REQUEST TO PROCEED TO EMC FOR APPROVAL OF TAR RIVER BASIN HYDROLOGIC MODELS

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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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TAR RIVER BASIN HYDROLOGIC MODELS

- Two models
  - OASIS
    - Also used for Broad, Roanoke, Cape Fear/Neuse
  - EFDC
    - Evaluate potential salinity impacts to Greenville's water supply

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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.

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TAR RIVER BASIN HYDROLOGIC MODELS

- Modeled surface water resources
  - OASIS
    - 5 streams
    - 4 reservoirs
  - EFDC
    - Tidal freshwater
    - Estuarine transition
    - Estuary

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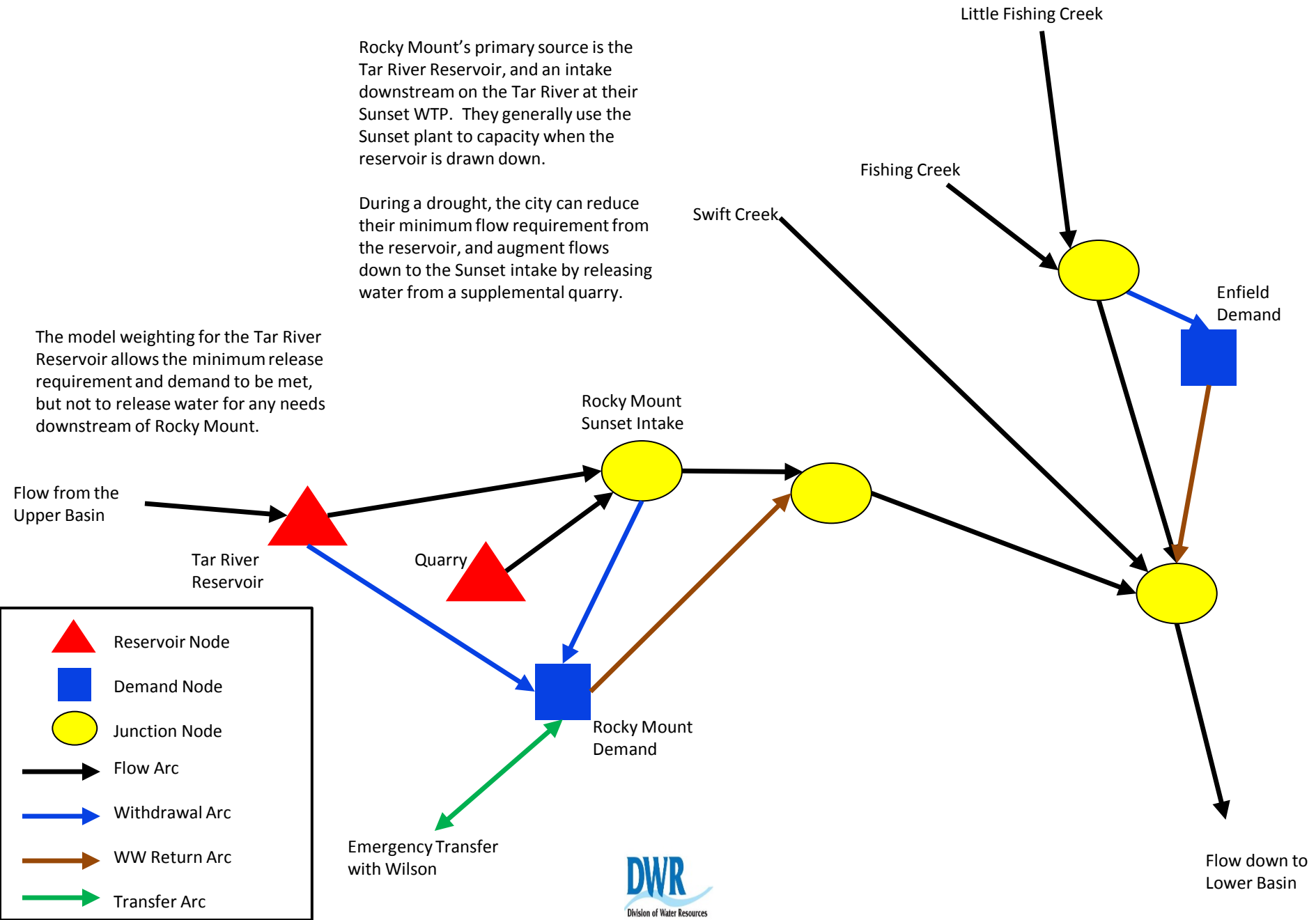
Flow Chart of Major Nodes in the Middle Tar Basin

Rocky Mount's primary source is the Tar River Reservoir, and an intake downstream on the Tar River at their Sunset WTP. They generally use the Sunset plant to capacity when the reservoir is drawn down.

During a drought, the city can reduce their minimum flow requirement from the reservoir, and augment flows down to the Sunset intake by releasing water from a supplemental quarry.

The model weighting for the Tar River Reservoir allows the minimum release requirement and demand to be met, but not to release water for any needs downstream of Rocky Mount.



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TAR RIVER BASIN HYDROLOGIC MODELS

- 10 modeled interbasin transfers
- Other withdrawals
  - 4 reservoir evaporation
  - Agricultural and golf course irrigation
- 2 instream flow requirements
- 2030 and 2060 withdrawal and return flow projections
  - 10 withdrawals
  - 16 return flows

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TAR RIVER BASIN HYDROLOGIC MODELS

- Inflow data
  - 11 USGS gages – OASIS
  - 13 tributary estimates based on 3 USGS gages – EFDC
- Local Water Supply Plans
  - For 33 systems
- Other scientific & technical information Dept. deems relevant
  - Drought plans for 7 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?

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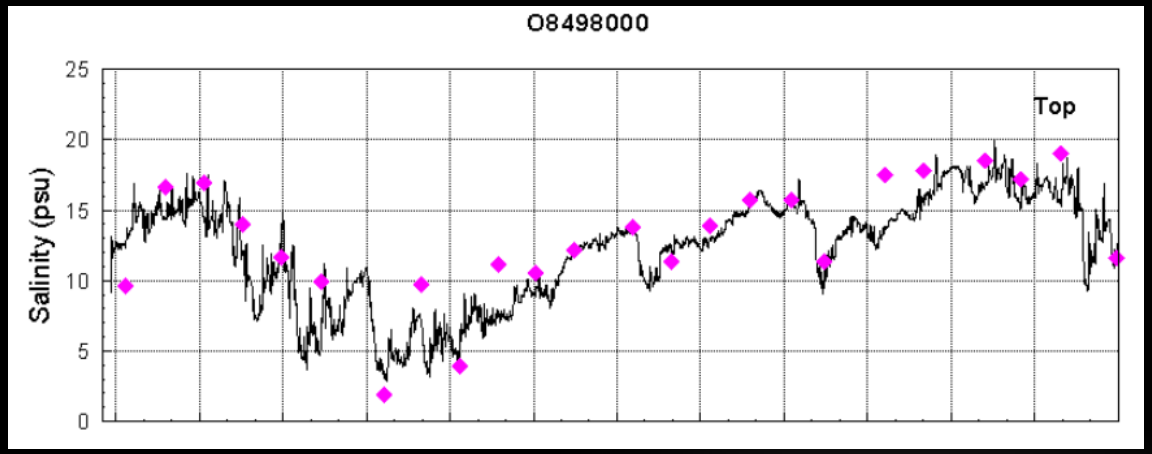
TAR RIVER BASIN HYDROLOGIC MODELS

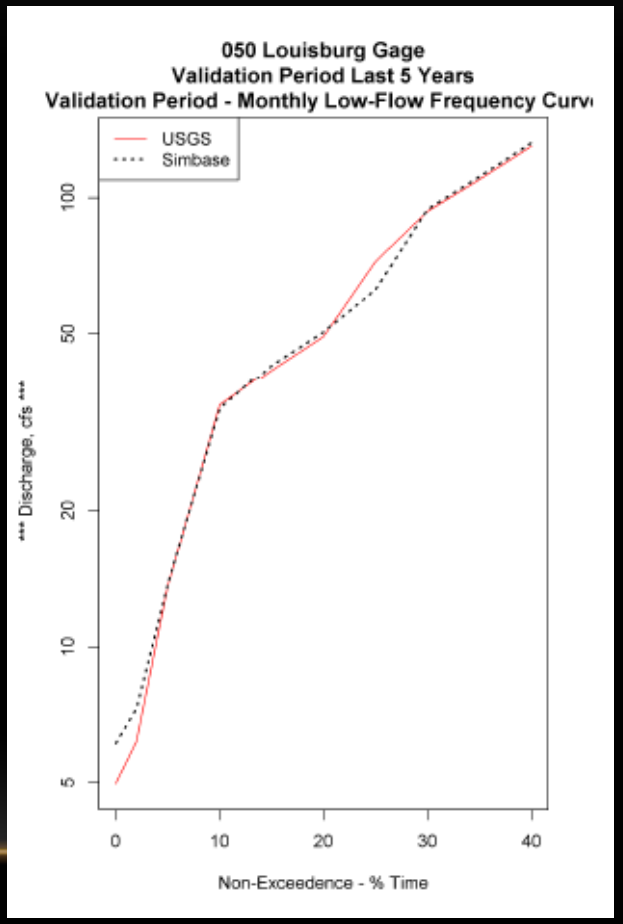
- Validation: statistical tests

Goodness-Of-Fit Statistics Summary Table - Tar River Basin Gage Flow						
	GOF Results			Drought Period Comparison		
	Data Format: Monthly			Data Source	Total, Days	% Difference ≤ ± 25%
	NSE > 0.5	RSR ≤ 0.70	PBIAS ≤ ± 25%			
010 Tar River Gage Flow	0.9999	0.0077	0.7	USGS	527	
	Satisfactory	Satisfactory	Satisfactory	Simbase	509	-3.4%

TAR RIVER BASIN HYDROLOGIC MODELS

- 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.

- ✓ 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 Tar 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.

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TAR RIVER BASIN HYDROLOGIC MODELS

- ✓ NC Register publication January 15, 2014
- ✓ Comments accepted through March 31, 2014

- 1 comment received from City of Raleigh
  - Questioned use of models to analyze ecological flows

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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.
  - ✓ Tar models are not rules

- (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.
  - ✓ Tar models are for planning purposes only

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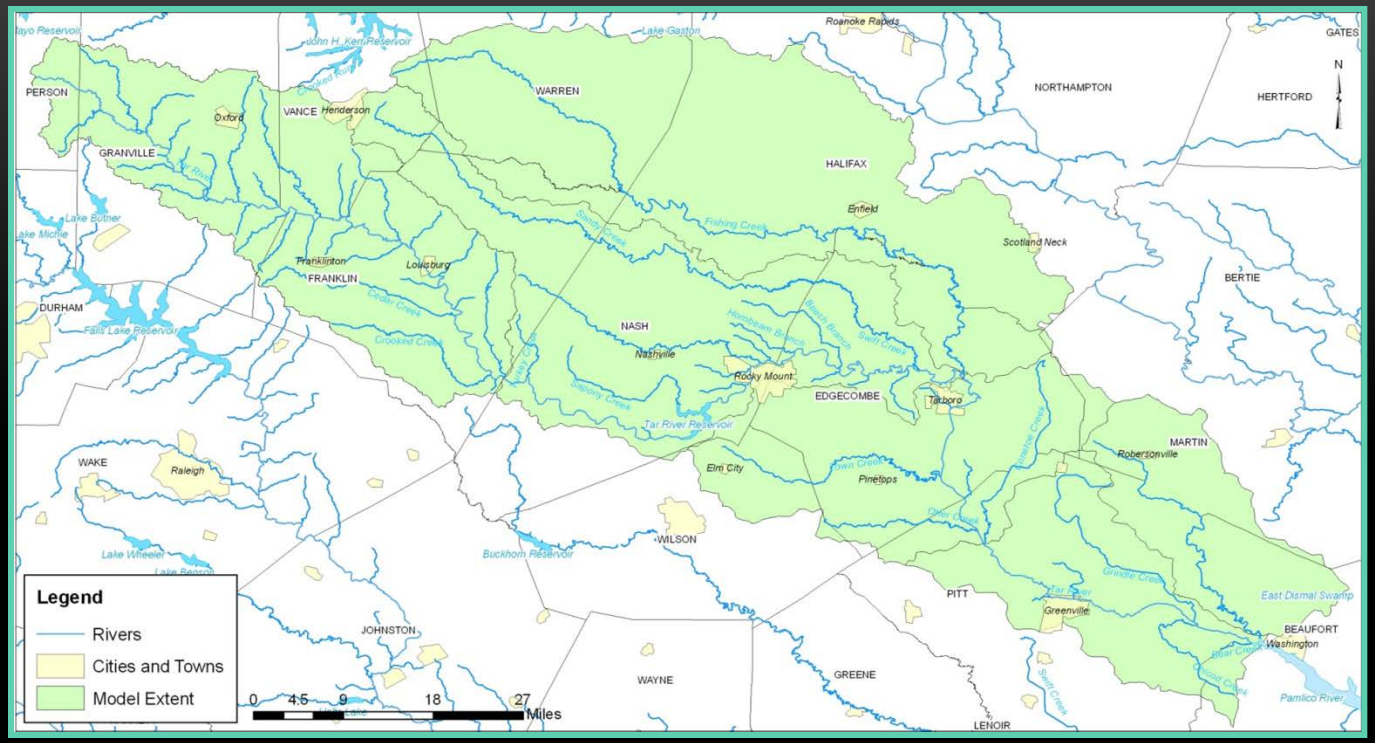
RECOMMENDATION

- The Division recommends that the Water Allocation Committee approve proceeding to the EMC for approval of the Tar River basin hydrologic models.



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QUESTIONS ?

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