

REQUEST TO PROCEED TO EMC FOR APPROVAL
OF CAPE FEAR / NEUSE RIVER BASIN
HYDROLOGIC MODEL

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Water Resources Planning Section

SESSION LAW 2010-143

- AN ACT TO DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO DEVELOP BASINWIDE HYDROLOGIC MODELS
- G.S. 143-355 is amended by adding a new subsection to read:
 - (o) Basinwide Hydrologic Models. - The Department shall develop a basinwide hydrologic model for each of the 17 major river basins in the State as provided in this subsection.

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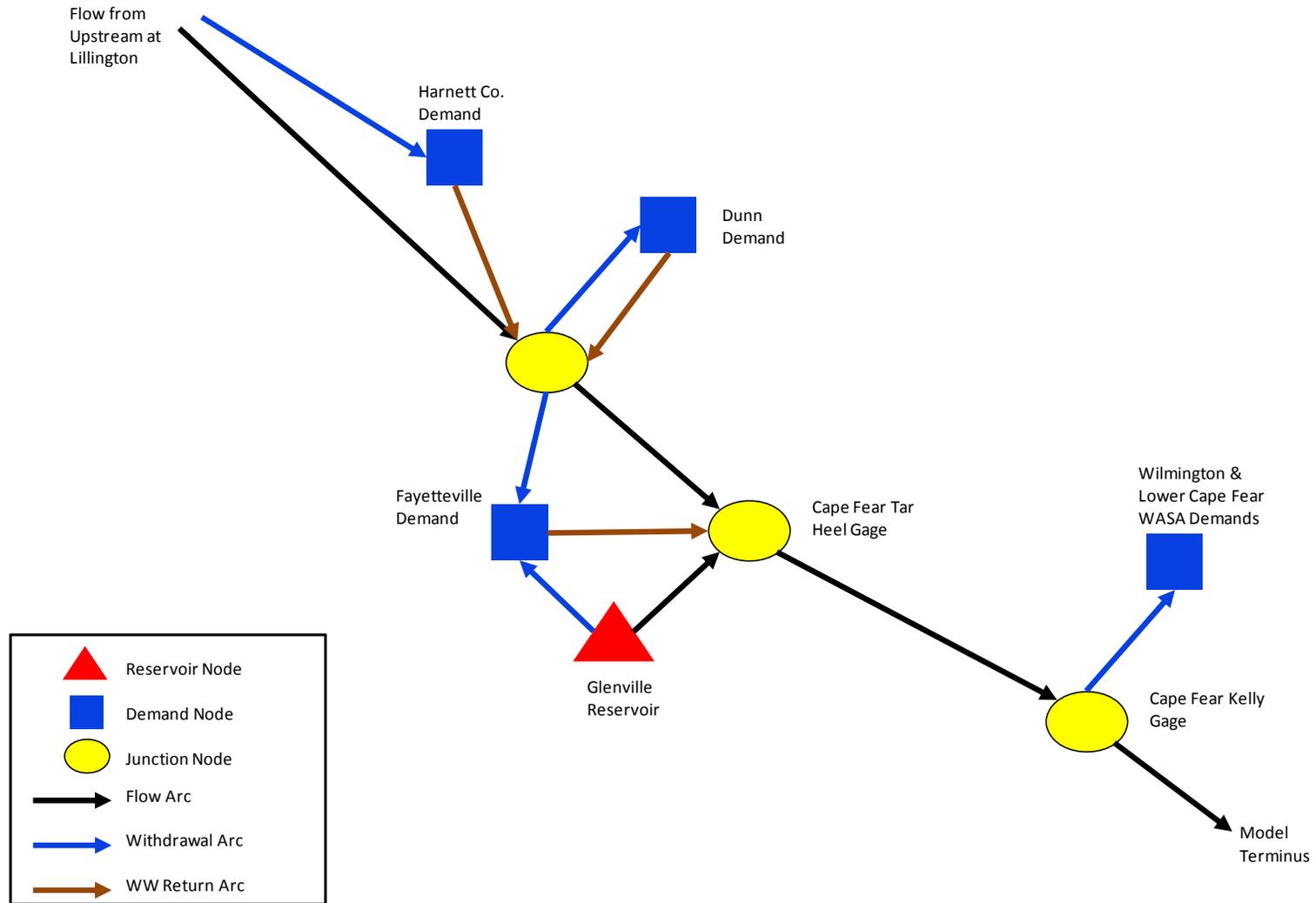
- (o)(3) Model. - Each basinwide hydrologic model shall:
- a. Include surface water resources, groundwater resources to the extent known by the Department, transfers into and out of the river basin, other withdrawals, ecological flow, instream flow requirements, projections of future withdrawals, an estimate of return flows within the river basin, inflow data, local water supply plans, and other scientific and technical information the Department deems relevant.

CAPE FEAR / NEUSE RIVER BASIN HYDROLOGIC MODEL

- Modeled surface water resources
 - 49 streams
 - 27 reservoirs



Flow Chart of Major Nodes in the Lower Cape Fear Basin



CAPE FEAR / NEUSE RIVER BASIN HYDROLOGIC MODEL

- 27 modeled interbasin transfers
- Other withdrawals
 - 46 reservoir evaporation
 - Agricultural and golf course irrigation, 15 industrial withdrawals
- 18 instream flow requirements
- 2020 - 2060 withdrawal and return flow projections
 - 39 withdrawals
 - 54 return flows

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- Inflow data
 - 22 USGS gages
- Local Water Supply Plans
 - For 133 systems
- Other scientific & technical information Dept. deems relevant
 - Drought plans for 29 systems

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- (o)(3) Model. - Each basinwide hydrologic model shall:
- b. Be designed to simulate the **flows** of each surface water resource within the basin that is identified as a source of water ... in response to different variables, conditions, and scenarios. The model shall specifically be designed to predict the places, times, frequencies, and intervals at which any of 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 affected.

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- (o)(3) Model. - Each basinwide hydrologic model shall:
- b. Be designed to simulate the **flows**...
- Validation: evaluation of model performance, i.e., whether model possesses satisfactory range of accuracy consistent with its intended application
- Does model represent real system's **flows** to sufficient level of accuracy?

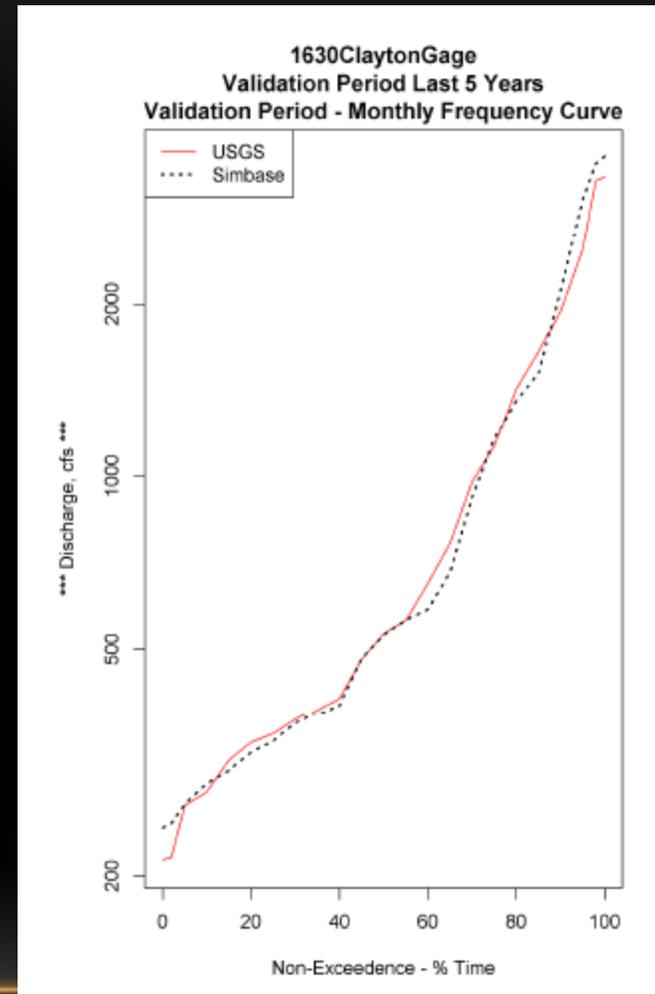
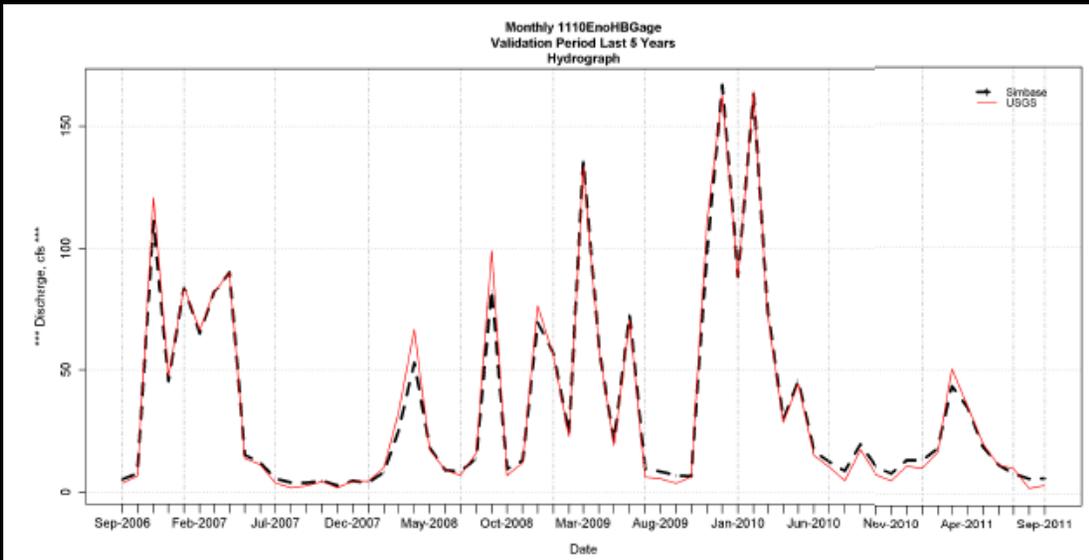
CAPE FEAR / NEUSE RIVER BASIN HYDROLOGIC MODEL

- Validation: statistical tests

Goodness-Of-Fit Statistics Summary Table - CF-Neuse River Basin Gage Flow						
Gages/Location	GOF Results			Drought Period, Days		
	Monthly			Data	Total	% Difference $\leq \pm 25\%$
	NSE > 0.5	RSR ≤ 0.70	PBIAS $\leq \pm 25\%$			
0090 Haw River at Haw River Gage	0.9905	0.0968	1.8	USGS	557	
	Satisfactory	Satisfactory	Satisfactory	Simbase	633	13.64%

CAPE FEAR / NEUSE RIVER BASIN HYDROLOGIC MODEL

- Validation: graphical comparisons



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- (o)(3) Model. - Each basinwide hydrologic model shall:
 - c. Be based solely on data that is of public record and open to public review and comment.
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- ✓ Flow records from U.S. Geological Survey
 - ✓ Withdrawals & discharges from local water supply plans, withdrawal registrations, and NPDES
 - ✓ Public meetings, public notice and comment

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- (o)(5) Interstate cooperation. - To the extent practicable, the Department shall work with neighboring states to develop basinwide hydrologic models for each river basin shared by North Carolina and another state.
- Not applicable for Cape Fear/Neuse River basin

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- (o)(6) Approval and modification of hydrologic models. -
- a. Upon completion of a hydrologic model, the Department shall:
 - 1. Submit the model to the Commission for approval.
 - 2. Publish in the North Carolina Register notice of its recommendation that the Commission approve the model and of a 60-day period for providing comment on the model.
 - 3. Provide electronic notice to persons who have requested electronic notice of the notice published in the North Carolina Register.
- b. Upon receipt of a hydrologic model, the Commission shall:
 - 1. Receive comment on the model for the 60-day period noticed in the North Carolina Register.
 - 2. [Act on the model](#) following the 60-day comment period.

CAPE FEAR / NEUSE RIVER BASIN HYDROLOGIC MODEL

- ✓ NC Register publication February 17, 2014
- ✓ Comments accepted through April 21, 2014

- 3 comments received
 - Town of Cary, CH2MHill: support the model
 - City of Raleigh: Questioned use of models to analyze ecological flows; reported segment of Neuse where simulated flow oscillates

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- (o)(6) d. A hydrologic model is not a rule, and Article 2A of Chapter 150B of the General Statutes does not apply to the development of a hydrologic model.
 - ✓ Cape Fear/Neuse model is not a rule
- (o)(8) Nothing in this subsection shall be construed to vary any existing, or impose any additional regulatory requirements, related to water quality or water resources.
 - ✓ Cape Fear/Neuse model is for planning purposes only

RECOMMENDATION

- The Division recommends that the Water Allocation Committee approve proceeding to the EMC for approval of the Cape Fear/Neuse River basin hydrologic model.

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QUESTIONS ?

