STATE WATER POLICY ALTERNATIVES FOR INSTREAM AND DOWNSTREAM FLOW PROTECTION

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Abstract. The question addressed is: What should be the state policy for protecting the instream and downstream uses, and how should this policy be implemented? That is, how should the state decide (a) whether to issue a permit for new or increased water withdrawal, thereby allowing reduction of streamflow, and (b) what conditions to specify in the permit to reduce losses to the existing and future stream users? The panelists present their proposals for what the policy should be, and discuss the advantages and disadvantages of the alternative policies. The panel is intended to provide ideas and information useful as background for the public, EPD and the Georgia Water Council in preparing the state policy component of the Comprehensive State-wide Water Management Plan.

Panel Participants:

John Biagi, Georgia DNR Wildlife Resources Division
Jerry Ziewitz, US Fish and Wildlife Service
Brian Richter, The Nature Conservancy
Bob Scanlon, City of Savannah
Billy Turner, Director, Columbus Water Works, Columbus, Georgia
Moderator: Alan Covich, Institute of Ecology, University of Georgia
Assistant Moderator: Ryan Eaves, Graduate Student, Public Administration, University of Georgia
Panel Organizer: Kathryn J. Hatcher, Institute of Ecology, University of Georgia.

INTRODUCTION

State Water Plan Initiative

The 2004 Comprehensive State-wide Water Management Planning Act (HB 237) requires the Georgia DNR Environmental Protection Division (EPD) to develop a comprehensive state-wide management plan for Georgia, and to submit the draft plan to the state Water Council for review by July 1, 2007. The Water Council may modify the plan and will recommend it for consideration by the Georgia General Assembly for the 2008 session.

Section 12-5-522(a) provides that "The division (EPD) shall develop and propose a comprehensive state-wide water management plan not inconsistent with this chapter and in accordance with the following policy statement:

"Georgia manages water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens."

Section 12-5-522(c) provides that "The proposed comprehensive state-wide water management plan shall set forth state-wide water policies not inconsistent with this chapter which shall guide river basin and aquifer management plans, regional water planning efforts, and local water plans."

In the first meeting of the Water Council on March 2, 2005, the Water Council chair and EPD director, Carol Couch, outlined the scope of the 2005 state water plan to included "articulation of state water resources management policy issues" and "recommendations for statutes, regulations, and policies to implement plan" along with guidelines and recommendations for process of sub-state (regional) planning. A list of 42 state water issues to be addressed in the state water plan had previously been developed and recommended by the Joint Comprehensive Water Plan Study Committee (Aug. 2002).

Policy Panels Project

Five panel discussions to address state water policy issues are scheduled for the 2005 Georgia Water Resources Conference. The panels are intended to provide ideas and information useful as background for the public, EPD and the Water Council in considering several of the key state water policy issues facing Georgia. The panels are not intended to reach consensus or to make recommendations....only to provide useful background information about the difficult water policy issues, the policy choices available, and the pros/cons of each choice.

The five panel topics were selected by the EPD director, who also recommended a DNR-EPD staff member to serve on each panel. Each panel consists of five panelists: a DNR-EPD representative; three panelists representing various interest groups to summarize their group=s desired policy choice and view of the pros/cons for the policy

choices; and a technical or legal expert), plus a neutral moderator acceptable to all the panelists, and an assistant moderator (a graduate student) who provided research assistance. The panel topics are:

1.* Protection of Instream and Downstream Flows
2. Water Quantity Allocation/Reallocation among Users
3. Minimum Aquifer Levels Protection Policy
4. Water Quality Allocation (TMDL allocation policy)
5. Water Conservation/Efficiency and Reuse Policy

Protection of Instream and Downstream Flows
Summary of the Issue

Georgia's citizens, businesses and communities derive both economic benefits and quality of life benefits from the instream use of the state's rivers. The instream uses include recreation, fishing, spiritual solace or inspiration, navigation, wastewater dilution, power generation, and maintenance of aquatic habitats and species. Each additional state permit for increased consumptive withdrawal from the stream gives a free benefit to the withdrawal use, with a decrease in benefits to all the existing instream uses. The effect of granting each new consumptive withdrawal permit is to take a portion of a public asset (water) away from one group of citizens (the present and future instream users) and to give that public asset to the permit applicant for private use or municipal use.

Policy Question

What should be the state policy for protecting the instream and downstream users, and how should this policy be implemented? That is, how should the state decide (a) whether to issue a permit for new or increased consumptive withdrawal, thereby allowing reduction of streamflow and benefits for the existing users, and (b) what conditions to specify in the permit to prevent or reduce losses to the existing and future stream users?

The present approach is to reserve a certain threshold amount of streamflow (such as 30% of the average flow) for all instream users. EPD implements this policy by requiring permit holders to stop withdrawing when the streamflow drops to the threshold stream flow, plus any water that must be passed to serve the existing downstream permitted withdrawers. Water withdrawals permitted before 1977 do not have this requirement to stop withdrawal.

One problem with this approach is that it could eventually lead to all streamflow above the threhold amount (say, 30% of average flow) being given to consumptive withdrawal uses, so that the streamflow becomes nearly constant all year at the threshold level. This unnatural stream flow pattern may impact many aquatic species which depend upon natural flow variability for survival. (Freeman, 2005; Richter,).

Some issues regarding the instream flow policy are as follows. (1) Should the protected instream flow be lower or higher than the present reserved threshold flow? (2) Should the state's rules for protecting instream users include some additional conditions to provide for a more natural (not flatlined) stream flow pattern? (3) Should the level of reserved instream flow be allowed to vary by region, so that some streams and existing instream uses receive a higher level of protection by the state? (4) Is the basic approach assumed here (the idea of reserving a certain amount of instream flow for use by all instream users) the best approach? Or is there some other approach, such as a legal test or benefits test for each new withdrawal applicant? For example, if a new consumptive water withdrawal permit is granted, is the loss of water and benefits to the existing instream uses worth the gain to the public from the new permit?

Legal Background

The Georgia Board of Natural Resources provided a White Paper on Water Issues (May, 2001), which gives the following legal background for the state's program to protect instream flow. There is no specific language in a State statuue providing for instream flow protection; “however O.C.G.A. 12-5-31(g) states that the granting of a withdrawal permit shall not have unreasonably adverse effects upon other water uses in the area, also O.C.G.A. 12-5-23 authorizes DNR to manage water uses in the State.” “DNR Rule 391-3-6-.07(4) requires persons withdrawing surface water to allow specified flows to remain in the river or to release specified flows from reservoirs.”

Brian Richter (panelist) notes that: “The Endangered Species Act is arguably the most influential federal law when it comes to environmental flow protection. The implementers of the Clean Water Act [federal Public Law 92-500] have been hesitant to use that law's directive to protect the "biological, chemical, and physical integrity" of the nation's water bodies for the purpose of environmental flow protection. Some of the greatest limitations to environmental flow protection at the state level include: a) the lack of easily-applied hydrologic criteria that identify how much water a given river or stream needs; and b) financial constraints in developing such science-based criteria, or developing hydrologic models to assess the impacts of future withdrawals and infrastructure on environmental flows.”

Jerry Ziewitz (panelist) notes that: “The Endangered Species Act (ESA) prohibits the “take” of listed species, where take includes habitat alteration leading to death or injury. Flow depletion may amount to take, but since “ownership” of water and wildlife resides with the states, it is unclear how the ESA applies to state water law and water rights. Summaries of case law that I’ve read suggest that the exercise of valid water rights can constitute a “taking” of an endangered species. When federal actions, such as permits under the Clean Water Act, are involved in water

development projects, case law also suggests that the federal action agency may condition *how* a state-granted water right may be exercised without "taking" that right in order to comply with the ESA.

The ESA requires federal agencies to ensure that their actions do not jeopardize a listed species or adversely modify its designated critical habitat. The federal actions that most apply to water issues include the operations of federal reservoirs and administration of the Clean Water Act."

GEORGIA'S INSTREAM FLOW POLICY

by John Biagi, Georgia DNR Wildlife Resources Division

Instream flow protection is necessary to protect the interests and demands of multiple uses of limited water resources. Off-stream demands include agricultural, municipal and industrial uses. Instream demands or uses include, aesthetics, recreation, and ecological integrity. The challenge comes in balancing often-competing needs without full understanding of the implications of water allocation decisions.

Summary of Current EPD Policy

Georgia has a mix of flow policies in place. Georgia Environmental Protection Division (EPD) is the regulatory agency with statutory authority to permit ground and surface water withdrawals greater than 100,000 gallons per day. Withdrawals that existed prior to 1977 occurred at time when consideration of instream flow needs was limited. As a result, these water users may have no minimum flow requirement as a condition of their permit. Most non-agricultural withdrawal permits issued post-1977 requires a 7Q10 minimum flow. 7Q10 is the lowest seven-day average flow in a stream that has a ten year recurrence frequency. A portion of these permitted withdrawals include a non-depletable flow above the 7Q10 that must be reserved or allowed to pass the water intake for downstream water users. Since 2001, EPD has adopted a new interim instream flow policy.

The interim instream flow policy was approved by the Department of Natural Resources (DNR) Board on May 2001 and implemented a statewide policy that was based on recommendations of a stakeholder team assembled by the EPD and Wildlife Resources Division (WRD) directors. The stakeholder team recommended using an "options" approach to the new policy, which was partially based on Evans and England (1995) report: *A Recommended Method to Protect Instream Flows in Georgia*. The stakeholder group added one new option, monthly 7Q10 minimum flow. The group chose to include most other flow recommendations listed in the report, including the option to conduct a site specific study funded by the water user, 30% Mean Annual Average Flow (MAAF) on streams with a direct water withdrawal, and 30/60/40% MAAF for water supply reservoirs. Peaking hydropower facilities are required to conduct a site-specific study to determine the most appropriate flow regime.

Monthly 7Q10 is calculated similarly to what is described above for 7Q10, but is broken out by month and therefore, provides flows that vary across the seasons. MAAF is calculated by adding all the daily flow measurements in a year and then dividing by 365. These annual averages are then averaged for the period of record to capture inter-annual variability. Multiplying by the percentage provides the appropriate seasonal flows.

These criteria do not apply to the Chattahoochee, Flint, Coosa, and Tallapoosa basins because of the tri-state water allocation negotiations. Additionally, these criteria do not apply to the highly regulated federally operated hydropower projects within the state. A constant theme for the interim policies that do not involve site-specific studies is that the minimum flow does not require flow augmentation. The water user is required to pass at all time, the lesser of the flow criteria or inflow at the withdrawal point.

Potential water users are allowed to select from the suite of options depending on what type of project they are proposing. Instream withdrawals could select 30% MAAF, monthly 7Q10 or a site-specific study that resulted in a different flow regime. The individual user would decide what is in their best interest as it pertained to flows and their project. A water authority proposing an off-stream impoundment with pumped storage from a larger stream would have to select either the monthly 7Q10, 30/60/40% MAAF or site specific study. These policies would apply to both the reservoir discharge and the large stream intake point. The EPD director must approve all site-specific study designs prior to study initiation.

Differences between monthly 7Q10 and fractions of MAAF vary depending on the resources. Streams with high groundwater inflows tend to have 7Q10 values that approach or exceed 30% MAAF, otherwise 7Q10 flow values tend to be lower than 30% MAAF. For this reason, many consider the monthly 7Q10 option less protective of aquatic resources because it allows a higher proportion of the stream flow to be diverted for off-stream uses.

In addition to the above flow policies, WRD and EPD also work through the Federal Energy Regulatory Commission (FERC) relicensing process to establish flows that enhance and protect downstream aquatic resources. FERC licenses privately held (non-federal) hydropower projects. A common component of these licenses are site-specific instream flow requirements. FERC flow requirements are developed in consultation with natural resource management agency personnel and are often seasonally in excess of 7Q10.

Advantages and Disadvantages of Current Policy

The primary benefit of the interim policy over the

preceding policy is recognition of the importance of seasonal flow patterns. When the first flow policy was put into place in 1977, 7Q10 "flat-line" flows were assumed to be protective of aquatic resources. Since then, advancements in instream flow science and understanding of what was necessary to protect aquatic resources progressed to the point where it was understood that continuous "minimum flows" throughout the year were not protective and could be detrimental to aquatic resources. The interim policy is based on the realization that flow variability with high winter-spring flows, moderate spring-summer flows and low summer-fall being an important component of the annual flow cycle.

Components missing from the interim policy are the recognition that flows vary between years with flood flows and droughts, and how water quality is affected by flow. WRD is currently conducting a study of the effects of drought and floodplain inundation on sunfish growth. Our hope is that this project will define the significance of floodplain inundation as measured by the benefits to the recreational sunfish fishery in our Coastal Plain Rivers.

Another area of concern is how little is know of the effects of flow reductions or changes in flow timing on the state's estuarine resources. Freshwater inflows to our estuaries and the resultant salinity gradients create transient habitats throughout the lower river distributaries for a multitude of organisms. The recent collapse of Georgia's blue crab fishery highlights the fragility of our coastal systems and the need for us to better understand the implications of flow policy on these systems.

Steps to Revising State Policy

The DNR Board recognized the need for Georgia specific instream flow research. The Board directed WRD, EPD and the Coastal Resources Division to seek the funding necessary to conduct instream flow studies within the state. Studies were to be completed by 2006, but the interim policy would continue to be employed if the studies were completed. Only two regional studies have been funded to date, one in the Piedmont and one in the Lower Flint River basin. Final reports have not been published on either of these studies, but most fieldwork is complete. The Piedmont study assesses the effects of flow depletion on stream fish communities during drought and normal flow years. The Lower Flint River basin study is a comprehensive study of the effects of flow alteration on water quality, stream morphology, and fish community while considering stream connectivity.

POLICY #2
Policy Proposed by Jerry Ziewitz
Discussion of Status Quo and Alternatives

Advantages and Disadvantages of Current Policy

The advantage of the current EPD policy is that it is simple, doable, helps prevent the stream from experiencing the disturbance of unprecedented low flows as a direct result of water use. The disadvantange is that protecting a minimum flow doesn't necessarily protect biological functions, because it is clear that patterns of flow variability are what structure aquatic communities. If minimum flow is the only means for regulating depletions to stream flow, it becomes possible, with sufficient storage or variable pumping capacity, to "flat line" the flow regime. Flat lining alters the aquatic community by eliminating the species that depend on frequent high or moderate flow pulses for energy inputs, habitat access, and can also eliminate those that depend on periodic low flows. Flat-lining the regime also has consequences on channel morphology over time.

An ideal policy would address minimum flows plus maximum depletions. We need the simple, do-able protection provided by minimum flow standards, but we also need the additional protection of capping depletions so as to limit the extent of hydrologic alteration that is possible for a stream. When reservoirs with substantial storage capacity are involved, we also need instream flow standards to protect other critical regime features besides magnitude of low flow, such as the frequency, and duration of the low flows, the frequency and duration of bankfull flow events, small and large flood events, and the rate-of-change (ramping rates) of reservoir releases.

Proposed Policy #2 (Ziewitz)

I would encourage GA to develop an adaptive water supply plan that combines a suite of instream flow protections (e.g., seasonally and possibly climatically variable minimum flows for all streams; periodic high flow pulses, rate-of-change criteria, etc., for dammed streams) with a state-wide water-use zoning policy that quantifies allowable maximum depletions for watersheds. This is the minimum flows/maximum depletions approach needed for an complete policy.

For this plan to serve both human needs and aquatic biodiversity conservation goals, the state would need to map its aquatic biodiversity resources and assign a conservation priority to all streams and watersheds. To the highest conservation priority streams and watersheds, the plan would apply the most protective instream flow standards and the most restrictive maximum depletions consistent with anticipated water supply needs.

By an "adaptive plan", I mean one that would actively test the assumptions underlying the instream flow standards and depletion caps prescribed for watersheds and revise those prescriptions as we learn more and as needs change. By "test the assumptions", I mean conducting research and monitoring that determines whether the minimum flow/maximum depletions prescriptions actually work. Example questions to test: Did we identify biologically relevant flow parameters with our instream flow standards?

Did the native fish assemblage persist in the streams where depletions were limited to x percent of average annual discharge? Did people have enough water? Did permittees comply with the minimum flows and maximum depletions?

Building dams and reservoirs should be avoided generally under the policy, but when necessary, limited to systems of low conservation priority. In addition to the impact of flow depletion that comes with building a water supply reservoir, dams cause habitat fragmentation, alter channel morphology, degrade water quality, and further deplete streamflow through evaporative losses.

Pros/Cons of Proposed Policy #2

The principal advantage of this approach is that is realistic. We can't have our stream (i.e., a naturally diverse and productive stream) and drink it too. We must therefore decide which streams we want to keep healthy and to what degree, and which streams are relatively more valuable to us for water supply and other uses. We make similar choices in the terrestrial context whenever we decide that certain areas are or are not okay for shopping malls and homes. We then accept that some areas will provide habitat for sparrows and others will provide habitat for red-cockaded woodpeckers. We need to protect habitat for aquatic critters in much the same way, namely by limiting/regulating human uses in certain habitats. Granted, it is more complicated in the aquatic context, because water flows downstream and so do the impacts of hydrologic alteration.

Another big advantage of this approach is that it would create a very strong incentive for water conservation, because it would explicitly declare the amount of water that is available for use in specific areas.

The principal disadvantage of this approach is that people are not realistic when it comes to water. We want to believe that we *can* have our stream and drink it too, especially if we live along a relatively healthy stream but we want our community to increase in population or support new industries that need water. Some people will strongly resist the idea of state or basin-wide water zoning to conserve aquatic biodiversity.

Most other alternatives are limited only to the first element of the approach I've outlined, i.e., they define instream flow parameters (e.g., year-round or monthly minimum flow) to protect through the regulatory processes of water permitting and reservoir operations. The common advantage of these alternatives compared to what I've suggested is that they don't saddle you with the political difficulties of explicitly capping human water uses – just leave the prescribed instream flow amount in the stream. Beyond this common advantage, the different methods of prescribing instream flows each have their own advantages and limitations (see M.C. Freeman's comparison of instream flow methods presented at this conference). The standard-setting approaches (e.g., Tennant, Aquatic Base Flow) are easy to apply, but don't protect flow variability, which we know is important. The incremental methods (e.g., IFIM) can identify critical flow-related habitat bottlenecks, but are generally species specific and require extensive site-specific data collection. These latter characteristics are impractical for state-wide application and too narrowly focused for a state with such extremely high aquatic biodiversity as GA. The hydrologic variability approaches (e.g, RVA, the ACT/ACF flow guidelines that I attached to this reply) overcome the limitations of these other approaches, but are difficult to apply in a regulatory context, and may not identify the most important flow regime features to protect.

The main disadvantage of limiting the biological conservation aspects of a water policy strictly to how much water is left in the stream and not also how much is taken out is this: we don't know enough to design a flow regime that will accommodate all of the needs of all the species that live in our streams. Even if we could, we would likely find that we would not be able to use very much water while protecting that regime, because it would probably look a lot like a natural flow regime.

It's far simpler to just limit the potential for impacts by limiting the amount of the depletions. Inventory and prioritize your aquatic biodiversity resources. Inventory and prioritize your water supply needs. Apply the most restrictive minimum flow/maximum depletion prescriptions to the highest conservation priority streams and the least restrictive prescriptions to the highest priority water supply areas. Make the hard choices where those two sets of priorities conflict in an open, informed, publicly responsible forum.

POLICY #3
Policy Proposed by Brian Richter
Discussion of Status Quo and Alternatives

Advantages and Disadvantages of Existing Policies

Very few states or countries provide any form of protection for environmental flows. Those that do provide protection only for "minimum" flow conditions, and do not adequately protect the fuller range of variability in flows necessary to sustain ecosystem health.

None of the states in the U.S. have particularly strong environmental flow policies. However, some of the water management districts in Florida have used the 1972 Florida Water Act (which explicitly calls for protection of "minimum flows and levels") to provide protection for variable flow regimes in some rivers such as the Peace and Alafia and Suwannee. A number of other states, including New Jersey, Massachusetts, and Maine, are discussing new policies or legislation that appears consistent with the characteristics of an "ideal" policy I listed above.

The Great Lakes states and Canadian provinces in the GL basin have recently adopted a "Great Lakes Annex 2001"

which calls for a net restoration benefit whenever any future water withdrawals are permitted in the basin. This policy appears to hold promise of requiring applicants to put into place measures that will effect restoration of the freshwater ecosystems to more than offset any ecological impacts of their water withdrawal. Over time, this could potentially lead to hydrologic restoration of many rivers and streams in the GL basin.

The best example of ideal environmental flow policy is the 1998 National Water Act for South Africa. We discuss it in some detail in our Rivers for Life book. It has brilliantly illuminated a pathway for other governments to follow.

The South Africa water law explicitly designates a Reserve of water in each river basin, comprised of two parts: a) providing for the basic water needs of every individual living in the basin; and b) protection of the river and lake ecosystems. The amount of the reserve required for ecosystem protection is to be determined by a scientific process involving inter-disciplinary scientists, and it will address both low flow and high-flow needs, as well as the level of flow to be protected in drought conditions. The potential weakness in South Africa's water governance is the implementing agencies. "Catchment management authorities" are just now being formed in each river basin, and only time will tell how effective their procedures and skills will be in protecting the water Reserves.

Proposed Policy #3

Any policy for environmental flow protection should recognize that there is no single "right" answer (flow level) for a river or stream. Instead, it should recognize that different levels of environmental flow protection will lead to different levels of ecosystem health. An ideal policy would include a classification of different levels of flow protection (e.g., Levels 1-6, or Classes A-F) and a social, public-participation process to designate appropriate levels of protection for each river or stream segment, similar to what is done for water quality regulation here in the U.S.

The water allocated for environmental flow protection must be explicitly "carved out" and protected in the overall water allocation process -- e.g., a public reserve of water should be explicitly protected (we discuss this concept in Rivers for Life as an "ecosystem allocation") for the purpose of sustaining socially-valued ecosystem services.

Implementing agencies (e.g., state water agencies) must be able to model the potential impacts of any future water withdrawals or infrastructure construction on the environmental flow reserve, and base their permitting decisions on these projections.

I would recommend that the state first invest, in collaboration with science-based agencies such as the USGS, in the development of statewide hydrologic criteria that define how much alteration of natural flow regimes would be associated with different classes of river health (e.g., Class A-F). The state then needs to foster a public participation process that leads to designation of desired health classes for each river/stream segment in the state. Finally, the state needs to have the capability to simulate, using hydrologic models, the potential impacts of any surface or ground water withdrawals and infrastructure (i.e., dams) on the natural flow regime of each river/stream, so that it can adequately manage these impacts consistent with the desired river health class.

Pros/Cons of Proposed Policy #3 (Richter)

The development of statewide hydrologic criteria would help to clarify, and communicate, what happens to a river or stream as we increasingly alter its natural flow regime. If a simple, easily-understandable framework could be developed and presented to the citizenry and decision-makers, they could collaborate in a public process to decide what level of health they want to protect, and water managers/regulators would know what level of protection is necessary to achieve those river health goals.

POLICY #4

Policy Proposed by Bob Scanlon

Discussion of Status Quo and Alternatives

I have been asked to respond to the instream flow policy issue from the prospective of the State's municipal governments. When we speak of municipal water permits we are actually talking about all permits for public water and wastewater systems not just those operated by cities. Depending upon whose data you look at, GA EPD's or USGS's, either municipal or agricultural permit holders as a class are the largest consumptive users of water in the state. Based upon the US Geological Survey's usage estimates, which include estimates of self supply (single household wells) 92% of Georgia's household and commercial water usage is provided by municipal systems.

Rather than suggesting a specific instream flow policy I'd like to discuss some of the policy considerations that should be included in a statewide instream flow policy. Effective public policy for the allocation of any natural resource is of necessity a blend of politics, economics, and science, and the scarcer the resource the more critical it is to understand the science behind it. Permits, whether for withdrawal from, or discharge to a stream are by definition permits to alter natural flow, so the policy decisions are not whether or not natural flows can be impacted, but rather how much.

In order to assure that the resource is managed in a sustainable manner as required by the guiding principles outlined in GA Code, 12-5-522, it is critical to understand

the downstream impacts of the water use (science). This being said, politics and economics are not likely to take a back seat in the debate.

Should instream flow policy be the same for all stream segments in the state? Existing permitting policy provides an option to assess impacts based on a percentage of mean annual average stream flow. Should these percentages be the same in the headwaters, where flows are small, as they are further downstream where flows are greater? A suggestion has been made to possibly accept a higher level of impairment in some river segments; much as we use zoning to separate desirable and undesirable land uses. This would clearly be a case where politics and economics trump science, but could it be done in such a way to avoid sacrificing all down stream basin quality? Can we use scientific studies to minimize the downstream impacts of upstream policy decisions which were heavily influenced by economics and or politics?

How should instream flow policy be reconciled with inter and intra basin transfer policies. Are impacts of basin transfers always negative, or could a transfer from a high flow basin to a lower flow basin provide a means to restore downstream ecological health and provide downstream water resources for a basin which may be overused in its headwaters? These questions raise serious political and economic issues but may provide opportunities to balance shaky regional water budgets.

Georgia is a water rich state and average rainfall is even heaviest in the North Georgia mountains near where most of the people live and where we find the headwaters of most of our major river basins. Three quarters of the states population live above the fall line and nearly all of them are dependent on surface water for even their most basic water needs. Most of our population has elected to live at the top of the hill. The challenge of the Comprehensive Plan is to assure that they have the water they need while also providing for the needs of downstream users in Georgia and neighboring states. We have plenty of water in this state but it is not necessarily where we want it when we need it; which is why it is critically important that we develop a comprehensive statewide plan based upon accurate assessments of our water resources and realistic projections of future needs. Projections of future demand should include aggressive wastewater recovery efforts and aggressive conservation plans. The most recent drought reminded us of the limits of our water resources. Many of the policies needed to regulate the impacts of our water use need to have a strong scientific foundation and therefore should be developed as a part of the comprehensive plan.

I would recommend that we maintain the status quo with both instream flow and inter/intra basin transfer policys until the final comprehensive statewide water use plan is being developed and we have insight into the issues involved with each basin, and that new policies if needed, be promulgated as part of the plan.

As a representative of a municipal utility I would be remiss if I did not take this opportunity to also address an additional policy issue. During this years legislative session we heard discussion of municipal water permit holders getting a “Free” benefit by their use of a “Public Asset”. Municipal utilities do not accrue benefits they merely provide the public with convenient and efficient means to access water resources. Nine out of every ten Georgians receive their household water from public systems. Suggesting that allowing someone the use of water (permitting either water supply or a waste load allocation) is denying someone else the use of that water is inconsistent with the regulated riparian principles under which Georgia regulates, and hopefully will continue to regulate, water use. To define Georgia’s waters as a public asset should not imply that each citizen holds a right to an equal share of the waters of the state, but rather that the waters of the state should be managed in the common interest of the citizens of the state following regulated riparian principles which are consistent with the theory of the law of commons.

POLICY #5

Policy Proposed by Billy Turner

Issues for Sustainable Water Resource Management

1) Data. Streamflow, ground water levels, and water quality data must be the solid basis of the Georgia Water Plan. These data must be used to establish the basic availability of water resources in the various parts of our state. Watersheds and aquifers have a very specific yield. The first step in our state water plan would be to establish the yield of each stream and aquifer. Where sufficient data don't exist then scientific modeling or extrapolation should be used. While this is a dynamic process as more data are gathered, there should be a central source for this yield data that everyone should use.

2) Quality vs Quantity. In managing water resources, water quality and water quantity are inseparable in most cases. However due to the Federal regulations, an extra focus has been place on water quality impacts with very limited focus on the impacts of water quantity. While Georgia requires a water withdrawal permit, this withdrawal permit is not connected to how, when and in what amounts the withdrawn water is returned to the source. Requirements for the withdrawing party to address and where possible to assume responsibility for water return to the source of withdrawal would be a positive step in our water policy.

3) Floods and Droughts. These extreme conditions are a natural part of the water cycle. It is these conditions that always seem to get the attention of the public and create strong negative reaction toward the agency or organization

who we think could or should have planned for them and therefore resolved their impacts. We do a pretty good job with this on the water quality side due to the requirements under the National Pollution Discharge Elimination System (NPDES). Floodplain zoning in recent years and some storage in Federal reservoirs have also addressed these extreme water situations. It is not as clear as to how withdrawals impact these extreme events. Even though these extremes occur less than 10% of the time, our Water Plan should address these situations because of their significant impact.

4) Septic Tanks and Water Conservation Tools. These are major elements of water resource management, but their impacts may have unintended impacts. Septic tanks, while a useful tool in water quality management for individual houses and other small water users, return little or no flow to surface streams during droughts. Low flow toilets and shower heads have received so much focus as water management tools we fail to address their related impacts. These low flow devices are mostly touted in areas where water demand has exceeded or is approaching available water supply. The result of these devices is usually to provide capacity for additional water usage not to provide water for return to the stream or aquifer. With each increment of increased water usage an additional increment of consumption is often produced which, when viewed from the downstream prospective, is an actual loss of water resource. Water reuse is a conservation tool that returns wastewater for an additional turn in the water supply cycle. If the reused water is put to a high level of consumptive use such as golf course watering, cooling water, or right of way watering the net effect on the water returned to the stream must be evalauated.

5) Managing Water Use. The State identifies water use in several categories such as municipal, industrial, agricultural, commercial, recreational, hydropower, steam power, nuclear power, habitat management, navigation, etc., for the purpose of developing regulations, rules or plans for water management. The rules could be simplified if all water usage were addressed in the same way considering: (a) its water consumption (withdrawal vs return) and (b) its water quality impacts (NPDES for individual users and TMDL for watersheds or sections of streams).

6) Water Storage. There is a need to evaluate the impacts of instream or off stream storage because of their potential impacts on the availability of water resources. These can impact the resource both positively and negatively in extreme as well as normal times. Therefore in developing any instream or off stream storage, rules or criteria must be available by which to judge the impact on the water resource.

7) Downstream Perspective. As a manager of water downstream of major storage and withdrawal users, I would offer two criteria for judging impacts. These are: (a) which uses are consumptive such that the water is partially or totally removed from the stream and not returned, and (b) how storage is used to modify the flow regime on an hourly, daily, monthly, seasonal or annual basis. Criteria should be developed to determine what are the acceptable water resources modifications due to both instream and offstream water storage.

POLICY #6

Policy Proposed by Kathryn Hatcher

Policy: Withdrawal = Discharge during Droughts

Policy Description. This proposal is a modification of the current policy, which requires water withdrawers to stop their withdrawal when the streamflow drops to the threshold drought level streamflow. For the proposed policy, called the Withdrawal=Discharge Policy, the withdrawer could continue withdrawing but with a reduced withdrawal set so that the withdrawal rate (mgd) equals the wastewater discharge rate. The withdrawer would then cause no net change to the streamflow below the discharge point in the stream.

Pros and Cons. The disadvantage of this proposal is that during droughts, the streamflow may be depleted between the withdrawal point and the discharge point, with temporary impacts to the aquatic ecosystem in the depleted stream section. However, the length of depleted stream section can be made very short by locating withdrawal and discharge pipes close together, but still sufficiently apart to prevent intake water contamination.

The advantage of this proposal is that it likely has less ecosystem impact than the existing policy. The consequence of the existing policy, which requires stopping stream withdrawal during low streamflow periods, is that withdrawers must build enough water storage to get them through the period of no withdrawal. The higher the level of protected streamflow, the larger the amount of storage (reservoirs) needed. The storage is typically a reservoir, which may be built on the stream or as an off-stream reservoir. The onstream reservoir permanently impacts a longer section of stream (under the dam, under the reservoir and below the dam) than the stream section which would be temporarily impacted under the proposed policy. The reservoir impedes fish migration every day for 100 plus years, whereas the proposed policy only temporarily hinders fish migration a few days per decade during droughts. The reservoir traps sediment and causes other environmental impacts, which do not occur under the proposed policy.

Under the proposed policy, where withdrawal = discharge during drought, withdrawers would still require some water storage, enough to make up for their consumptive loss during the period when the streamflow is

below the threshhold flow, but this storage is much smaller than that required under the existing policy. A smaller amount of required storage means that alternative storage plans such as off-stream storage are more feasible. Also, the consumptive losses (and hence the storage required) could be minimized by water conservation policies limiting outdoor water use and other consumptive losses during the drought periods. The proposed withdrawal=discharge policy would have lower costs to provide water storage for use during drought, since only enough storage to replace consumptive water use is needed, rather than enough storage to provide for the entire water use during a drought. For a municipal water supplier, the existing state policy requires roughly 5 times as much storage as the withdrawal=discharge policy and so creates a boom for reservoir construction.

In evaluating 404b permits for reservoir construction, the USACE is required to only issue a permit for the least environmentally damaging practicable alternative. It is likely that reservoirs which are designed to provide the full withdrawal amount for duration of the drought (when streamflow below threshhold) will have greater environmental impact and greater cost than feasible alternatives available under the withdrawal=discharge policy. Reservoirs designed under the existing state policy probably do not meet the Clean Water Act's Section 404b test of being the least environmentally damaging alternative to meet water supply needs.

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