NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION

WATER ALLOCATION COMMITTEE
MEETING AGENDA

512 N. Salisbury Street
Archdale Building
Raleigh, NC
Ground Floor Hearing Room

Time: 9:00 a.m. – 11:00 a.m.
Wednesday, September 10, 2014

Executive Order Number One mandates that the Chair inquire as to whether any member knows of any conflict of interest or appearance of conflict with respect to matters before the Commission. If any member knows of a conflict of interest or appearance of conflict, please so state at this time.

Tommy Craven, Chairman, Presiding

I. Preliminary Matters

1. Call to Order

2. Approval of minutes from the November and July meetings

- The committee approved both the November 2013 and the July 2014 minutes.

3. Revisions or additions to the agenda

II. Information Item

1. **Overview of River Basin Hydrologic Model Approval** **Tom Fransen and Craig Bromby**

- Craig Bromby, with the Office of General Counsel in the Dept. of Environment and Natural Resources, presented an overview of the river basin hydrologic approval process.
- Session Law 143-2010 states that the Department shall develop a basinwide hydrologic model for each of the 17 major river basins in the state.
- The statute states that upon completion of the model, the Department shall submit to the Commission for approval.
- The statute states that a hydrologic model is not a rule, but not how an approved model will be used.
- Nevertheless, comments have been received that express some concern because of the phenomenon of regulatory credence.
- Because of the way the statute was written some interpret the determination of ecological flow effectively becomes the standard.
- The division does not believe this to be the case, but the definition does lend some credence to that opinion.
- The problem with the statute: What it requires is the model includes surface water resources within the river basin including a number of things. For example, groundwater resources, transfers in and out of the river basin, other withdrawals, and ecological flow, as well as many others. However, ecological flow is also a defined term: The model has to be designed to simulate the flows of each surface water resource within the basin. The model shall be designed to predict where and when the following may occur: 1)Yield may be inadequate to meet all needs, 2)Yield may be inadequate to meet all essential water uses, 3) Ecological flow

may be adversely impacted. The problem with that is ecological flow has been determined to be an input into the model and should be compared to the outputs.

- Because of this Craig Bromby researched cannons of statutory construction and the one that applies the most is the plain meaning rule. The plain meaning rule: A court must follow the plain meaning of statutory test, except when the text suggests an absurd result. Asking the division to put in ecological flow as an input, and then compare it to an output, is an absurd result.
- Proposed solution: Have to assume that "ecological flow" as mentioned in (0)(3)a is lowercase ecological flow. For example, if there had been an ecological flow determined for a release from a dam in a 401 certification, that is a specific withdrawal allowance.
- When you look at (0)(3)b that would be an uppercase Ecological flow, which is the Ecological flow provision found earlier in the statute which relates to ecological integrity.
- The comments express that ecological flow could be viewed as a quasi-standard, although it hasn't gone through rule-making.
- Ecological flow is not a standard or a one size fits all.
- Craven: You mention that ecological flow could not be an input because it would affect the model. We could put ecological flow in as an input, but it doesn't enter into the calculations at the node. At any node you would add the inflows and subtract the withdrawals, and the model would then tell you how much was continuing downstream. That value could then be compared to the value that was input in as ecological flow. Don't see how that skews the model. See the definition of ecological flows in the statute, then there is another definition from the Science Advisory Board (SAB).
- Bromby: Definition of 03a, cannot be the same definition as in 03b. This is also what the SAB was struggling with. If you define it the same in both places, it makes a result that isn't real and gives no new information.
- Hutson: There are three things in b3 that the model has to be compared to: 1) all water needs, 2) essential water uses, and 3) ecological flow. Those three concepts seem to be outside the model. The model takes all the inputs, give out a number and the number is compared to those three things. If those three things are outside the model the exclusion from meeting the requirements of the Administrative Procedures Act only applies to the model and not things that the model is compared to.
- Bromby: A question of whether ecological flow was required for the development of model. The way it was just described, probably not. That seems to be an issue and one we have to deal with.
- Fransen: The best way to setup model variables is for those permitted ecological flows and instream flows, to be a constraint in the model. The algorithm will try to take water from somewhere else to satisfy that flow requirement. Fransen continues…
- Models can be a variety of things, small and large. For the context of this statute we are talking about computer simulations to characterize the likely behavior of real hydrologic features and systems. They are primarily used to represent the physical processes observed in the real world. The division's approach is to characterize the likely behavior of the real hydrologic system. This is a standard practice in modeling. Our models are getting international recognition.
- Within the model, we don't put in every stream out there. We only include withdrawals or discharges of 100,000 gallons or more per day.
- There is a difference between ecological flows and instream flows. Ecological flows are a subset of instream flows. Instream flows include ecological flows and other recreational flows, such as canoeing, kayaking and even baptisms. Historically we talked about minimum instream flows, not ecological flows. The models meet the requirements of the statute by including actual permitted ecological and instream flow requirements. DWR wants to characterize the real hydrologic system.
- We know the model won't be perfect, so that's what the validation process is for. The validation process evaluates the models performance and asks: Does the model represent the real system's flows to a sufficient level of accuracy?
- Interstate cooperation: To the extent practicable, the DWR works with neighboring states to develop models for each river basin shared by N.C. and another state.
- Craven: The presentation says that ecological flows are a subset of instream flow requirements. Can see how it used to be, but given the statutory significance, why can't you isolate eco flows separately from the other flows that don't fit the new definition? Are we putting ecological flows in the wrong category?
- Fransen: Include those that are part of a permit. By doing the analysis after the fact, you can customize to unique situations you may find throughout the basin versus something that's hard coded in.
- Hutson: Are there any permits that presently exist to regulate ecological flow?

- Fransen: Most talk about instream flow requirements. Don't think they use the term ecological flow. Would need to research.
- Hutson: The statute says the model must include ecological flow requirements, so wouldn't they be different than instream flow requirements?
- Fransen: Don't know of a specific permit that talks about ecological flow requirements.
- Craven: The education we receive in one presentation should build on the next. Should hold off on any motions until after the series of presentations. Then we can go back and discuss each one individually, or collectively.

III. Action Items

1. Request to Proceed to the EMC for Approval of Tar River Basin Hydrologic Models — Tom Fransen

- The Tar model is the first of the three. All three are similar and also have some differences.
- This particular model uses two models: The OASIS model and the hydrodynamic model.
- Didn't list all reservoirs and streams, but just a summary. Can go back into the model to look at a particular reservoir or stream.
- The figures (arcs and nodes) we have in the report, along with the explanatory text, come from the previous commission's request. Sometimes looking at tables can make it difficult to see how things relate.
- Some numbers may be aggregated (several users off of one node). That may explain why the numbers don't add up in some cases. Taking into account the water movements in one fashion or another.
- The Tar is fairly simple with four reservoirs and some agricultural and golf course irrigation.
- There are two instream flow requirements.
- The 2030 and 2060 withdrawal and return flow projections include 10 withdrawals and 16 return flows.
- There are 11 USGS gages to use and we have information from 33 water systems from their local water supply plans.
- The reason we don't have 33 drought plans is that not every system has a drought plan we can model, but we put those in that we can. Some systems may be tied to groundwater for example.
- This is all summarized on the goodness of fit table as well as the drought statistics that we use.
- We have used flow records from the U.S. Geological Survey; included withdrawals and discharges from local water supply plans; used withdrawal registrations and NPDES permits; held public meetings; and sent out a public notice and received comments.
- This basin is all in N.C., so the interstate cooperation does not apply.
- The noticed was published in the N.C. Register on Jan. 15, 2014 and we accepted comments through March 31, 2014. We received one comment from the city of Raleigh, which questioned the use of models to analyze ecological flows.
- The models are not rules and are for planning purposes only. This means that we will take these results and include them in the basinwide plans.
- Craven: For the record, Raleigh's comments should be classified as multiple comments, rather than a single comment.
- Hutson: Did you not know about groundwater resources, or were they included in the model?
- Fransen: We can separate out base flow, which is the groundwater surface water interaction. From that extent we can look at it. A number of the discharges are groundwater systems that discharge to surface water, so those are included , but we are not modeling groundwater directly.
- Carroll: Included ecological flows as inputs. Are they ever separate entities at any of these locations?
- Fransen If there is a permit requirement, then we put that in the model.
- Carroll: Ecological flows are a manmade creation, as opposed to the real world water that is flowing. Identify flow at input inside of the model, or just understand when and at what conditions according to the model that ecological flow would not be sufficient on the output side.
- Fransen: If there is a non-permit condition, we are checking to see if there will be adequate flow?
- Carroll: Is the model trying to solve for that problem?

- Fransen: Just looking at it after the fact. Did it or did it not? Was Raleigh, for example, able to meet their full demand? Not trying to force the model to meet it. Don't include it as a constraint in the model.

2. Request to Proceed to the EMC for Approval of Roanoke River Basin Hydrologic Model **Tom Fransen**

- One of the 17 required basins. The Roanoke is in VA and NC, so we are modeling the reservoirs and rivers in both states.
- There are four interbasin transfers included in the model. For other withdrawals, there are eight reservoirs. We take into account agricultural and golf course irrigation and there are 15 industrial withdrawals.
- There are eight instream flow requirements, 33 withdrawals and 46 returns.
- There are 11 USGS gages, 44 local water supply plans and drought plans for five systems.
- For the Roanoke we got very good validation, as they all came out as satisfactory. The dataset has been used in two hydropower relicensing projects.
- The graphical comparisons overlay pretty tight.
  - As in the Tar model process, we have used flow records from the U.S. Geological Survey; included withdrawals and discharges from local water supply plans; used withdrawal registrations and NPDES permits; held public meetings; and sent out a public notice and received comments.
  - Worked with the Commonwealth of VA. They have supplied data and reviewed the model. NC and VA have agreed to use this model for joint Roanoke River basin water supply planning.
  - The public notice was published in the NC Register on February 3, 2014 and comments were accepted through April 4, 2014.
  - We received two comments: 1) Duke Energy provided their water demand projections through 2060 and 2) An individual provided information about historical and topographic study of the Roanoke watershed prepared by the VA Canals and Navigations Society.
- This is not a rule and we will be using it for planning purposes only. We are using it for a report on John H. Kerr right now.
- DWR recommends that the Committee approve proceeding to the EMC for approval of the Roanoke River basin hydrologic model.

3. Request to Proceed to the EMC for Approval of Cape Fear-Neuse River Basin Hydrologic Model **Tom Fransen**

- Fransen: This is the first time we've tried to combine two basins, 49 streams, 27 reservoirs, 46 reservoir evaporation, 39 withdrawals, 22 gages, 133 local supply plans. Twenty-nine of the systems were able to meet their drought point.
- The validation came out satisfactory.
- The notice in the NC Register was published in February with comments accepted through April. Three comments were received: One from town of Cary, one from CH2MHill, and one from city of Raleigh.
- The Cape Fear-Neuse Model is being used by the Jordan Lake Partners to do regional planning.
- The division recommends that the water allocation committee approve proceeding to the EMC for approval of the Cape/Neuse River basin hydrologic model.
- Dawson: Other than Duke have there been any other modifications to any of these models since they've been out for public comment?
- Fransen: No changes except for fine tuning with the Jordan lake partners in the Cape Fear-Neuse model
- Hutson: As a part of this model does it include as an input releases from dams?
- Fransen: Yes.
- Hutson: So all these models include whatever the permit needs to be established for releases?
- Fransen: Right. We have 18 instream requirements; those are usually requirements that are associated with the dam.
- Dawson: I haven't heard anyone challenge your decisions on how you constructed this model, is that correct?
- Fransen: That's correct. The Jordan partners are helping us model the system more accurately.
- Dawson: Can you expand a little more on the concern from Raleigh?

- Fransen: One of the nodes I suggested we talk about is called a routing node. How long it takes the water to get from point A to point B. Where we saw the isolation issue was the node upstream from the routing node. Hydrologics has some OCL coding that would help.
- Dawson: Are you convinced that this can be resolved and have you shared the solution with Raleigh and are they comfortable that it will be addressed?
- Fransen: We have shared it with them and in regards to their being comfortable you'll have to ask them.
- Dawson: When you are comparing the models I'm assuming the reason you went to the second model was because of the withdrawal of water from the city of Greenville because they are further upstream just like the Cape Fear region is further upstream. The need for knowing where that saline interface how it moves back and forth, needed the other model, is that correct?
- Fransen: That's correct.
- Dawson: So it's not a hydrology issue it's a withdrawal issue that brings about the need for a slightly different model?
- Fransen: It's a hydrologic issue. When you start dealing with the complex coastal areas and you get the tidal influences, you can no longer make the assumption that flow and stage are directly related to each other.
- Dawson: As population grows, and demand grows there may be withdrawals at some point along other rivers that may bring about the need for this second model.
- Fransen: That's correct.
- Dawson: I've heard no challenges that this model is correct. Want to make sure we aren't selecting the coastal interface model, you might call it, by default, because we're using the one the Greenville area wanted to use.
- Fransen: I think it's the right model to use. It's similar to Catawba so to be consistent with the statute it didn't make sense to go out and create something new.
- Dawson: What's the threshold for the gain in the contribution of groundwater?
- Fransen: We're treating the cut off as 100,000 gallons per day of water or larger. Part of that is the issue of available data.
- Dawson: I suggest you get someone who isn't familiar with those illustrations to help with nomenclature so it's easier to follow, but it's a very useful tool.
- Fransen: I appreciate that. This was Dr. Moreau's area of expertise.
- Carroll: Because of the threshold of 100,000 gallons per day, do you have an estimate for how all-encompassing the models are? What percentage of the total flow is included in the models?
- Fransen: We've done some research, but I don't remember off the top of my head. It's probably between 80-90 percent of the usage especially when we're including irrigation sources. That should be in the basin planning report.
- Craven: Would the officials from Raleigh care to address where we are with addressing the technical issues?
- McLawhorn: I have had different answers than I heard this morning. When we raised the issue about the nodes below Falls Dam and the inadequacy of the model to deal with that was that the model was being changed. The answer you just got was that the model hasn't been changed. Couldn't find the operating instructions for Falls Dam. McLawhorn continues…
- DWR said the nodes issue was being fixed because that section of the river would not be controlled by the nodes and the answers. It was instead controlled by the operating instruction and the release from Fall Dam as it was established to be measured at the Hwy. 42 Bridge, after the water circles through Raleigh and comes out of our WWTP.
- When we talked to DWR in March, I understood that the operating instructions for Falls Dam were not in the model. Today's answer didn't speak directly to the operating instruction, so I'm not sure of the answer to the question.
- There is an elephant in the room today. You've been asked to approve a partial model. No one has discussed what they are going to do when ecological flow is adversely affected because they are separating that into a separate process. As I understand the statute, you have to approve both processes. How will they decide when ecological flow is adversely affected?
- Waldroup: Raleigh and other stakeholders were instrumental in crafting the session law because we were very concerned about ecological flow. We thought the Ecological Flows Science Advisory Board, which

was created to define ecological flows, would decide it was too hard. Instead they came back with a policy, which they are not charged to do. The EMC is charged with policy. Waldroup continues…

- The SAB came back with a presumptive, prescriptive threshold and policy outside of APA. This is the only chance that anyone has a chance to comment.
- Dawson: If we can get the modeling aspects out of the way, then we only have one big subject to deal with.
- Fransen: We have a process in place. Raleigh is one of the Jordan Lake partners and we have encouraged Raleigh to make sure everything in the model is correct.
- Dawson: Are the changes in the scope of the existing contract?
- Fransen: Looking at the maintenance piece, between the two contracts and the expertise we have in house, these issues should be resolved.
- Dawson: Need to make sure this doesn't fall in between the cracks.
- Tedder: It's been well documented that the statute lacks clarity for everyone to be able to move forward with the subject of ecological flows. Agree with Bromby's comments on the issue. The statute needs to be clear and it needs to be revisited by the legislature. Tedder continues…
- A lot of effort has been put into a very tough subject. The data was so severely lacking but the SAB moved forward with a recommendation anyway. That recommendation borders on ad hoc rule-making.
- Wish those involved in the session law could look at some existing statutes with the same issues. Hopefully some steps will be taken for clarification.
- The statute says the commission shall act, not approve the models. I have a motion to move forward after everyone has their time to comment.
- Hutson: Want to thank staff, the city of Raleigh and others in talking with us about this. Bromby made a very good legal presentation. Hutson continues…
- If the term ecological flows was not in that first section that would make it easier to approve the model itself.
- The statute is inconsistent and unclear and needs to be fixed. It is going to be used for planning purposes, but is still going to be used.
- Don't feel that ecological flow is part of the model but something the model results are compared to. If you have ecological flow as general applicability that's a rule and you can only get there by going through rule making.
- Have to decide if you are defining ecological flows generally or site by site. Have real concerns about having a guidepost on ecological flows.
- Tedder: Would like to put forward a motion. **"The Department of Environment and Natural Resources is authorized and directed to work with the General Assembly to specifically resolve the inconsistent and incompatible uses of the term 'ecological flow' in General Statute section 143-355 (o)(3)and (4). Until such time that such issue is resolved, the hydrologic models for the Tar River Basin, the Roanoke River Basin and the Cape Fear River-Neuse Basin are not approved. Until such time that such issue is resolved, the Department is authorized to continue to use the Tar River Basin, the Roanoke River basin and the Cape Fear-Neuse River Basin hydrologic modes in planning decisions and, as required in order to comply with required statutes or rules, to make decisions on permit applications or other matters concerning water allocations; PROVIDED THAT any determination required by General Statute section 143-355 (o)(3)(b) 1, 2, and 3 shall be based on site specific data and shall not be based on any generally applicable standard or value, including but not limited to any generally applicable standard or value for ecological flow contained in or derived from the report entitled 'Recommendations for Estimating Flows to Maintain Ecological Integrity in Streams and Rivers in North Carolina' dated November 2013. If the Department wishes to establish generally applicable standards or values for determining 'all needs', 'all essential uses', or 'ecological flow' for purposes of making the predictions required by General Statute section 143-355 (o)(3)(b), 1,2 and 3, it shall do so by rulemaking proceedings in accordance with the applicable provisions of the North Carolina Administrative Act."**
- The motion was seconded by Commissioner Carroll.
- Craven: Asked if there was any further discussion. There was a unanimous decision on the motion.
- The commission will report this to the EMC tomorrow.

IV. Concluding Remarks

Chairman Craven adjourned the meeting at 10:28 a.m.