

QUANTIFYING THE FEDERAL REQUIREMENT: WATER FOR FISH AND WILDLIFE IN THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN

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Abstract. I explore the idea of a federal requirement for flow in the Apalachicola-Chattahoochee-Flint (ACF) River Basin to protect fish and wildlife. This idea is complicated by the fact that both water and wildlife are public trust resources of the states, not the federal government. However, the federal government exercises considerable control of water in the ACF through the operations of several large reservoirs. Also, several ACF aquatic species are protected under the federal Endangered Species Act (ESA). Until its termination in 2003, negotiations for an allocation formula under the ACF Compact provided briefly a forum for considering a federal flow requirement for fish and wildlife. I discuss in general terms what is known and not known about the flow needs of the ESA-listed aquatic species in the ACF. The overarching need in the basin is for a flow prescription that both federal and state water managers and regulators would apply adaptively to decisions affecting the water resource. The prescription should represent an informed societal choice about the desired balance between human uses of the basin's waters and the ecological integrity of those waters.

The Premise

This panel session on ACF Basin federal water requirements was organized under the premise that federal laws and regulations limit the amount of water that is available for use in Georgia to something less than the amount that is physically available. I was asked to address "quantifying the federal requirement for fish and wildlife". As most of my work in Georgia has focused on the Apalachicola-Chattahoochee-Flint (ACF) River Basin, I shall use that experience as the lens through which to examine the premise. The scope of the premise is immense, even when limited to the one basin, and I have not attempted to develop or summarize applicable biological and hydrological data from which to draw specific quantitative conclusions (I apologize for the misleading title). I have approached the premise instead as an invitation to explore how we might go about drawing such a conclusion. The views I express are my own, and do not necessarily represent the views of my agency, the U.S. Fish and Wildlife Service (USFWS).

Water as Property

Water is a resource that our legal system treats as property, but perhaps because water is forever moving in the global hydrologic cycle, it's a special kind of property. Water is property that belongs to the state acting as trustee for the public, who are the beneficiaries of this common property ownership (Sax 1999). By the state, I mean the State of Georgia, the State of Alabama, etc., and not the United States. Each state has its own water law for allowing citizens, corporations, local governments, and the federal government to use the water that the state holds in public trust. Because water is property, and property law is state law, the federal government has no direct role in granting rights to use water in the states. Relative to the premise of this panel, I would say also that the federal government has no explicit or direct authority to "require" how a state grants water rights.

Federal law trumps state law, but even the federal Clean Water Act, probably the broadest application of federal authority to water resources, is very carefully worded to avoid conflicting with the states' ownership of water and to deal almost entirely with water *quality*, not quantity. The hundreds of federal reservoirs, constructed mostly by the Bureau of Reclamation and the Corps of Engineers, obviously manage water quantity, but the federal government owns the dam and the real estate involved, not the water. As a practical matter though, storage capacity equals control. In the ACF, the Corps of Engineers controls the vast majority of the surface water storage capacity (U.S. Army Corps of Engineers 1998).

The ACF Compact

Interstate water issues necessarily transcend to the federal level, where Congress may pass Compacts and the Supreme Court may issue decrees. For a relatively brief time, we had the ACF Basin Compact involving Alabama, Florida, Georgia, and the federal government. Like all interstate water compacts and decrees, its principal purpose was to equitably apportion water as property among the states. Unlike all previous compacts, the ACF Compact itself did not specify the apportionment. That was left to negotiations between the governors of the three states acting as Compact Commissioners, with follow-up review by a single Federal Commissioner appointed by the

President. The ACF Compact was the first compact (along with the companion Alabama-Coosa-Tallapoosa [ACT] Compact between Alabama and Georgia) passed after most of our major federal environmental laws were enacted. It included a provision that the states accomplish the apportionment while protecting “the water quality, ecology, and biodiversity of the ACF” as provided in these various federal environmental laws. Befitting the federal government’s legal status as a non-owner of the water resource, the Federal Commissioner was a non-voting member of the ACF Commission.

The verb “apportion” means to divide into portions. From 1998 to 2003, however, the three states did not negotiate how much water each would claim as its portion of the shared water resource. Instead, they negotiated the operations of the federal reservoirs in the basin. Even though the feds didn’t own the water and didn’t have a voting seat on the Commission, storage capacity equals control, and the feds have the storage in the ACF.

The Endangered Species Act (ESA) in the ACF

More than a year after the termination of the ACF Compact, several ACF lawsuits are in federal courts, and they all focus on the same subject as the Compact negotiations: federal reservoir operations. Most recently, the operations relative to fish and wildlife have joined the legal fray, and the ESA is the statute involved. Florida filed a suit in January this year alleging violations of the ESA by the Corps. Fish and wildlife, like water, are public trust resources of the states, not the federal government. Animals listed under the federal ESA are still property of the state, but the ESA most directly influences what people do regarding these species. With an aquatic listed species, we have a state-owned resource that is governed primarily by a federal law and is totally dependent for its existence on the state-owned water resource, and in the ACF, substantial control over the water resource resides in federal reservoirs. In this asymmetric mix of state ownership and *de facto* federal control, what is the “federal water requirement” for ESA-protected species?

The goal of the ESA is fairly simple: conserve endangered and threatened species and the ecosystems upon which they depend. We have listed seven aquatic species in the ACF Basin: one fish, the Gulf sturgeon, and six fresh water mussels. We have designated critical habitat for the sturgeon, which includes the Apalachicola River and Bay, and will begin the critical habitat designation process for the mussels later this year. The sturgeon is found only in the Florida portion of the basin, because the Corps’ Jim Woodruff Lock and Dam blocks its upstream migration to probable spawning habitats in the Flint and Chattahoochee rivers. The mussels have been extirpated from the main stem of the Chattahoochee, but as a group are fairly widely distributed in the

Apalachicola and Flint basins and in a few Chattahoochee tributaries.

My agency has been working steadily with the Corps over the past several years to gather the data necessary for a consultation about the effects of the ACF reservoir operations on the Gulf sturgeon and two of the six listed mussels, the fat threeridge and purple bankclimber. All three species occur in the Apalachicola River, downstream of all the Corps’ dams. We have not yet completed that consultation.

The Gulf Sturgeon

We started our consultation about the effects of the Corps’ reservoir operations on the Gulf sturgeon in the spring of 2002 when we observed a limestone outcrop exposed in the stream bed of the Apalachicola River, an outcrop that probably supports sturgeon spawning. We have since worked together on an exhaustive survey of all potential spawning habitats in the river and are in the process of developing a river-wide flow vs. habitat relationship. Last fall, the Corps purchased 15 radio transmitters that we attached to 15 adult sturgeon. We hope that these fish will lead us to precisely where they are spawning this spring, which we can verify by egg sampling.

Let’s assume for discussion purposes that Gulf sturgeon reproduction failed for the Apalachicola subpopulation in the spring of 2002 because the limestone outcrop was high and dry, although we have no direct evidence yet that such a failure occurred. Let’s also assume that the sturgeon would have been fine but for human actions that decreased the flow, although the dry weather alone might have exposed the outcrop regardless. Given these assumptions, “take” as defined in the ESA regulations would have occurred, and unauthorized take is prohibited, but who and what caused the hypothetical take? Was it the Corps by altering the flow of the river in how they operated the dams? Was it the cumulative effect of consumptive water use upstream? Was it the evaporative losses from the thousands of small reservoirs on the many tributaries of the basin? Was it some combination of all of the above? How would we answer these questions in order to possibly avoid such an impact in the future? Welcome to my world.

Spawning is not the only sturgeon life history event of concern relative to flows in the Apalachicola. It’s quite possible that rearing habitat for young-of-the-year or juvenile sturgeon may be more limiting than spawning habitat. Although adult sturgeon do all of their feeding in the estuarine or marine environments, young sturgeon are strictly riverine and do not develop a tolerance for very salty water until they are a couple years old or more. Scientists with the U.S. Geological Survey (USGS) have analyzed data that they believe shows a stronger relationship between year class strength of the Suwannee

River sturgeon subpopulation and flows in the fall and winter than with flows in the spring (Randall and Sulak 2004). Higher flow means more fresh water habitat near the mouth of the river, which is where the young fish over winter in that system.

The ESA-Listed Mussels

How much water does a mussel need? More than 0 cubic feet per second, which is what Spring Creek and several other stream segments in the lower Flint Basin experienced for quite some time in the summer of 2000. Mussels died in stagnant or dry streams that summer, including some of the listed species. Drought is a natural phenomenon, but would Spring Creek and others have continued flowing that summer absent human consumptive water uses? If so, is it possible to avoid this impact in the future? The State of Georgia has taken action with its Flint River Drought Protection Act, through which a limited number of farmers are paid not to irrigate in a dry year. To date, the state has paid only surface water users to not irrigate. The majority of water use in the lower Flint Basin relies on ground water, but ground water and surface water are well connected in this area.

Just as the flow needs of the sturgeon extend beyond the spawning season, the flow needs of the mussels extend beyond keeping a certain spot wet during a dry spell. All of the listed mussels require fish to serve as a host for their larval life stage. Different fish species work as fish hosts for different mussel species, and the circumstances and mechanisms of infecting the fish host vary. The shiny-rayed pocketbook, one of the ESA-listed species, suspends its larvae on a long filament of tissue, called a superconglutinate, that dangles from its shell in order to attract the attention of a fish (O'Brien and Brim Box 1999). Without sufficient current to suspend the filament in the water column, it is likely an ineffective lure. Without sufficient densities of the appropriate host fish species, reproduction fails. The flow needs of the mussel are, therefore, also the flow needs of the host fish species. Perhaps the host fish species spawns during high water in floodplain habitats, as many species do, and the list of potential hydrology/biology linkages grows and grows.

The ACF Instream Flow Guidelines

Every time we start to look closely at the instream flow needs of a particular species, we seem to raise more questions than we can possibly answer in a lifetime of research. It is axiomatic that species persist in the environments to which they are adapted. In riverine and estuarine environments, flow is the variable driving many important physical and ecological processes. It follows then that species are adapted to the flow regimes of their native watersheds.

Early in the Compact negotiations, we worked with the Environmental Protection Agency (EPA) and USGS to

identify those features of the flow regime that available data suggested were the most important to retain or alter as little as possible in order to protect ecological integrity. We called these measures of flow magnitude, timing, frequency, duration, and rate of change our instream flow guidelines (U.S. Fish & Wildlife Service and Environmental Protection Agency 1999). The guidelines were not a flow prescription; they were a set of hydrologic variables that we believed were biologically relevant to a flow prescription. The flow prescription for which the guidelines were intended to apply as an assessment tool was an allocation formula under the ACF Compact. We offered the guidelines to the states as a means of comparing alternative proposals. We stated that hydrologic alteration within the bounds of these guidelines would not likely impair ecological integrity. Conversely, a formula that departed from the environmental baseline defined in the guidelines would require additional evaluation and consultation with the USFWS in accordance with the ESA.

A Flow Prescription for the ACF

The Compact negotiations did not proceed in a fashion such that the instream flow guidelines were used to help develop a preferred alternative. Nor have they been of much use to water managers and regulators, who would prefer something that tells them, "Here are the present limits for using the water," i.e., a flow prescription. My view is that a flow prescription should represent a deliberate societal choice about the human uses we desire to support with water taken from streams and the health of those streams. Human uses unavoidably alter streams, so all streams can't be pristine. We need to choose for each stream system an acceptable balance between pristine and altered. It is the role of hydrologists, biologists, and others to help make that choice an informed one. The needs for water and our knowledge base constantly change, so it is only prudent to consider any flow prescription a work in progress.

"A Concept on the Possible Structural Elements of a Water Allocation Formula for the ACF River Basin" (ACF Federal Commissioner 2003) was an attempt on the part of the ACF Compact Federal Commissioner and the federal agencies to suggest a flow prescription for the basin as a whole. We developed a feasible set of reservoir operations and anticipated human needs for water in the basin while retaining important natural flow regime features at the border between the states. We expressed this tentative balance as: 1) a set of maximum depletions for each state and each sub-basin within a state; and 2) a set of state-line minimum flows that varied by month and by climatic condition (dry vs. normal or wet). Within this template, we suggested that the federal and state governments could collaborate on adaptive management of the water resource. The response from the states was

respectful, but the Concept was not further explored, and then the Compact terminated. Post Compact, ACF water managers and policy makers still need a working flow prescription, only we must now seek it in the context of the Corps' reservoir operations and the separate actions of the three states, instead of in the deliberations of one interstate commission. Clearly, we've lost a huge opportunity.

With the Corps, a flow prescription would take the form of a new water control plan for the federal reservoirs, a plan fully vetted through the ESA and other applicable federal processes. Unfortunately, the various court cases have stalled most progress towards a new water control plan. As the defendant in these suits, the Corps is understandably reluctant to substantially revise their practices until these suits are resolved. Until then, few officials, on the federal or state side of water science and management related to these reservoirs, seem willing to collaborate in the ways necessary to get the job done, namely to engage each other in an open forum and take on some tough decisions with limited and imperfect information. Everyone is instead preparing their case.

With the states, a flow prescription would take the form of new water use policies that make explicit the hard choices between growth in human water uses and protecting aquatic ecosystems. Research in Georgia, for example, suggests that fish community integrity is negatively correlated with the amount of water withdrawn for human uses (Freeman and Marcinek 2004). The states could use the estimates of effects provided by this and further similar studies to support adaptive water supply planning for meeting human needs while conserving biological resources. The states could adopt polices that would limit withdrawals from key locations in an aquatic biodiversity conservation network and permit additional withdrawals as needed from locations that are less critical to that network..

Conclusion

Is there such a thing as a federal flow requirement to protect fish and wildlife in the ACF? Yes. We will eventually work out with the Corps an operational scheme for the reservoirs that serves the authorized purposes of each project consistent with the ESA and other applicable law. Will this requirement limit the amount of water the states may use? It is my view that the states alone are empowered to choose the answer to that question. The states hold the water in trust for the public, not the federal government. I am optimistic that the states will choose a balance between human uses and ecological integrity that protects and even restores the health of most streams in the basin, and doing so will necessarily limit the amount of water available for human use. It will take time, and it will take collaboration between all levels of government and the public, but it will happen if people want it to.

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