** During the 26 October 2006 semi-annual/planning meeting, the Mobile District demonstrated to USFWS the spreadsheets used to track basin inflows and releases and to track the number days when the daily average discharge from Jim Woodruff Dam is less than the daily basin inflow while the daily inflow is between

8,000 cfs and 10,000 cfs. These conditions were tracked from 1 January 2006 through 31 December 2006. There were 23 days during calendar year 2006 when daily average release was less than the daily basin inflow. During calendar year 2007 there were 12 days when the daily average release was less than the daily basin inflow for the range of flows between 8,000 cfs and 10,000 cfs; and five of those days occurred after implementation of the EDO on 16 November 2007.

Information regarding daily average inflow, 7-day average inflow and daily releases are regularly posted on the Mobile District Water Management website:

<http://water.sam.usace.army.mil/>

Below is a listing of the potential taking days (dates when the daily release from Jim Woodruff Dam was less than the daily basin inflow).

b. In coordination with the Service, the Corps shall develop on or before March 30, 2007, a feasible plan to monitor listed mussels in the action area. The goals are to:

- 1) periodically estimate total abundance of listed mussels in the action area; and
- 2) determine the fraction of the population that is located in habitats that are vulnerable to low-flow impacts. *This condition was extended to August 30, 2007 and fulfilled.*

**STATUS:** During the 26 October 2006 semi-annual/planning meeting with USFWS, the Corps presented a conceptual plan for a recon level study, comprised of a mussel biologist and a river hydraulic scientist to review aerial photography and/or field inspections on the river to observe potential habitat and river hydraulic conditions. The purpose would be to identify those areas with potential habitat and those areas with stable or unstable river conditions. The recon level study would assist in development of a survey/sampling design for a mussel monitoring plan. This effort could potentially be integrated with the sediment/morphology panel review. Due to funding constraints, it was requested by letter dated 31 January 2007 that the due date for this RPM5 requirement be extended until 30 August 2007, and by letter dated 30 March 2007 USFWS approved the extension. This schedule would provide for consideration of the mussel monitoring plan at the semi-annual meeting with USFWS in August 2007.

In the 1 March 2007 semi-annual meeting, it was agreed that the mussel monitoring plan would be developed in conjunction with the sedimentation/morphology specialists' recommendations, and the mussel specialists would attend the river specialist meetings/workshops and river site inspections. This would allow transfer of information regarding mussel habitat requirements to the panelists; and information on anticipated trends that could affect mussel habitat or vulnerable areas to the mussel specialists. USFWS noted that the mussel monitoring data should identify the relative abundance in both stable and unstable areas; and utilize data from the sedimentation/morphology trend analyses to identify where these areas would likely occur. Mobile District indicated that discussions had been initiated with Drew Miller, formerly of ERDC and Barry Payne currently at ERDC regarding the proposed monitoring efforts. A draft SOW would be

coordinated with USFWS and initiated once funding was obtained, which was anticipated later in the spring of 2007.

On 30 March 2007, USFWS granted an extension of the due date for a mussel monitoring plan, but requested a status and schedule for completing the task, and requested a sampling survey of vulnerable mussel habitat areas that could be impacted by flows less than 10,000 cfs. By letter dated 11 May 2007, Mobile District provided an updated status of implementing this RPM. A sampling survey of vulnerable sites between River Miles 40 and 50 was completed by the contract malacologist in June 2007. In addition, a reconnaissance field trip was conducted on 20-21 June 2007 with Corps, USFWS, and contract personnel (Geomorphologist, River Engineer, and Malacologist). The field trip included a boat tour of the entire river with specific focus on mussel habitat characteristics and apparent trends. A workshop with Mobile District, USFWS, ERDC, and the above contractor personnel was held in Mobile on 14-15 August 2007 to discuss the findings of the subject matter experts and discuss the long term monitoring studies that are needed to 1) periodically estimate total abundance of listed mussels in the action area; and 2) determine the fraction of the population that is located in habitats that are vulnerable to low-flow impacts. Following the workshop, the Corps submitted the proposed monitoring plan to the USFWS on 30 August 2007, based on information developed during the workshop and field reconnaissance inspections, and including a summary report of the sampling survey conducted in the summer of 2007 and a recommended mussel monitoring plan. USFWS indicated that they are still reviewing the proposed mussel monitoring plan and are coordinating the plan with other scientist. The Corps will continue to work closely with USFWS regarding the final design and execution of the monitoring study. It is anticipated that details of the long-term monitoring study details will be finalized this winter/spring and the studies will begin in Summer 2008. As noted above, this condition is considered fulfilled. However, it is anticipated that additional modifications or refinements to the study design may be identified in further consultation discussions with USFWS this spring.

c. The Corps shall implement the studies outlined above as soon as is practicable.

**STATUS:** Funds for studies recommended by the sediment/morphology specialists or to implement the detailed mussel monitoring plan were not available in FY 2007. However, funds were requested for inclusion in the President's budget for FY 2008, and current plans are to initiate the mussel monitoring plan and studies or actions recommended by the sedimentation/morphological panel in FY 2008, as appropriate within funding and authority limitations. Limited mussel sampling surveys of vulnerable sites and non-vulnerable sites were funded and completed in the summer of 2007. A mussel distribution survey is planned to be funded and completed in the summer of 2008.

d. The Corps shall include monitoring results in the annual report provided to the Service under Condition 1.c.



**STATUS:** Monitoring of the amount of take, consistent with RPM5 condition a., i reported in this report. Once the recommended additional monitoring and studies are funded and completed, the results will be included in the annual report as appropriate.

*e. The Corps shall implement surveys to estimate listed mussel mortality associated with the incremental flow reductions.*

**STATUS:** The EDO was implemented on 16 November 2007 and included an initial reduction in minimum flow to 4,750 cfs. Monitoring of incidental take associated with the initial incremental reduction in flows to 4,750 cfs was completed jointly by the Mobile District and USFWS during 16 – 21 November 2007. This monitoring was conducted to assure that the amount of observed mussel mortality or exposed mussels did not exceed the authorized amount of take in the Amended BO. A copy of the incidental take monitoring report was included in a letter dated 7 December 2007, documenting that the amount of take was within the authorized take of up to 100 purple bankclimber mussels, 100 Chipola slabshell mussels, and up to 5,600 fat threeridge mussels (no purple bankclimber, no Chipola slabshell, and 1,469 fat threeridge mussels were documented in the incidental take monitoring surveys)..

*f. By January 5, 2008, the Corps shall design a survey for estimating the number of listed mussels present in the Action Area at 0.1-ft elevation intervals between the stage that is equivalent to a release of 5130 cfs from Woodruff Dam and an elevation that is 3 ft lower than that stage. The primary purpose of this survey is to estimate how listed mussel distribution may change with the incremental flow reductions. Due to the large size of the Action Area, the survey shall employ appropriate statistical sampling methods for estimating numbers at depth. Because the largest fraction of the numbers of listed species occur in the RM40-50 reach, at least 40% of the sampling effort shall occur in this reach.*

**STATUS:** By email on 8 January and letter dated 10 January 2008, Mobile District requested an extension until 31 January 2008 for submittal of this survey design. The extension was requested because of additional field data collected in December 2007 and additional coordination with USFWS required to finalize an appropriate study design. Additional coordination with USFWS and ERDC was completed over the past few weeks and a copy of the proposed study design was submitted concurrent with submittal of this annual report on 31 January 2008.

*g. The Corps shall commence the survey of take under condition e above as soon as releases fall below 5000 cfs and continue the survey as appropriate thereafter for the duration of the EDO. Take may occur whenever flows fall below 5000 cfs following periods of more than 30 days at flow rates greater than 5000 cfs, or when flows fall to a low not previously encountered. The Corps shall commence the survey of numbers at depth under condition f above as soon as practicable after January 5, 2008, depending on flow conditions and other appropriate considerations.*

**STATUS:** As noted above, the incidental take monitoring for the initial incremental reduction in flow to 4,750 cfs on 16 November was completed during 16-21 November 2007. The condition f. mussel distribution study design has been submitted and plans are to initiate these surveys in the late spring or summer of 2008, depending on flow conditions. It is anticipated that the surveys would be performed when flows are at or near 5,000 cfs.

*h. The Corps shall develop information on the life history of the listed mussels to better inform future decisions about how to minimize the impact of anticipated take, especially take that results from reductions in minimum flows. Special studies to be funded by the Corps: 1) identifying age structure at various depths; 2) determining mussel movements in response to changes in flow using mark-recapture methods; 3) estimating age-specific survival rates; 4) estimating age-specific-fecundity rates; 5) identifying other anthropogenic factors that may affect mussel habitat; and 6) characterizing the habitat of the purple bankclimber and Chipola slabshell in the Action Area.*

**STATUS:** A mussel monitoring plan was developed during the summer of 2007 as part of the combined river sediment/morphology and mussel habitat field inspections and follow-on workshop, and a copy of the mussel monitoring plan was submitted to USFWS on 30 August 2007. USFWS is still reviewing the proposed plan. In the meantime, consultation discussions are continuing between Mobile District, ERDC malacologists and USFWS to refine mussel monitoring study designs and to integrate the condition h. studies with the condition f. mussel distribution studies as practicable. It is anticipated that some of the study components can be implemented in the summer of 2008, subject to funding constraints.

*i. In coordination with the Service, the Corps shall develop on or before March 30, 2008, a feasible plan of study for the listed mussels in the Action Area.*

**STATUS:** As noted above, consultation discussions are continuing between the Mobile District, ERDC malacologists and USFWS regarding development and refinement of appropriate study design for the conditions h. studies. It is anticipated that a study design will be completed for initial studies by 30 March 2008, and that initial studies will be implemented during the summer of 2008.

*j. The Corps shall implement the surveys and studies outlined in i. above as soon as is practicable.*

**STATUS:** The Mobile District will continue to work closely with USFWS to finalize the study plans and implement them as soon as practicable, subject to available funding.

*k. The Corps shall include survey and study results in the annual report provided to the Service under Condition 1.d.*

**STATUS:** As noted above, monitoring of the incidental take of mussels for the initial reduction in flows under the EDO to 4,750 cfs was completed in November 2007 and a copy of the monitoring report is enclosed (this report was previously forwarded to USFWS on 7 December 2007). A report of the mussel habitat sampling survey conducted in June was previously provided in October 2007, and is also enclosed in this annual report. Reports of additional monitoring surveys and studies will be included as they become available.

**RPM6. Minimum Flow Criteria and Triggers.** Determine the appropriate triggers or criteria to indicate when the EDO will provide for reductions in the minimum flow from 4,750 to 4,500 cfs, and from 4,500 to 4,150 cfs.

**Rationale.** Based on preliminary feedback regarding the new mussel data and modeling data, it is apparent during the expedited consultation that incremental reductions of the minimum flow from Jim Woodruff Dam could further minimize adverse impacts to listed mussel species in the Apalachicola River while still providing opportunities to conserve and replenish storage in the Federal reservoir system to continue to provide support for the multiple project purposes in the basin. Therefore, the Corps proposed an amendment to the November 1, 2007, BA that incorporates 4,750 and 4,500 cfs as increments of minimum flow reduction in the EDO. Consistent with the proposed action described in the BA, the trigger to implement the EDO and a reduced minimum flow from Jim Woodruff Dam of 4,750 cfs is when Composite Storage falls below the bottom of Zone 3 into Zone 4. This trigger has already occurred. The Corps will continue to work with the USFWS to determine the appropriate triggers or criteria to indicate when the EDO will provide for reductions in the minimum flow from 4,750 to 4,500 cfs and from 4,500 to 4,150 cfs. Monitoring data, impacts on composite storage, climatic and hydrological conditions experienced, and meteorological forecasts will be used to assist in the identification of appropriate triggers or criteria.

*a. By December 7, 2007, the Corps shall, in cooperation with the Service, determine appropriate criteria for initiating a reduction from 4,750 cfs to 4,500 cfs in the EDO minimum releases from Woodruff Dam. The criteria shall consider all appropriate monitoring data and models (e.g., survey of mussels mortality under condition 7.4.5.e, composite reservoir storage, climatic and hydrological conditions experienced, hydrological models, meteorological forecasts) to specify when a reduction is needed and the probable impacts to project purposes or other resources avoided by a reduction at that time, including impacts to listed species that would likely occur without the reduction.*

**STATUS:** On 21 November 2007, Mobile District proposed two additional triggers to the Zone 4 EDO trigger to determine when the next incremental reduction to 4,500 cfs would be justified. These triggers were based on comparison to historic flow conditions on the Flint River above Newton and on the Chattahoochee River above Walter F. George Dam (i.e. portions of the basin which do not contain the ability to store beneficial rainfall). Through continued consultation with USFWS, a revised trigger element was

identified relating to composite storage level within Zone representing exhaustion of conservation storage in the lower storage reservoirs (Walter F. George and West Point) and all flow support being required from Lake Lanier. This revised trigger for the incremental reduction to 4,500 cfs was forwarded to USFWS by letter dated 7 December 2007. This letter also noted that the three trigger component had been met at that time, and it was recommended that the incremental reduction to 4,500 cfs be made. This recommendation was based on forecasts for an extremely dry winter and spring due to LaNina conditions, and results of the incidental take monitoring demonstrating that the amount of take from the 4,750 cfs incremental reduction was well within the authorized amount of take included in the Amended BO for the EDO.