Meeting Summary

Instream Flows Ad Hoc Meeting
December 7, 2010
Macon, GA

Introduction

Becky Champion, Assistant Branch Chief with EPD working with the Coosa-North Georgia Water Planning Council, provided a welcome to the group. At the last Coosa-North Georgia Council meeting, there was a request for more details on the science regarding instream flows related to the resource assessments. This ad hoc meeting was convened as members of several councils asked for similar information.

Gail Cowie with EPD provided an introduction and reminded everyone that the meeting is a work session for Council Members. The meeting is intended to support the writing of the Regional Water Plans by the Councils, provide an opportunity for Councils to gain better understanding of the resource assessments, and ask more detailed questions of experts regarding instream flows. There will be an opportunity before lunch and at the end of the day for comments from the public.

Background: Instream Flow Provisions in Georgia and Other States

Nap Caldwell with EPD provided a presentation regarding current instream flow criteria in Georgia.[1] This presentation summarized where we have been and what we are doing, not where we are going.

In the early 1970s, the passage of the Clean Water Act and the Georgia Water Quality Control Act created a platform for permitting. There were a number of wastewater treatement plants being constructed to control organic pollution into the receiving streams. These plants were designed and operated based on assumptions regarding certain minimum instream flows, with permitting decisions made to protect water quality. Withdrawal permits at the time relied on annual 7Q10 as the requirement.

In 1977, the goal of minimum instream flow requirements was to protect the WWTP discharges and not necessarily protect aquatic habitat. From 1977 to 2001, the following alternatives were used: lesser of annual 7Q10 or inflow; lesser of non-depletable flow or inflow (to protect downstream wtihdrawls from actions upstream); or other metrics defined by the Director.

In 1982, DNR's Wildlife Resources Divison (WRD) began looking at the annual 7Q10 instream flow policy requirement. Drawing from 1997 recommendations, the DNR Board adopted an interim instream flow policy that was used in 2001 and beyond. Three alternatives are used in permits:

(1) Lesser of monthly 7Q10 or inflow;
(2) Flow based on site-specific instream flow studies; or
(3) Mean annual flow (MAF) options. For applicants proposing direct stream withdrawals with no reservoir, the lesser of 30% MAF or inflow. For applicants proposing withdrawals from a reservoir, the lesser of 30% MAF (for July-November), 60% MAF (for January-April), 40% MAF (for May, June, or December) or inflow.

[1] Presentations and handouts from the meeting are available on the Statewide Water Planning website (www.georgiawaterplanning.org).

Q: Are the instream flows you're describing the same as the unimpaired flows used in the Surface Water Availability model?
A: Nap responded that the unimpaired flow data were not available when the interim instream flow policy was developed. Permitting decisions are based on observed flows. The resource assessments use a series of monthly 7Q10 based on unimpaired flows.

Q: Is the 7Q10 in the resource assessments based on gage data?
A: Nap responded that the unimpaired flow is calculated based on adjusting the gage flows to remove the human impacts on these flows over a number of years.
Q: Please confirm that the actual gage data were not used.
A: Nap confirmed that the gage data does not have the benefit of the operations performed by EPD to develop the unimpaired flows.

Gail Cowie distributed a handout summarizing instream flow policies in neighboring states.

- Florida – complex system mainly related to their 5 District structure. The goal is to prevent harm to water resources. Establishes the functions of the water resource and the instream flows are designed to protect that functionality. They use a pattern of flows over a year (hydrograph). The instream flows are used for planning and permitting.
- Alabama – regulate wastewater discharges based on annual 7Q10. No water withdrawal permitting or other instream flow provisions.
- Tennessee – recently added instream flow considerations to state water quality standards to meet the fish & wildlife habitat criteria and support recreational uses.
- South Carolina – new water withdrawal permitting requirements that requires looking at minimum instream flows and also accounts for downstream users needs. Requirements look at seasonal instream flow needs.
- North Carolina – address through state water policy acts that requires site specific studies for withdrawals of a certain size. Minimum releases from dams also varies based on physiographic province, stream size, and condition of aquatic habitat. A 2008 Act requires hydrologic modeling to evaluate ecological flows for all river basins across the state that will be used of regional water planning.

In summary, each State considers instream flows differently. The differences between States are related to how they manage resources and when their instream flow policies were adopted. Seasonal variation is a trend as well as approaches that respond to the different uses or characteristics of water resources versus one set standard.

Q: Who performs the instream flow studies in North Carolina?
A: Gail Cowie responded that the NC state regulatory agency does (NC Department of Environment and Natural Resources).

Identifying Resource Values and Instream Flows to Support Them

Gail Cowie introduced Mary Freeman who is with US Geologic Survey and who is on the Scientific Engineering and Advisory Panel (SEAP), because she is nationally recognized for her understanding of instream flows in Georgia.

Mary began her presentation by describing flow-dependent values and flow variations. Flow-dependent values may include: water supply, waste assimilation, power production, navigation, recreation, fisheries, and biodiversity. Low flow protections support uses like navigation, water supply, and waste assimilation. Recreation, fisheries, biodiversity and other natural resource values, however, are generally maintained by variability in flows. It is the alteration of natural patterns of flow that impact fish and other organisms, not necessarily the flow level. Flow variability includes seasonal variation, high and low-flow occurrence (floods and droughts), and variations from year to year.

Flow regimes are naturally variable. A continuum of flows, from high to low, are important from an ecological perspective. High flows are important for sediment transport and shaping the channel, maintaining the floodplain. High flow pulses are important for connecting upstream and downstream areas, allowing for migration and connection the floodplain to the stream. Habitat formation occurs during high flows but the animals migrate during the moderate flows. Low flows are important for fish reproduction and growth, plant growth and seed germination.

Variation of wet to dry years is also important. In wet years, there is high reproduction by some migratory fish but these may not be good years for juvenile survival. Dry years provide good juvenile survival for some fishes because of long stable periods of low flow in the stream margins. Dry years are good for migratory fishes, fish-eating birds, establishment of flood-sensitive plant seedlings, algae & sediment build-up, but not as good for canoeing.

Mary provided an overview of the surface water availability resource assessments as they relate to instream flow needs. There are 39 different planning nodes that have daily time-step data. The resource assessments are based on unimpaired flows, which are observed flows with most human impacts removed. The Interim instream flow policy of monthly 7Q10 or unimpaired flow was applied at the unregulated nodes and the requirements for flow from dams were applied at the regulated nodes.

Mary Freeman commented that the resource assessments provide a good hydrologic basis to look at how resource values may be affected by current or future water use. In the resource assessments, if the instream flow falls below the 7Q10 or unimpaired flow, then there is a gap. The assumption is that the need for instream flow protection is during the low flow extremes. Mary feels the resource assessments provide the Councils with a lot of good information. There are some planning nodes where, under current or future water demand scenarios, drought conditions are seen more frequently in the model results than under natural conditions.

The resource assessments, however, don't currently assess flows during non-drought conditions. Looking at any node with a gap, especially if there is a big gap, there is water consumption somewhere in the basin that causes the more frequent or more severe drought conditions than natural. Conversely, however, just because there is only a small or no gap doesn't mean that conditions aren't coming very close to the threshold. Understanding how much flow is really altered requires looking at flows during non-drought periods as well.

Q: Is that an answer to the data needs question, that Councils need to understand the flows during non-drought conditions to assess flow alterations?
A: Mary Freeman responded that the information currently available looks at low flow conditions and not at the higher flows, so Councils could request information for higher flow regimes. Councils may also recommend information be developed for the next round of planning.

Q: Current permits already grant a certain level of water withdrawals. I think my Council should proceed cautiously with identifying management practices if the impacts to streams are uncertain. The management practices could negatively affect businesses and therefore should be carefully considered. How do the Councils proceed if the information is not available?
A: Gail Cowie reminded the Council members that EPD Director Barnes has described this round of regional planning as a discovery process. One of the important elements of the regional planning process is the assessment by the Council of what is known and unknown. The Council can identify the resources that are most important to the Council and then recommend that EPD study how the current/planned activities will affect flow for future rounds of planning.

Comment: The constraints of each Council and within each Council will be unique.

Q: During drought years, it is clear that upstream actions could affect downstream flows, but conversely actions downstream could affect upstream water availability as well, right?
A: Mary Freeman agreed.

Q: Do Councils really have an opportunity to develop regional standards as the instream flow policy is statewide?
A: Gail Cowie responded that, while there is state-level regulation of instream flows, the task ahead of the Council is to look at their region. Councils can establish regional goals and identify priority water resources for further study.

Q: Will the State defer to the Regional Water Plan?
A: Gail Cowie responded that the Regional Water Plans, once adopted, will guide EPD permitting. Plans may also include recommendations to the State.

Comment: The natural evolution from other states seemed to start with state-level policies and then progressed to regional policies as more data became available. If water is already allocated to the minimum level, then there may not be an opportunity to adjust demands to a level that is more suitable for the specific conditions. How can Councils change conditions if the permits are already written? The environmental perspective is that provisions for additional instream flows need to be made now or the resource will be over-allocated so that there is no room for protection.

Comment: This discussion is not directly related to permitting or regulatory issues. Councils might be more comfortable moving forward if it was clear that the flow regimes are for informational purposes only.
A: Mary Freeman appreciated the comments. The focus is not on changing State-wide regulations and policies. The Councils need to know how to protect the resources most important to the water planning region. Protecting these resources includes considering the effects of flows and the needed mix of high and low flows. Some changes in flow regime may be acceptable. It is very difficult to make predictions about flows under future conditions.

Mary Freeman continued her presentation and showed a graph from a paper published last year by Brian Richter, a member of the SEAP who works world-wide on water allocation processes. The hydrograph shows annual flow variations. Conceptually, there are sustainability boundaries. For a given resource and functionality, it is possible to alter flows without harming the resource's functionality. Adding too much or depleting too much water, however, may yield an unacceptable result. The concept is very helpful in demonstrating the complexity.

At a specific node, the degree of change from unimpaired flows could be calculated, either as seasonal or monthly or for "typical" high and low flow scenarios. The percentage of change from unimpaired flows can be evaluated and resulting changes in ecological conditions can then be hypothesized. From an ecological perspective, there will not be a one-size-fits-all solution because the solution depends on what functionality is being protected and the specific conditions of the stream.

Q: In rivers dredged for navigation, like the Chattahoochee River, shouldn't the Councils look at the navigation needs, needs of specific fish, and the human needs and then evaluate management practices based on these conditions?
A: Mary Freeman agreed that water planning should not be done for one resource in isolation without looking at other resource needs.

Comment: The City of Griffin has a current challenge related to pigtoe mussels. A hurricane "flushed" the mussels downstream. There are unusual occurrences, like hurricanes, that affect natural resources. It is tough to plan for these unusual occurrences.
A: Mary responded that planning for the long-term viability of species is an important but different issue. Typically, those plans look at the range of conditions for species across the landscape.

Comment: The challenge is to identify data needs for the future. It seems that unimpaired flows are a tool for looking at the future along with real data.

Comment: It is an interesting consideration, natural conditions changing outside of the Councils' control.
A: Mary Freeman responded that the concept of adaptive management has become more popular because it allows for responses to unforeseen conditions.
A: Gail Cowie added that the State Water Plan calls for the review and revision of the Regional Water Plans every 5 years. The revisions could include changes in forecasts, resource assessments, or other changes. One of the present tasks for the Councils is to identify benchmarks that will be used during the 5-year update to assess whether progress toward the goals has been made.

Q: Can we get a briefing from the DNR staff in attendance on stream conditions based on the ongoing stream surveys? I'm interested in the general condition of the streams based on impaired or unimpaired populations. The current conditions are important for estimating the need for restoration.
A: Patti Lanford with WRD will give a presentation following lunch on this topic.

Q: Are there studies of species regeneration after drought? Water pollution may be a bigger issue than low instream flow.
A: Mary Freeman responded that the stream will change and species will be lost if there are only all wet years or all drought years. There have been some specific studies regarding re-colonization of species over time following drought. It is important to remember that droughts are natural occurrences.

Q: Is it possible to separate the man-made influences and the natural variations?
A: Mary Freeman discussed a study that assessed fish communities just below water withdrawal locations as well as just below urban (impervious) areas. Mary has done a study which showed a decline in fish community condition as the size of water withdrawals increased relative to the size of the stream. Fewer stream-dependent species were found and instream flows were lowest where the permitted withdrawals were highest. Mary said the results suggest a hypothesis: As withdrawal capacity out of the

stream increases, flow variability decreases. The biggest losses have been seen downstream of reservoirs because of the lack of variation in flow.

Q: Did your study considered the seasonality of withdrawals? One of Griffin's withdrawal points is only used during the rainy season so it would not aggravate low flow conditions.
A: Mary responded that this was not part of the study. She added that there wasn't gage data available for the 28 sites studied. The study did look at the withdrawal records and noted the large variation. There was a lot of scatter and site-to-site variability. The study did compare the size of the permitted withdrawal related to the size of the stream.

Comment: There are specific concerns for the Towaliaga River related to meeting TMDLs and low instream flows. Upstream reservoirs and proposed withdrawals will aggravate the current low flow conditions during drought.

Q: Was there a comparison of the downstream and upstream fish assemblages in the study Mary discussed?
A: Mary Freeman responded that was not part of the study.

Comment: Instream flows affect all downstream users and not just natural resource considerations. All human, industrial, and natural users downstream benefit from greater flows in the River.

Mary concluded by noting that there are potentially many stream reaches with values that are not reflected in the resource assessments. One example may be the Wildlife Resource Division's priority waters. The resource assessment nodes are not at locations that evaluate flow changes in these reaches. A potential for the future would be to add additional assessment nodes to assess specific values that depend on instream flows.

Information Needs

Gail Cowie provided additional information related to questions from the morning session. First, there was a question about whether or not EPD was open to the concept of different instream flow policies in different parts of the State. Gail commented that yes, the interim instream flow policy currently provides flexibility for site-specific studies. EPD's Regional Planning Guidance also gives Council's the flexibility to look at flow regimes that are higher than monthly 7Q10.

EPD received comments on the draft current resource assessments requesting comparison of assessment results using monthly 7Q10 with those using the 30% mean annual flow option, also provided by the interim flow policy. Based on these requests, EPD is completing this analysis and it will be sent to the Council members and stakeholders either late this week or early next week.

Gail also added that during the morning discussion there were several comments regarding instream flow for regulated nodes with facilities operated by the Corps of Engineers. These regulated nodes have very different management considerations. It is important to distinguish between regulated and non-regulated nodes.

Q: Are there any real world examples where the 30% mean annual flow is lower than the 7Q10 flow?
A: Mary Freeman responded that it depends on whether you look at monthly or annual 7Q10. In the winter months, the monthly 7Q10 is typically higher than 30% mean annual flow. Nap added that

except during the high flow months, it was unlikely that there would be a circumstance where the annual 7Q10 would be higher than the 30% MAF.

Comment: Based on the discussion in the morning, it appears that the level of water (depth) may be more important than flow.
A: Mary Freeman – Flow is really important for some aquatic life. To support fish passage, typically the criteria are based on the height of water in the shallowest portion of the stream. The function being evaluated will dictate whether the level or flow is more important, but both are important. Woody Hicks added that flow and stage/level are also tied to one another and the relationship between these two parameters changes over time. The Florida instream flow protocol considers both flow and level. Woody recommended that any future instream flow policy recommendations consider both flow and level as both are important to protecting stream health.

Comment: The majority of the existing water withdrawal permits are based on annual 7Q10 minimum instream flows. Only a handful of new permits have been issued under the existing interim policy. The Councils should consider addressing the grandfathered withdrawals that are permitted using the annual 7Q10.

Gail Cowie introduced Patti Lanford to give an overview of the state's fish monitoring program.

Patti Lanford explained that she is a fish biologist with the Fisheries Section of the Wildlife Resources Division (WRD) of DNR. She assesses the fish assemblages in wadeable streams in Georgia. The quantity and type of fish species are used by the state in the TMDL process. To date, they have assessed almost 1,000 streams. The streams are assessed using the Index of Biological Integrity (IBI). The streams that rate poor or very poor are considered impaired. Assuming the stream water quality follows a normal distribution, then approximately 65% of the fish community scores would rank fair or better and about 35% of the scores would be poor or very poor. The actual monitoring results have a higher percentage of poor and very poor sites compared to the theoretical normal distribution.

The fish sampling results are available by ecoregion. Streams in the Appalachian Mountain, Blue Ridge, and Ridge and Valley Provinces tend to score higher, while the Piedmont and South Georgia Provinces tend to have more impaired streams. The differences in ranking are probably associated with the levels of development.

Q: Is the definition of an impaired stream in the Blue Ridge Province was the same as for the Coastal Province?
A: Patti Lanford responded that the criteria are dependent on the ecoregion, river basin, and other site-specific criteria.

Q: Is a dam considered an impairment?
A: Patti Lanford responded that although dams may impact fish communities and/or water quality, a dam itself is not considered an impairment.

Q: Do the fish assessments compare the IBI scores for urban and rural areas?
A: Patti Lanford responded that the IBI scores consider whether fish are pollutant tolerant (hardy) or not. If all of the fish identified in a stream are tolerant to pollution, then the stream is likely impaired. The impairment may be from urban areas. The ranking depends on both the type and number of fish.

Q: Do you also look at macroinvertebrates, as they are also good indicators of habitat quality?
A: Patti Lanford responded that macroinvertebrate monitoring is performed by another group within DNR. The fish assessments have been done longer than macroinvertebrate monitoring, so the fish data are much more extensive.

Q: Do these results just look at streams with fish impairment and not streams with other types of impairment?
A: Patti Lanford responded that the metrics incorporate some additional factors, such as water quality, into the ranking.

Comment: The Adopt-A-Stream program assesses macroinvertebrates because their health is linked to water quality.

Q: Why isn't the goal for streams 100% unimpaired?
A: Patti Lanford responded that this reflects the assumption of a normal distribution.

Q: How can Councils get a list of the fish assessment results?
A: Patti Lanford responded that Councils should request the list through the Assistant Branch Chief working with their Council.

Q: The Councils have maps that show the streams impaired for dissolved oxygen and nutrients. Is there a map for streams considered impaired based on fish assemblages?
A: Gail Cowie responded that the Councils should have a list of all impaired streams, but it would be easy to show those streams just impaired for fish.

Q: There are federal requirements that streams meet their designated use. Are there Council obligations to meet these requirements and how will the Regional Water Plans be assessed by the federal government?
A: Gail Cowie responded that the state has programs to address the federal requirements. Each Council should have received a list of the impaired streams. The Councils can look at adding provisions in their Regional Water Plans to address and restore these streams. There will not be federal oversight of the Regional Water Plans.

Mary Freeman commented that the Councils may choose to identify the stream reaches that they care to protect (due to state protected species, federally protected species, recreational uses, etc.). If there are values the Council wants to protect, the resource assessment models can show how much the flow shifts from unimpaired flows in addition to showing how often they drop below minimum instream flow. However, detailed information on, for example, the change between high spring flows and the number of spring bass in a specific river may not exist. Aquatic systems are complicated and the Councils may never have that level of detail. If the Council identifies the values to protect, the models can be used to get a rough idea of the probability of change in those values.

Options for Council Consideration

Gail Cowie stated that the intent of the final portion of the agenda was for Council members to discuss language that might be considered for inclusion in the Regional Water Plans.

Comment: Determining the future flows needed to protect aquatic species is uncertain. There is a struggle between reactive and proactive planning. Despite good planning, there is still a need to react to the natural flow variability.
A: Gail Cowie commented that planning for rivers with impoundments it is a very different problem. For streams without impoundments, being less reactive may help protect the values important to those who use those streams. Councils can consider their priorities for the most important streams to assess in greater detail.

Q: Can we expect more reservoirs to be built that depend on off-stream flows?
A: Gail Cowie responded that building reservoirs on smaller streams that are augmented by pumping bigger streams is one of the management practices under consideration by different Councils.

Comment: Reservoirs permitted in upstream communities will affect the downstream communities and downstream communities may also affect upstream communities.
A: Gail Cowie responded that the permitting process considers the impacts on other users. This may be a thought process to include in the Regional Water Plan. For example, Councils may want to direct any off-stream storage away from priority areas.

Q: How about the amount of water that Florida wants out of Lake Seminole? If high and low flows are good, would that not also be the case for flows out of Lake Seminole?
A: Alice Lawrence with the US Fish and Wildlife Service in the Athens, GA office responded that the 5,000 cfs flow is the historic flow based on low-flow gage data from 1928 to 1950s when Woodruff was built. The flow requirement is also tied to the coal-fired plant downstream.

Gail Cowie asked the Council members if there are data needs to improve the next round of Regional Water Planning.

Comment: There is a concern that water resources in the Lower Flint-Ochlockonee Council are already over-permitted. The water users in the region are working hard to reduce their water demands but that may not be enough.
A: Gail Cowie responded that there are alternatives being considered to address the periods where the low flows are lower or longer than they would have been otherwise. Practices include groundwater augmentation and adjusting the current mix of water sources, among others. The guidance from EPD Director Barnes is to identify practices to move toward closing the gap. Practices may include recommendations to the State on things that should be changed.

Comment: The resource assessment models should be based on permitted and not peak withdrawals. The assumptions behind the resource assessment cause some concern; gaps will be more manageable with some changes in assumptions. Not including Alabama's withdrawals from the Chattahoochee River in the energy data is also a concern. The nutrient data from Florida is also not included, which makes it hard to set regional standards or deal with instream nutrients. Councils will have difficulty writing the Regional Water Plan given the concerns with the resource assessments.

Q: Who will revise the Regional Water Plans in 5 years?
A: Gail Cowie responded that the State Water Plan specifies that the Councils will review the Regional Water Plans every 5 years. The individuals serving on the Councils may change, as these positions are appointed, but EPD and the Councils have roles in review and revision.

Q: Why didn't EPD place a moratorium on permitting actions until the Councils completed their Regional Water Plans? Withdrawals for Plant Washington and the City of Forsyth are moving forward concurrent with the Regional Water Plans.
A: Gail Cowie explained that the Regional Water Plans will be based on the best available data and the State Water Plan explicitly states that water management decisions should continue to be made based on the best information available at the time. As data and information are improved, through regional planning and after, that information can then be used for decision making.

Q: How will the information presented today be shared with the rest of the Councils and Council members who are not in attendance?
A: Gail Cowie responded that the meeting summary and the presentations would be posted on the EPD website.

There were no more questions or comments and the meeting was adjourned.