

APPENDIX E

ARC LETTER

25 OCTOBER 2007



Atlanta Regional Commission 40 Courtland Street, NE Atlanta, Georgia 30303

October 25, 2007

Col. Byron Jorns
Commander and District Engineer
Department of the Army
Mobile District, Corps of Engineers
109 Saint Joseph Street
Mobile Alabama 36602-3630

Re: Request for Immediate Alterations to Interim Operations Plan Releases

Dear Colonel Jorns:

I am writing on behalf of the North Georgia Water Supply Providers—the Atlanta Regional Commission, the City of Atlanta, Fulton County, Cobb County-Marietta Water Authority, DeKalb County, Gwinnett County and the City of Gainesville—to request that the Corps grant relief from its Interim Operations Plan (IOP) and alter its operation of the federal reservoirs within the Apalachicola-Chattahoochee-Flint (ACF) river basin.

The system is in crisis. As described in the State of Georgia's October 12, 2007 Request for Immediate Relief, we are in a drought of record proportions. Given these extreme drought conditions, prudent resource management by the Corps and all other stakeholders is essential to maintaining the integrity of the ACF system.

In addition to our continuing conservation and resource management efforts, our north Georgia communities are continuing to rise to the challenge to respond to this crisis. A total ban on outdoor water use has already been imposed and is being observed. In addition, the Governor has asked for an even greater reduction in water use—requiring all permit holders in the 61-county affected region to reduce water withdrawals to a level 10% lower than last year's base demand. We cannot conserve our way out of this crisis, however. No amount of conservation can overcome the effect of current operations under the IOP, which must be altered immediately for our efforts to make any difference. Simply put, time and water are running out.

Furthermore, although we understand that the “bottom of conservation pool” is not necessarily the bottom of the reservoir, the potential use of dead storage raises numerous environmental concerns and would present an unacceptable risk to public health and safety. Therefore we urge you to adopt a recovery plan for the system that does not rely on the use of dead storage in Lake Lanier or any of the reservoirs. The focus, instead, should be on the adoption of a new plan to restore the system.

We propose a three-part Reservoir Recovery Plan to be implemented immediately. The recovery should proceed in three phases: (1) adopt the Emergency Operations Plan described below to stabilize the system; (2) immediately after the emergency plan has been adopted, initiate a process to develop and implement a new *sustainable* Interim Operations Plan to remain in effect until the

water control plan can be updated; (3) formulate a new long-term Water Control Plan to reflect current conditions in the basin and to address risks associated with system failure.

Based on our projections, which assume inflow conditions consistent with the worst drought on record (2000-2001), the Emergency Operations Plan that we propose provides an excellent chance for System Storage to recover to Zone 2 by June 1, 2008. We believe these gains can be achieved without any significant adverse effect to endangered species, flood control, or other purposes. Further, we would like to emphasize that the Emergency Operations Plan should remain in effect only until the reservoirs are restored and/or a new sustainable IOP can be adopted.

Finally, we understand that the Corps will need to initiate an emergency consultation with the U.S. Fish & Wildlife Service before altering its current operations. We urge you to begin that process immediately.

FORECASTING METHODS

Assumptions about future hydrology play an important role in the evaluation of emergency response measures. As a rule, the relative benefit of the measures we propose will increase as hydrologic conditions improve. Even if hydrologic conditions are much worse than anything we have experienced in the historical record, however, the measures we propose will provide a substantial benefit relative to the IOP.

Projections Based on 2000-2001 Hydrology

We have used two methods for projecting inflow in preparing this plan. The first method is to assume that inflows over the next several months will be equivalent to the inflows received on these dates during prior years. Because current conditions appear consistent with the period of 2000-2001—the worst drought on record—it is reasonable to use that period for this projection.

Furthermore, forecasts based on past hydrology do *not* represent the worst-case scenario. A drought worse than the worst drought on record could pull the lakes down even further than forecasts based on historical hydrology would suggest. Therefore, to show what could happen if conditions become worse than we experienced in 2000-2001, we have modeled each proposal using inflow from the same period reduced by 15%.

Figures 1 and 2 use these projections to show the need for immediate relief from the IOP. The solid-line projections are based on a repeat of conditions experienced during the 2000-2001 drought. Figure 1 shows the results for Lake Lanier; Figure 2 for system storage. Figure 1 shows that the IOP could pull Lake Lanier down to 1050' by the end of 2008. This is a dangerously low level of storage. If the current drought is truly the worst drought on record, however, Lake Lanier could be hit much harder. A reduction in inflows of just 20% below 2000-2001 levels would empty Lake Lanier by November 2008.

Figure 1. Projected Lake Lanier Levels For Next Two Years Under Corps IOP Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 & 20 Percent

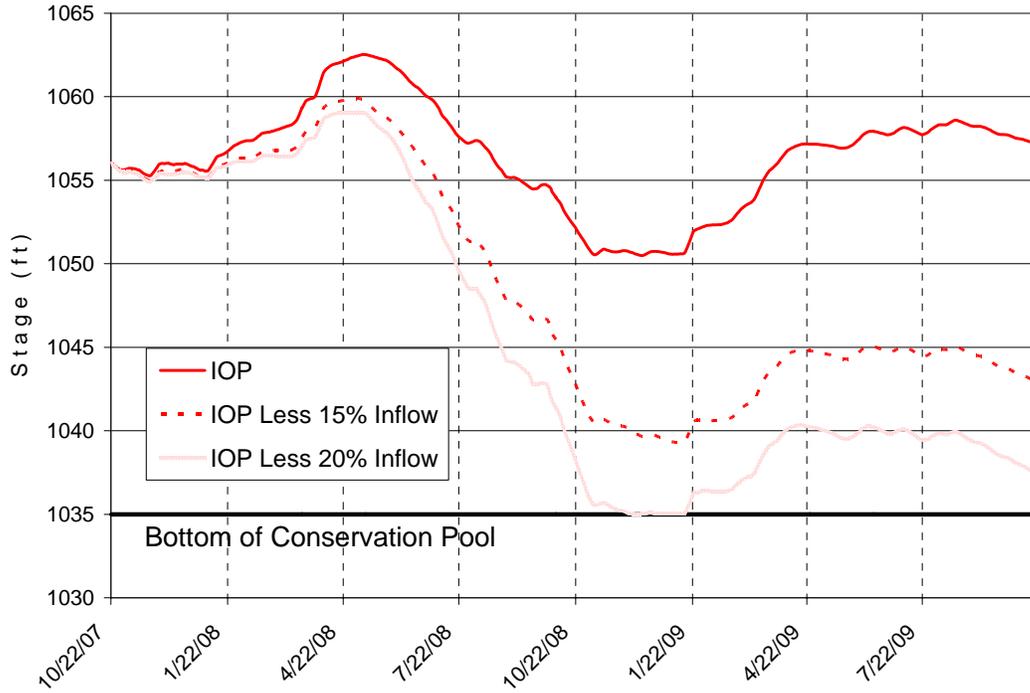
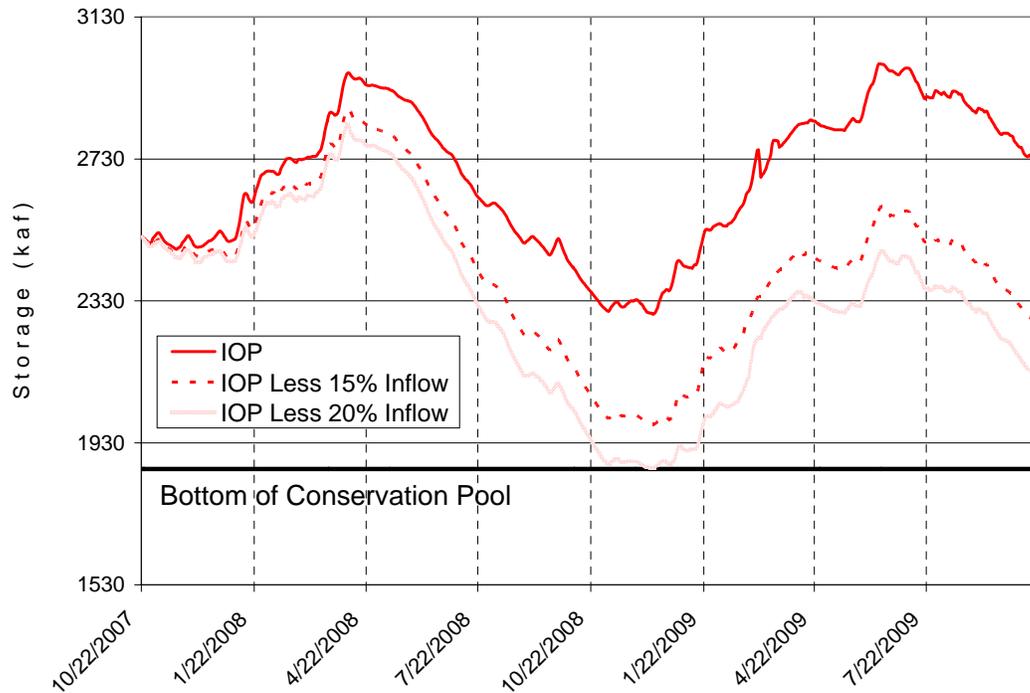


Figure 2. Projected System Storage For Next Two Years Under Corps IOP Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 & 20 Percent



Projections Based on Statistical Inflow Forecasts

Statistical forecasting methods are also available. One method developed by Robert Hirsch of the USGS makes use of the statistical correlation between current and future conditions: if inflows have been low, they tend to stay low, and vice versa. Forecasts based on this method converge with the forecasts that would be made using historical hydrology after about 4 months. This convergence occurs because there is little correlation in the statistical record between flows four months apart. This method is fully documented in the Water Supply Providers' January 10, 2007 submittal.

Projections based on the Hirsch method show that there is a significant probability that Lake Lanier will run out of water by September 2008. Given the magnitude of the consequences if the system does run out of water, this level of risk is unacceptable. Projections based on the Hirsch method also confirm that measures included in the Emergency Operations Plan significantly increase the probability of a full recovery of the ACF system.

Although we have not presented the results of our analysis using the Hirsch method here, we urge the Corps to familiarize itself with this and other forecasting techniques that can be used to improve management of water resources within the ACF Basin. We have automated the process of using the Hirsch method to generate conditional streamflow forecasts and would be pleased to make our tools available to you upon request.

RESERVOIR RECOVERY PLAN

Whichever method is used to forecast inflows, the need for action is clear. The IOP must be suspended or modified immediately to stabilize lake levels and to allow the reservoirs to refill. Lake Lanier simply cannot be allowed to run out of water.

The Reservoir Recovery Plan we propose is divided into three phases. First, the requirements of the IOP must be waived temporarily to reduce reservoir discharges and to allow the reservoirs to refill. We propose an Emergency Operations Plan to guide operations while the IOP requirements are waived. The Emergency Operations Plan is designed to stabilize the system without causing unnecessary harm to the environment or endangered species. After the immediate crisis is stabilized, the next phase should be the adoption of a new, sustainable IOP. Finally the IOP should be replaced by a new Water Control Plan that reflects current conditions within the basin.

1. PHASE 1: Emergency Operations Plan

The IOP requirements that require unsustainable discharges and prevent refill should be waived immediately as part of a one-time-only response to the current crisis. These requirements should then be reviewed in connection with the adoption of a new *sustainable* Interim Operations Plan to be adopted before June 1, 2008.

Specific elements of the Emergency Operation Plan are described in Parts 1.1 and 1.2 below. Figure 3 and Figure 4 show the benefits that can be achieved by implementing these measures under two different hydrological assumptions: the solid lines in these plots project reservoir levels under the IOP under hydrological conditions that mirror the 2000-2001 drought; the dotted lines project reservoir levels if inflow conditions over the next two years are 15% *lower* than the 2000-2001

drought. In either case the Emergency Operations Plan will substantially improve conditions. It should be clearly noted, however, that the Emergency Operations Plan should not be expected to provide a full recovery.

Figure 3. Comparison of Projected Lake Lanier Levels Under IOP and Emergency Operations Plan Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent

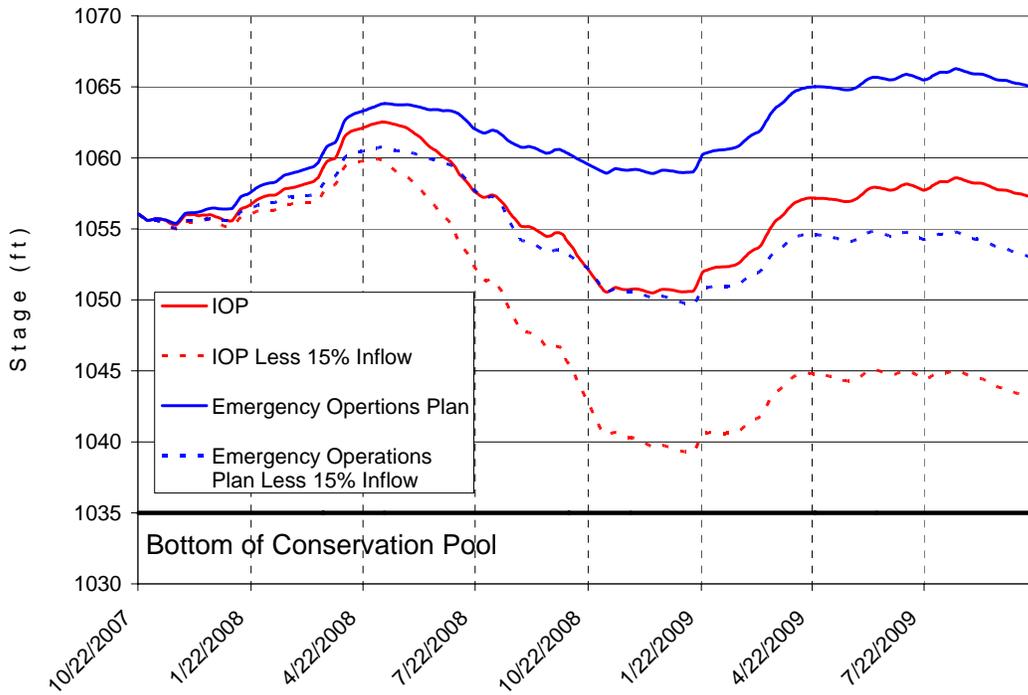
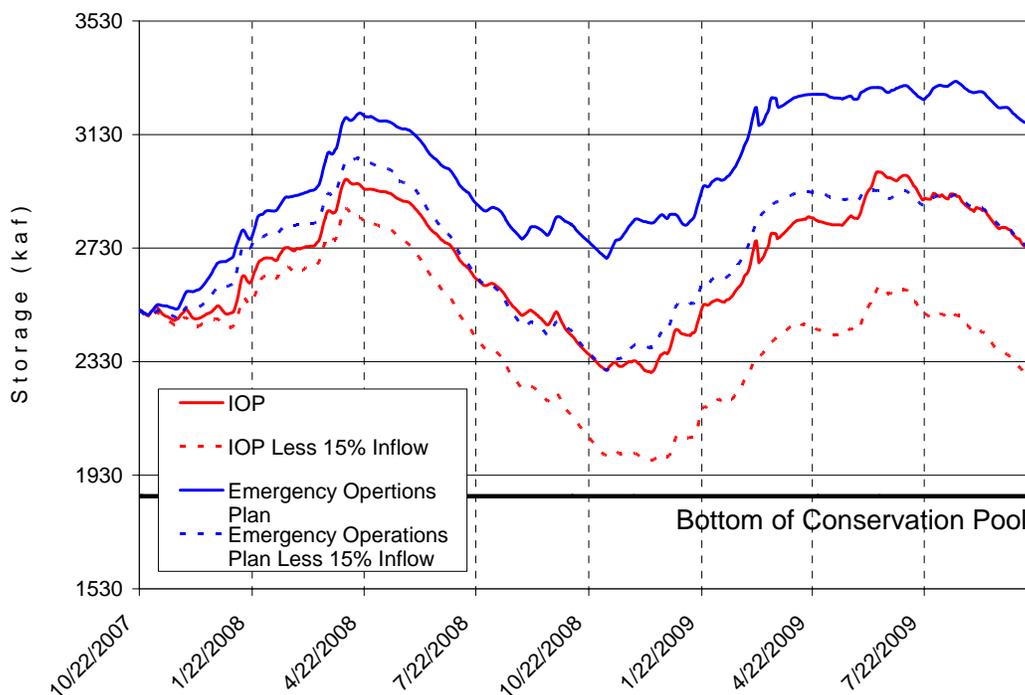


Figure 4. Comparison of Projected System Storage Under IOP and Emergency Operations Plan Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent



1.1 Reduce the Discharge from Lake Lanier and Other Reservoirs

In the short term two steps should be taken to reduce the discharge from Lake Lanier. The first is to modify the minimum flow requirement at the Chattahoochee gage and the second is to modify the ramping requirements.

1.1(a) Modify the 5,000 cfs Minimum Flow Requirement

The 5,000 cfs minimum flow at the Chattahoochee gage should be reduced because it is not sustainable over the long term. The Corps and FWS have both acknowledged that this minimum flow was originally set for industrial purposes and not because it is the minimum flow required by the mussels. Therefore we urge the Corps to work with FWS to determine the minimum flow that is actually required to sustain the mussels.

Given the timing of the current crisis, however, we do not believe that reducing the minimum flow should be the highest priority in the Emergency Operations Plan. Although it would clearly be disastrous to use reservoir storage to support minimum flows through the winter and spring, projections based on past hydrological cycles suggest it is very unlikely that reservoir storage will be required to augment stream flows to meet the 5,000 cfs minimum flow past the end of November. If these projections hold for the upcoming year—and that is an important caveat, which we address below—it follows that it may already be too late to grant meaningful relief *this year* from the 5,000 cfs minimum flow. It is far more important to waive the requirements of the IOP that would otherwise prevent the reservoirs from refilling this winter and spring.

Although we do not believe the minimum flow should be the highest priority for the upcoming months, the requirement clearly should be reviewed and revised before June 1 next year, when the minimum flow is likely to become an important issue again.

1.1(b) Modify Ramp-Down Requirements

The other IOP requirement that must be waived to reduce the discharge from the reservoirs is the ramp-down requirement, which has already been suspended (with approval of FWS) from now until March 1, 2008. The Emergency Operations Plan proposes a slight modification to these new ramping requirements.

The original ramp-down restrictions required the Corps to release large amounts of water from storage to “smooth out” the natural variations in stream flow that occur when it rains. Instead of storing water associated with rainfall events, as it could and should, the Corps was instead required under the IOP to let it go—because it is required to release 100% of Basin Inflow at the critical times—and the Corps was also required to release substantial water from storage to provide a gradual ramp-down from the higher levels resulting from these rainfall events.

FWS has already recognized that ramp-down requirements can be suspended on an interim basis because there likely would be no adverse effect on endangered species. The flow of the Apalachicola River at the Chattahoochee gage has been at or around 5,000 cfs at all times since May 2007. Therefore mussels at risk of stranding have already been stranded. Stranding should not present any significant risk in the next several months unless stream flows are allowed to rise significantly above 5,000 cfs.

Based on the recent actions of the Corps and FWS, both agencies now appear to agree that ramp-down requirements should not be imposed to reduce the rate of fall of the river after a natural rainfall event. Ramping requirements should only be used to transition between man-made alterations of the flow regime, such as between spawning and non-spawning flows or between navigation releases and normal operations.

As we understand it, the new ramping regime approved by FWS is designed to accommodate these concerns. FWS has approved the use of the “Basin Inflow fall rate” rather than the IOP maximum fall rate schedule. We believe this concept adequately captures the principle that reservoir storage should not be used to moderate natural variations in the flow of the river. We do have one concern, however, which is that it might be necessary at times to ramp-down even when Basin Inflow is rising or remaining steady. Therefore we suggest that the maximum flow rate should be the *maximum* of (1) the Basin Inflow fall rate; or (2) the maximum fall rate schedule. This is how we have modeled the ramping requirement for purposes of the models used to prepare the graphs and figures included in this presentation.

1.2 Refill the Reservoirs

Given the timing of the current crisis within the hydrological cycle—as we are currently in the driest month of the year but are beginning to transition into the typically wetter winter months—the highest priority in the Emergency Operations Plan should be an immediate, temporary waiver of the IOP to allow the reservoirs to refill during the winter and spring. We also recommend an

immediate, temporary waiver of rule curves for West Point Lake and Lake Walter F. George to maximize storage capacity in the lower basin *for this winter only*.

1.2(a) 5,000 cfs / 11,000 cfs Storage Rule

To allow the reservoirs to refill, the IOP should be temporarily waived and replaced with the following schedule, which is illustrated graphically in Figure 5.

1.2(a)(i) Storage Rules

During the non-spawning season:

- When Basin Inflow is greater than 5,000 cfs, all flows in excess of those required to meet the 2000 cfs minimum flow target at Farley Nuclear Plant should be stored in the Chattahoochee reservoirs to the extent possible.
- When Basin Inflow is less than 5,000 cfs, (or whatever alternative minimum flow FWS determines to be appropriate) storage should be released from the Chattahoochee reservoirs to meet the minimum flow.

During the spawning season:

- When Basin Inflow is greater than 11,000 cfs, all flows in excess of those required to meet the 2000 cfs minimum flow target at Farley Nuclear Plant should be stored in the Chattahoochee reservoirs to the extent possible.
- When Basin Inflow is between 5,000 cfs and 11,000 cfs, Woodruff Outflow should equal Basin Inflow.
- When Basin Inflow is less than 5,000 cfs, (or whatever alternative minimum flow FWS determines to be appropriate) storage should be released from the Chattahoochee reservoirs to meet the minimum flow.

1.2(a)(ii) Potential alterations based on system status:

- This refill plan should remain in effect at least until the system recovers or until a new *sustainable* Interim Operations Plan can be adopted.
- If System Storage is still in Zone 4 on February 1, the spawning flow for 2008 should be eliminated and further emergency measures should be evaluated immediately.

Regarding the caveat for extreme emergencies, additional emergency measures will absolutely have to be taken if system storage is still in Zone 4 on February 1. Our models indicate that this will only occur if the current drought becomes much worse than anything we have experienced in the historical record. In that event the probability of a total system collapse will be very high. If this occurs the spawning flow for 2008 would have to be eliminated. When faced with a choice between a total system collapse and a one-year interruption in spawning flows, a one-year interruption in spawning would be a reasonable and prudent alternative.

Figure 5. Graphical Illustration of 5,000/11,000 cfs Storage Rule

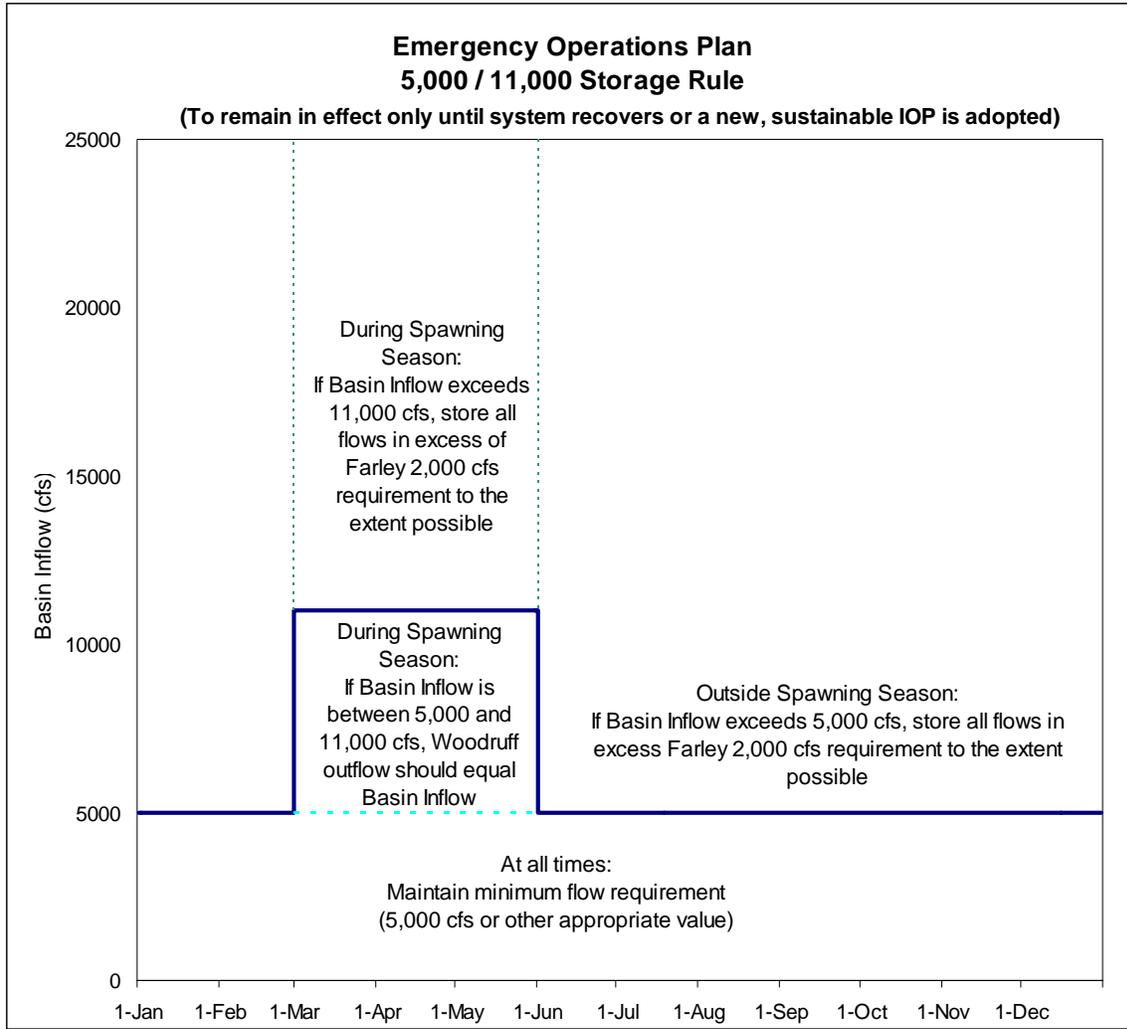


Figure 6, Figure 7, and Figure 8 show the effect of the Emergency Operations Plan on Lake Lanier levels, System Storage and Woodruff Outflow respectively.

Figure 6. Projected Lake Lanier Levels Under 5,000/11,000 cfs Storage Rule Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent

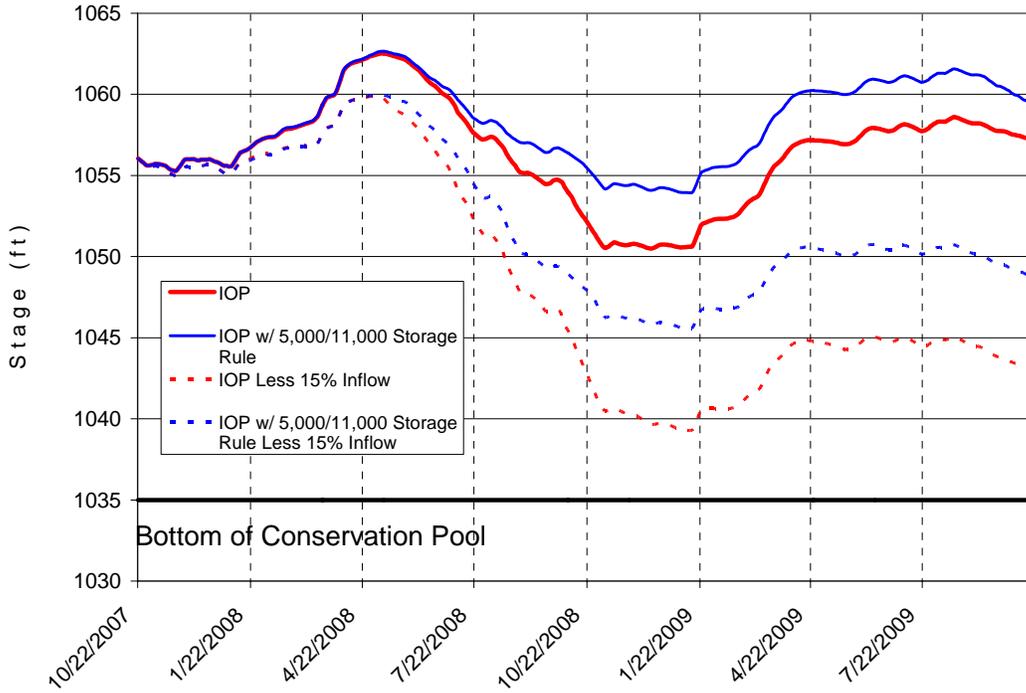


Figure 7. Projected System Storage Under 5,000/11,000 cfs Storage Rule Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent

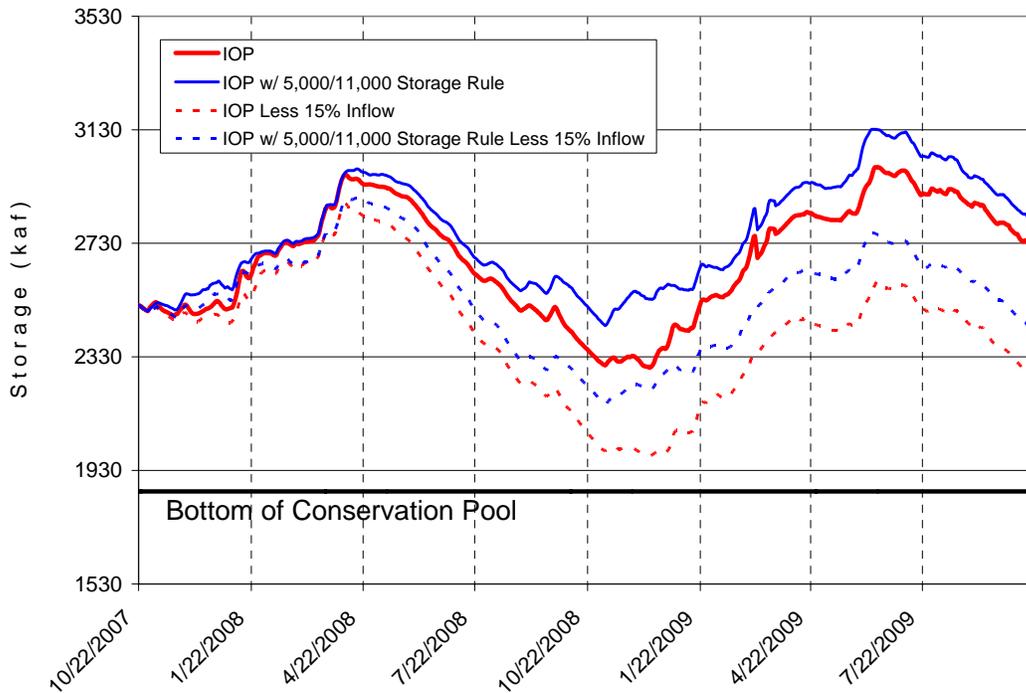
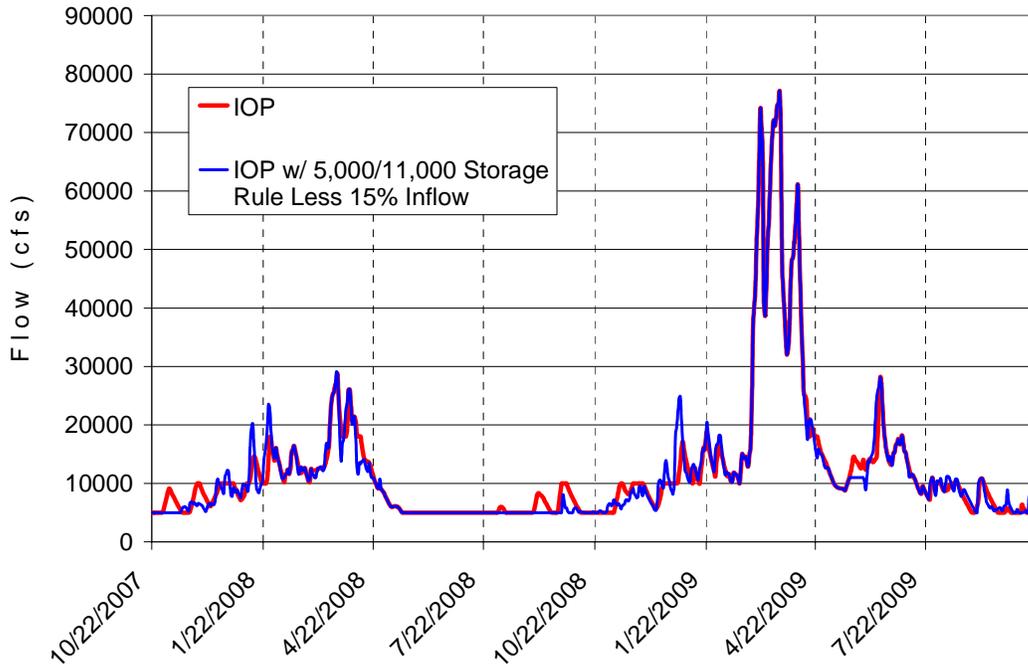
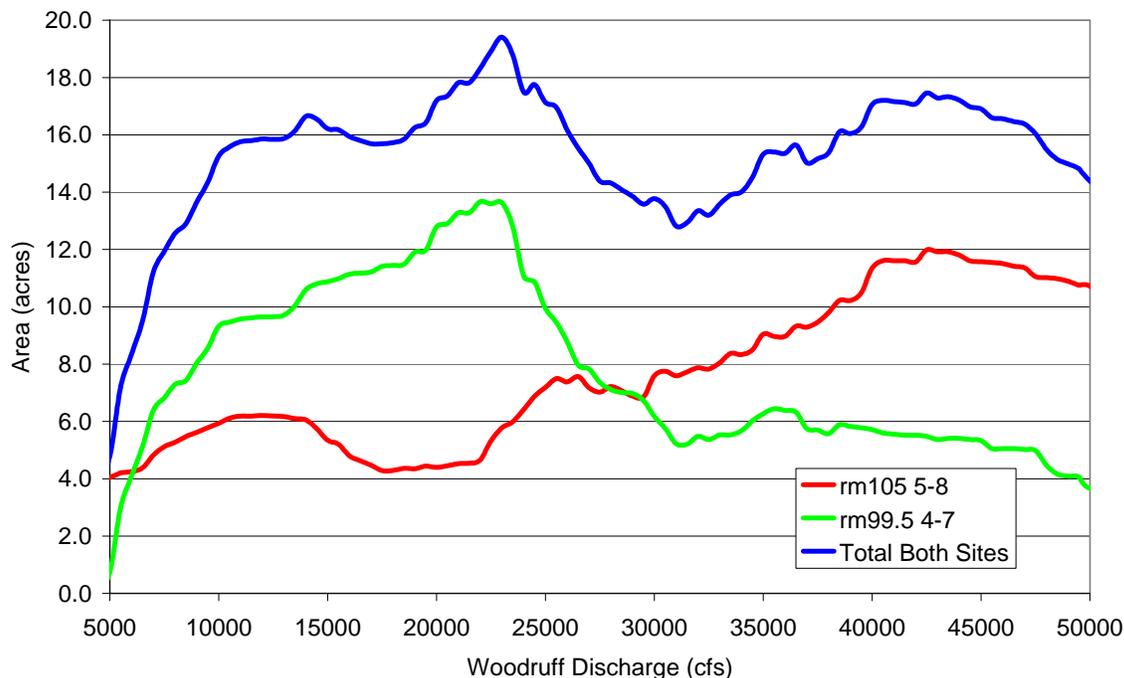


Figure 8. Projected Woodruff Releases Under 5,000/11,000 cfs Storage Rule Using 2000-2001 Inflow Conditions



The provisions of the Emergency Operations Plan for spawning flows should be acceptable to FWS based on data provided in the Biological Opinion about the physical characteristics of the known spawning sites. The Biological Opinion uses the availability of spawning habitat under various flow regimes as a surrogate for spawning success. Habitat is considered to be available if it is inundated to a depth between 8.5 feet and 17.8 feet. FWS has collected data on the amount of habitat that is available at any given flow, which is a function of the shape of the river bottom at the known spawning sites. This data is summarized in Figure 4.3.1.C of the Biological Opinion, which is reproduced as Figure 9 below. The habitat availability curve plateaus after about 10,000 cfs. The curve for RM 105—by far the most important spawning site—shows that flows in the range of 18,000 cfs (the threshold value in the IOP) produce *less* spawning habitat than flows between 10,000 cfs and 14,000 cfs.

Figure 9. Area of hard substrate inundated to depths of 8.5 to 17.8 feet at the two known Gulf Sturgeon spawning sites on the Apalachicola River.
 [Biological Opinion Figure 3.6.1.4.C]



As shown above, the available data show that the 18,000 cfs “no storage” threshold should be modified to allow flows in excess of 11,000 cfs to be stored. By this measure, storing flows between 14,000 cfs and 20,000 would actually *benefit* sturgeon; storing flows in excess of 11,000 cfs would do no harm. Figure 10 and Figure 11 prove this point by comparing available habitat for 2008 and 2009 under the IOP and under the Emergency Operations Plan. Figure 12 and Figure 13 make the same comparisons for RM 105, the most important spawning site. There is no significant difference.

Given current conditions and the best available data, this relief should be granted.

Figure 10. Comparison of Projected Available Spawning Habitat (Both Sites) in 2008 Under IOP and Emergency Operations Plan, Using 2000-2001 Inflow Conditions and Data From Biological Opinion

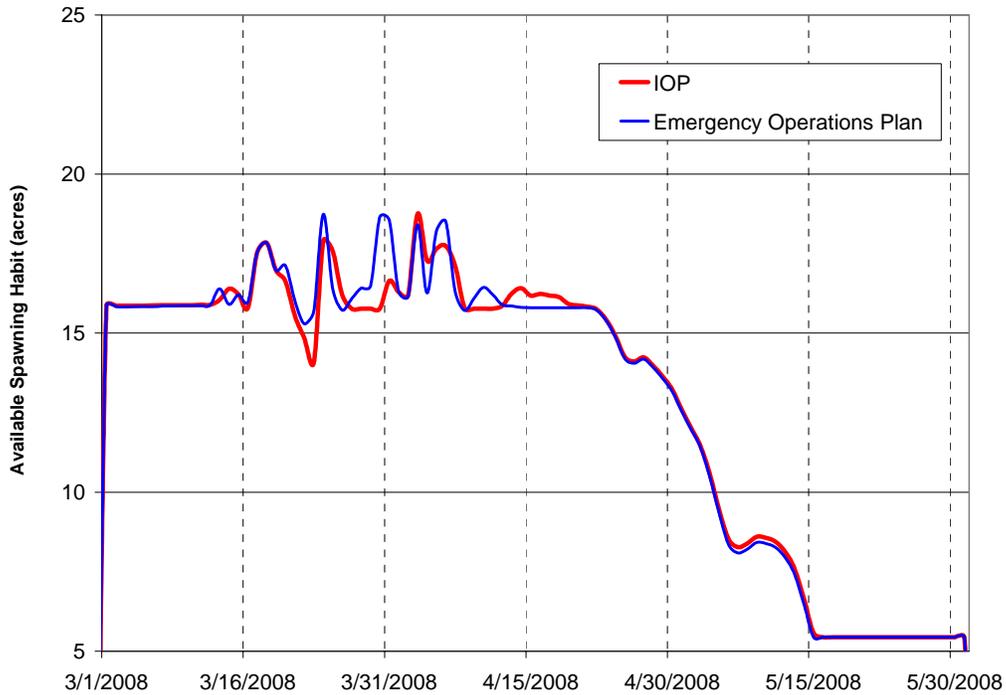


Figure 11. Comparison of Projected Available Spawning Habitat (Both Sites) in 2009 Under IOP and Emergency Operations Plan, Using 2000-2001 Inflow Conditions and Data From Biological Opinion

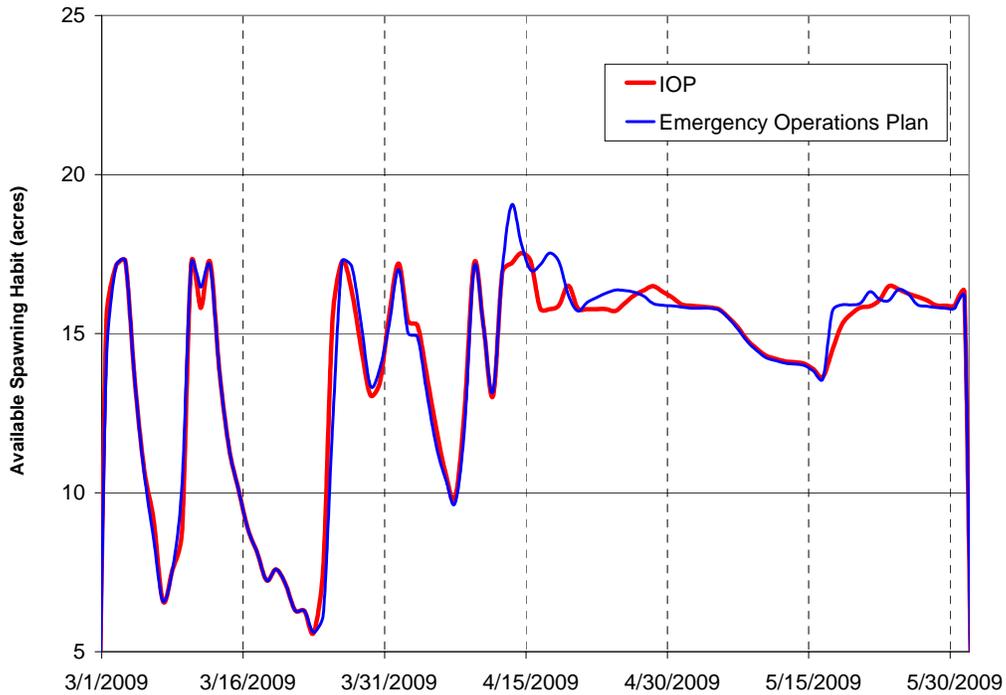


Figure 12. Comparison of Projected Available Spawning Habitat at River Mile 105 in 2008 Under IOP and Emergency Operations Plan, Using 2000-2001 Inflow Conditions and Data From Biological Opinion

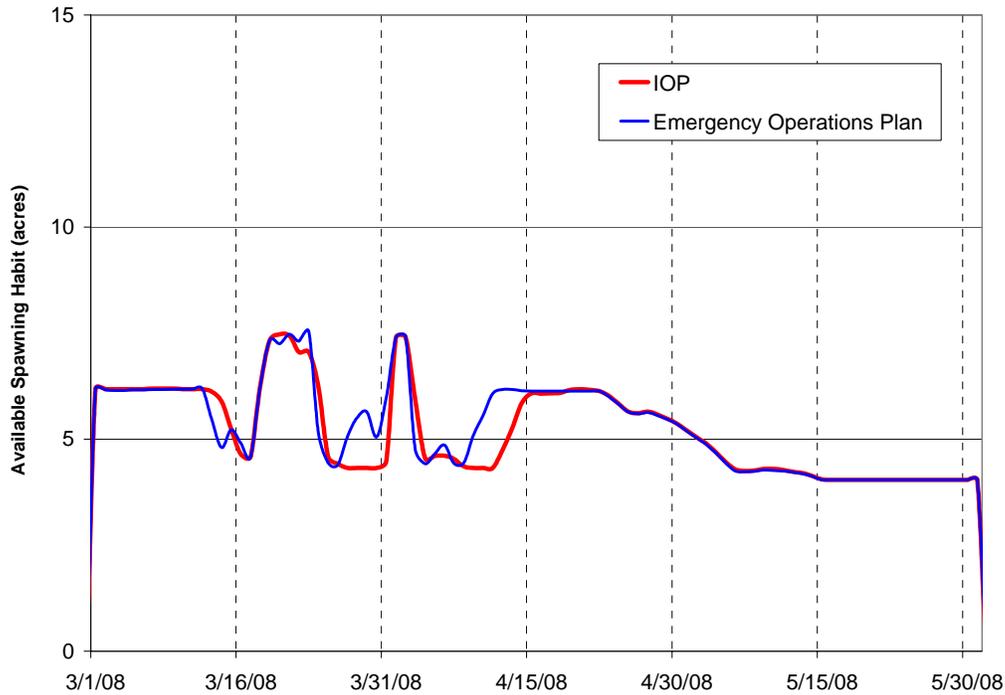
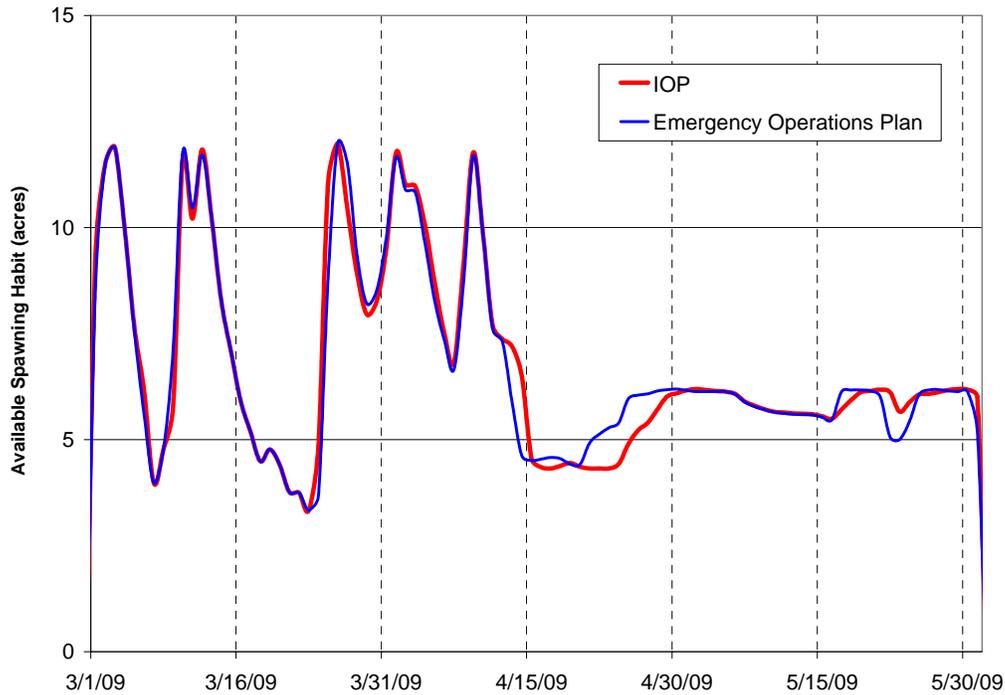


Figure 13. Comparison of Projected Available Spawning Habitat at River Mile 105 in 2009 Under IOP and Emergency Operations Plan, Using 2000-2001 Inflow Conditions and Data From Biological Opinion



1.2(b) Temporary waiver of the seasonal drawdown at West Point and Walter F. George (for 2007-2008 only)

In addition, the provision of the Water Control Plan requiring a seasonal drawdown at West Point and Walter F. George should be temporarily waived as part of the emergency response to the current crisis. A temporary waiver of the drawdown will substantially increase system storage in the lower basin at little or no cost to the environment. This measure will create needed flexibility to manage the current crisis. Figure 14, Figure 15 and Figure 16 show the effect on the IOP of eliminating the seasonal drawdown at these two reservoirs.

Figure 14. Projected Lake Lanier Levels Under IOP With No Seasonal Drawdown at West Point or Walter F. George Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent

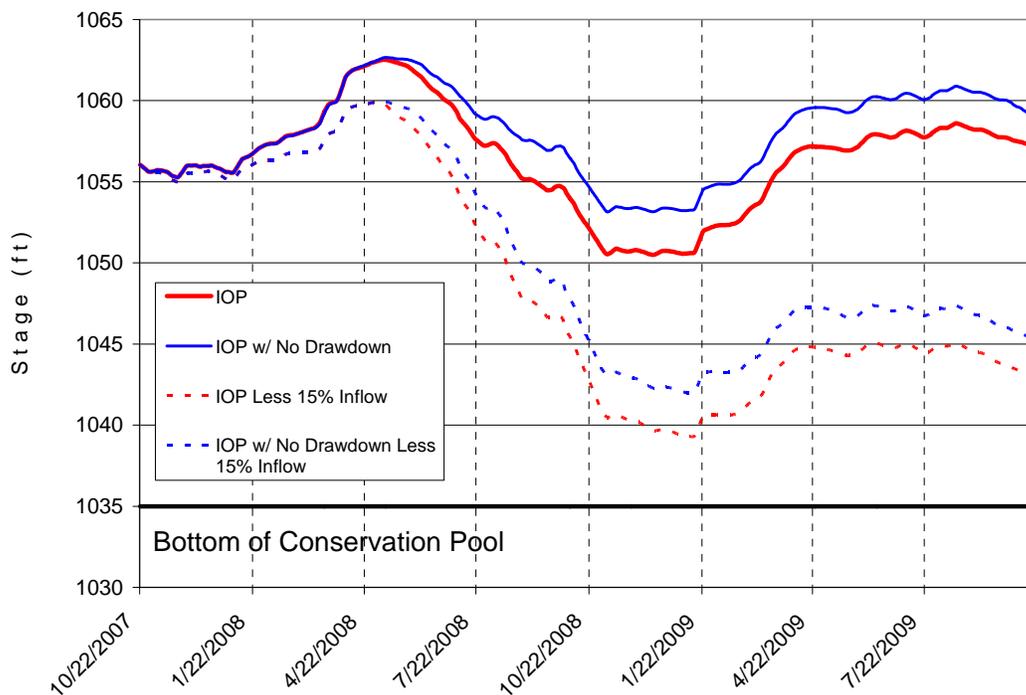


Figure 15. Projected System Storage Under IOP With No Seasonal Drawdown at West Point or Walter F. George Using 2000-2001 Inflow Conditions and 2000-2001 Inflow Conditions Reduced by 15 Percent

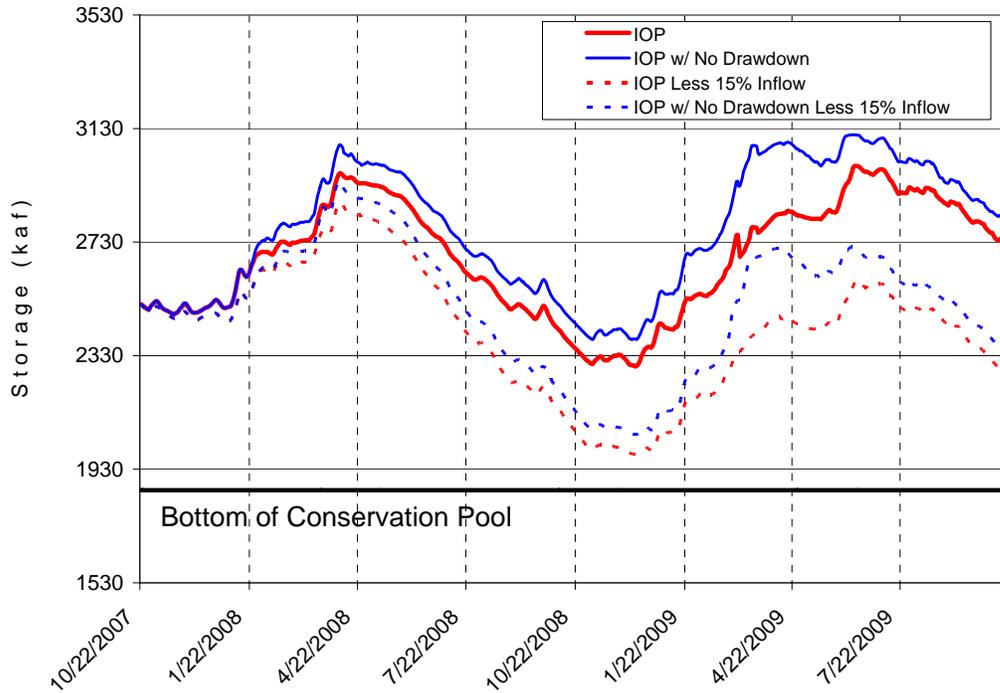
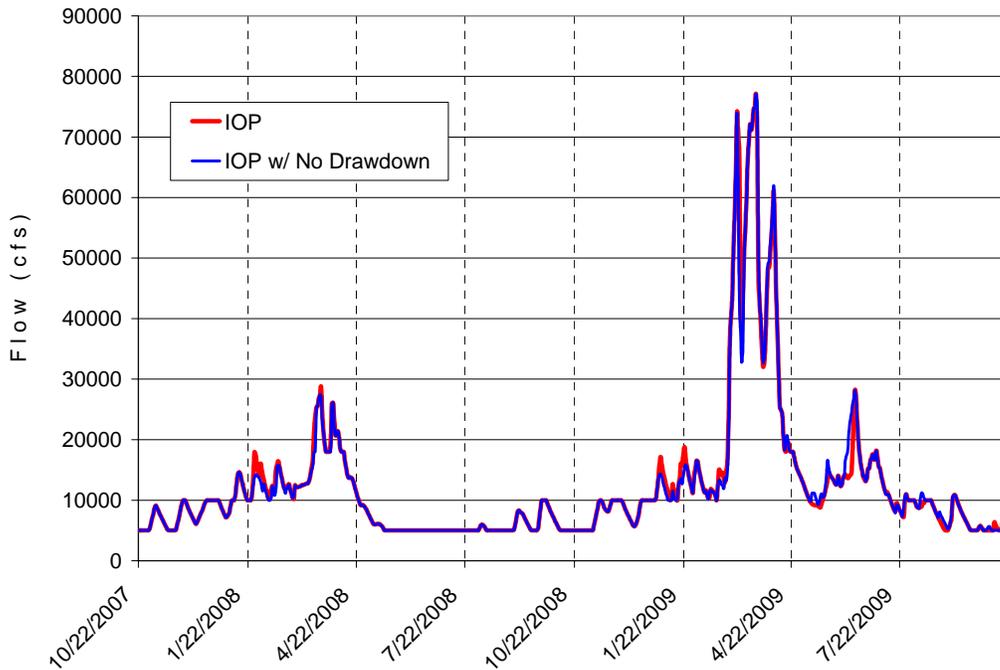


Figure 16. Projected Woodruff Outflows Under IOP With No Seasonal Drawdown at West Point or Walter F. George, Using 2000-2001 Inflow Conditions

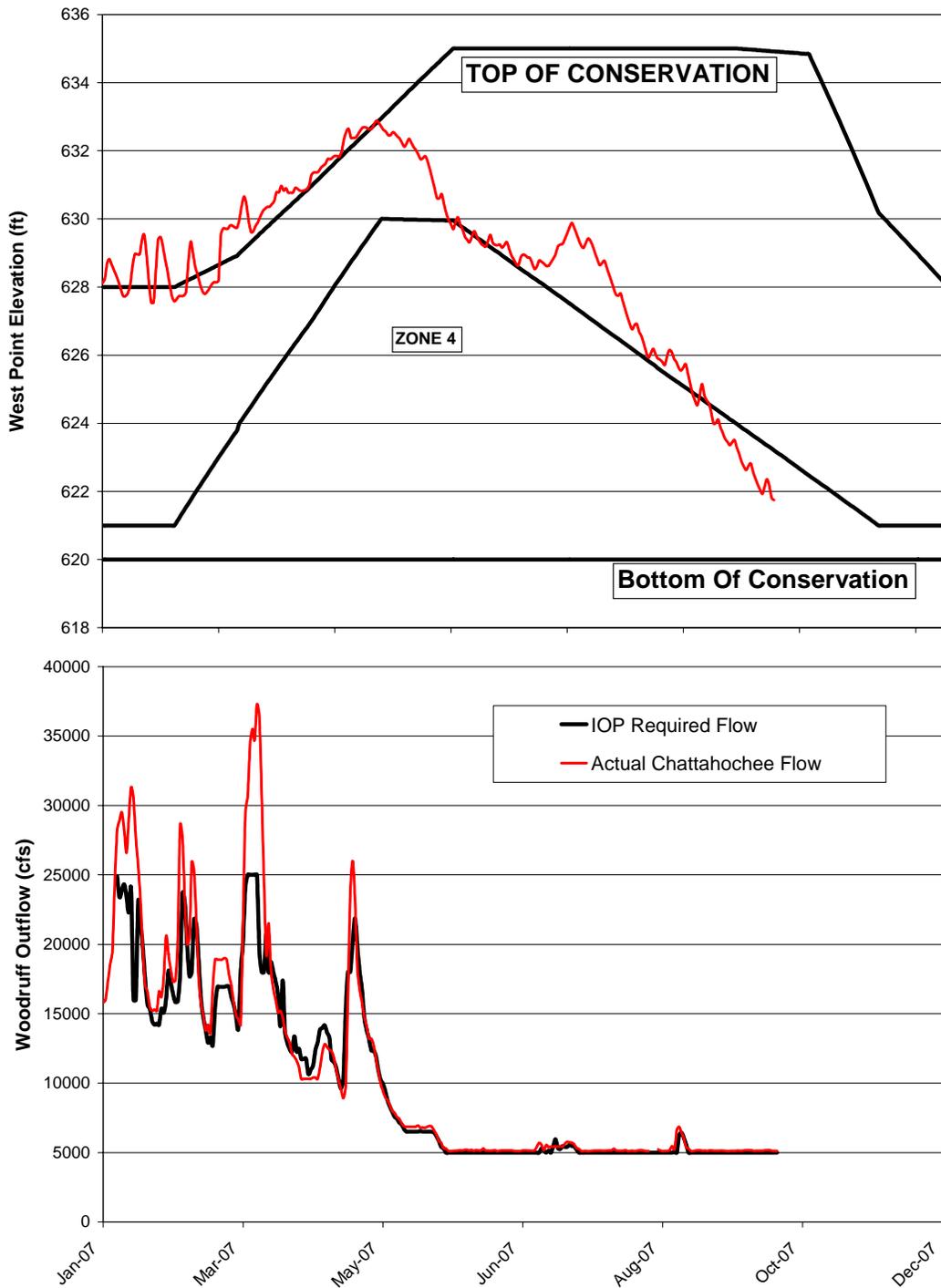


The Corps is legally authorized to reduce or eliminate the seasonal drawdown as long as this can be done without compromising the flood control function. Given present conditions, where the drought risk is much higher than the flood risk, an emergency exception to the water control plan should be granted to keep the winter pool level at 635'. This change would contribute substantially to the system's ability to refill.

Figure 17 shows how the "Water Control Action Zones" for West Point operated in the spring of 2007 to require the release of large quantities of water in excess of the IOP requirements—water that is desperately needed today. The first graph in Figure 17 shows lake elevations in West Point as compared to the rule curve and the second graph shows flows at the Chattahoochee gage as compared to the IOP requirements. During the period from January to May 2007, a volume of water was released from West Point substantially larger than the *IOP* requirements; this excess could have been safely stored in West Point Lake.

Later, when the rule curve at West Point was raised, the Corps was forbidden by the IOP from using basin inflow to fill West Point to the summer pool level. The Corps was therefore forced to release large amounts of water from Lake Lanier to balance the two reservoirs. These mistakes cannot be repeated in 2008 if the system is to have any chance of recovering.

Figure 17. West Point Levels and Woodruff Outflow Under IOP in 2007



2. Phase 2: Sustainable Interim Operations Plan

We request a temporary waiver of the IOP in accordance with the plan described above to allow the system to recover and to restore public confidence. The Emergency Operations Plan should remain in place at least until the system has recovered or until a new, sustainable IOP has been adopted.

Immediately after a plan has been put in place to get through the current crisis, the Corps should begin work on a new, sustainable Interim Operations Plan. We cannot wait until the water control planning process is completed.

To avoid a repeat of past mistakes, we request that the Corps consult with the Water Supply Providers and other stakeholders before adopting the new IOP. We further suggest that the clear need to adopt a new IOP prior to the adoption of the new water control plan should create opportunities for the Corps to experiment with new types of operations, perhaps on a pilot basis.

On January 10, 2007, the Water Supply Providers proposed an operating plan that we have called the “Maximum Sustainable Release Rule.” The basic principle of this plan is to provide the maximum flow in the Apalachicola River that can be sustained while still allowing the ACF reservoirs to refill each year by June 1. Although the rule includes other provisions as a type of “failsafe” to protect the environment and public health and safety, these provisions would only be triggered in the most extreme conditions.

Our modeling of the Maximum Sustainable Release Rule shows it does a much better job for the environment—and for the endangered species in particular—without compromising the security of water supply. Figure 18, Figure 19 and Figure 20 show the effect of the Maximum Sustainable Release Rule on Lake Lanier, System Storage and Woodruff Outflows, respectively, for 2008 using hydrology based on 2000-2001 conditions.

Figure 18. Comparison of Projected Lake Lanier Levels Under IOP and Maximum Sustainable Release Rule Under 2000-2001 Inflow Conditions and 2000-2001

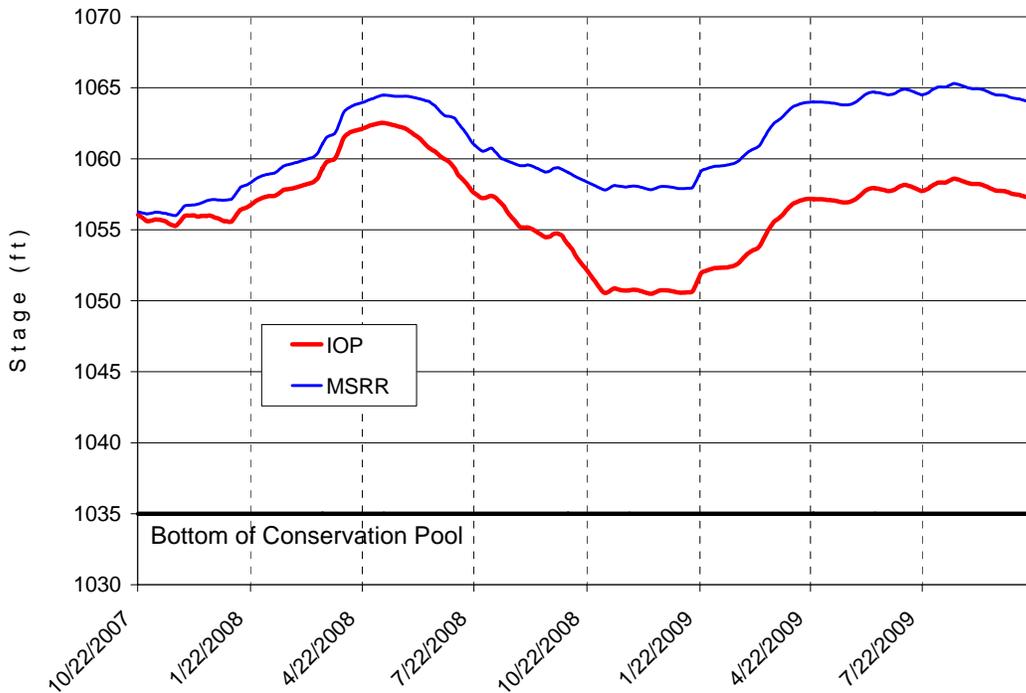


Figure 19. Comparison of Projected System Storage Under IOP and Maximum Sustainable Release Rule Under 2000-2001 Inflow Conditions and 2000-2001

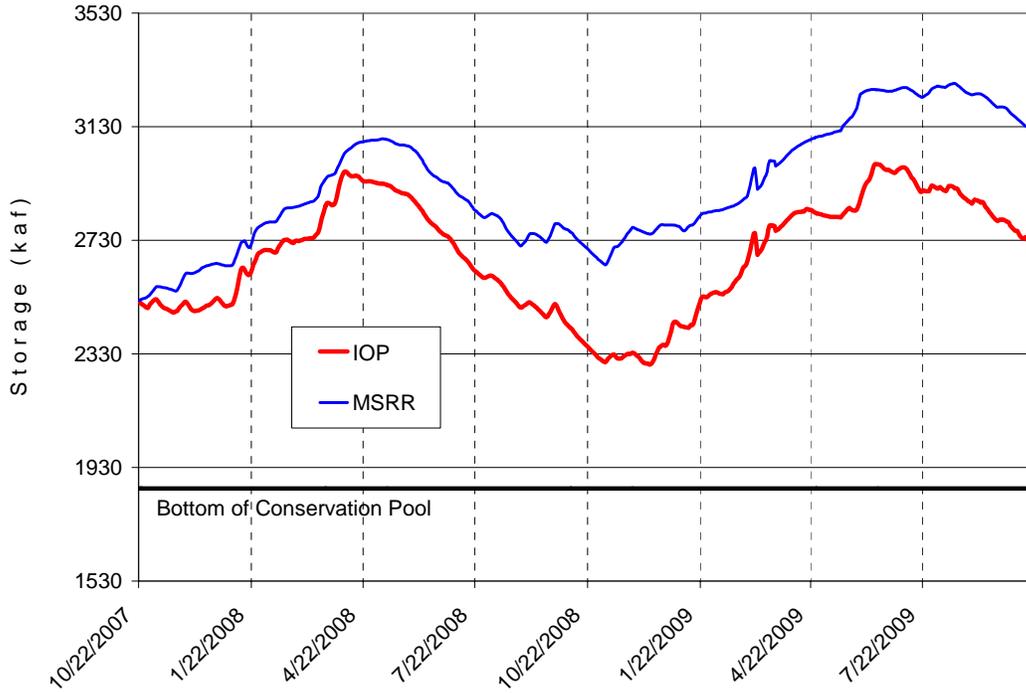
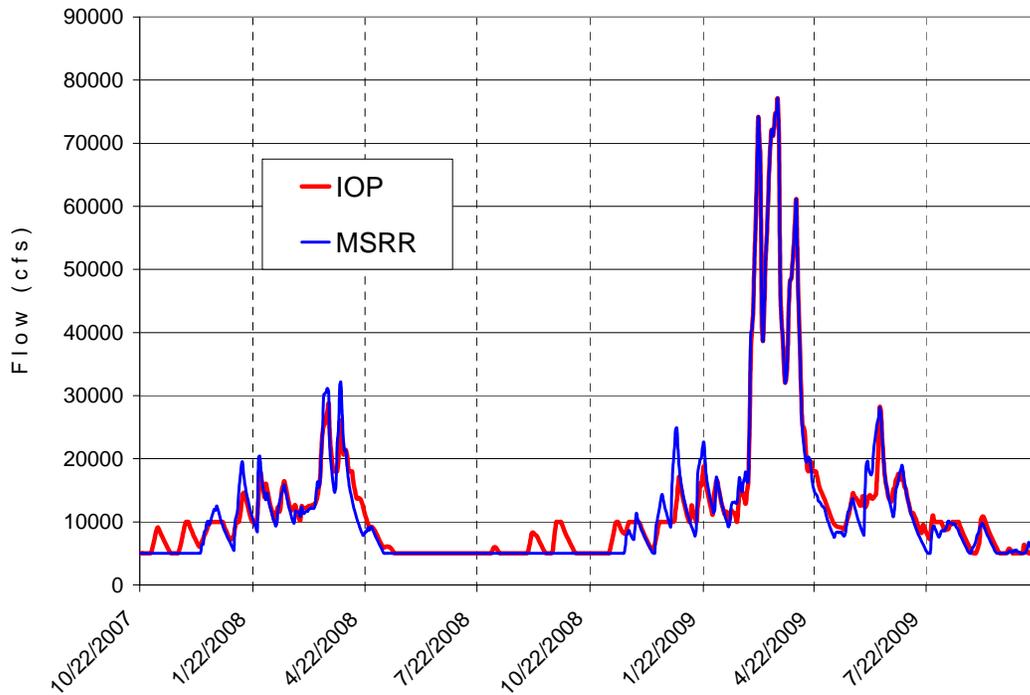


Figure 20. Comparison of Projected Woodruff Outflows Under IOP and Maximum Sustainable Release Rule Under 2000-2001 Inflow Conditions and 2000-2001



We encourage the Corps to consider this and any other reasonable measures to avoid a recurrence of the problems experienced this year.

Phase 3: A New Water Control Plan

Finally, it is long past time for the Corps to prepare new water control plans for the ACF Basin. New plans absolutely must be prepared to reflect current and future conditions in the basin. New plans must be prepared not only to avoid a repeat of the current crisis but also to maximize benefits of the federal reservoirs for all users, including the environment. We can do a much better job of managing this resource and we all have a duty to do so.

CONCLUSION

In conclusion, the current IOP is unsustainable and should be altered. Reasonable options exist to stabilize the system without causing unnecessary or significant impacts to endangered species. We request that you implement the Emergency Operations Plan detailed above to address the present crisis and to move expeditiously to adopt the full Reservoir Recovery Plan. We would welcome the opportunity to comment further and stand ready to assist in any way that we can.

Sincerely,



Charles Krautler
Director

cc: Gail Carmody
Sandy Tucker
Sam Olens