


Cape Fear River Basin Hydrologic Model Update

March 17, 2010

CAPE FEAR RIVER BASIN HYDROLOGIC MODEL




Developed for the
Cape Fear River Assembly
and its Partners, including

North Carolina Division of Water Resources	LCFR WSA
	Morrisville
	OWASA
Apex	Pittsboro
Burlington	PWC
Cary	Reidsville
Chatham Co.	Wake Co.
Durham	Wilmington
Greensboro	
Harnett Co.	Dupont
High Point	Progress Energy
Holly Springs	International Paper

An application of OASIS with OCL covered by U.S.
Patent Nos. 6,002,863 and 6,581,027 © 2005

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 **HYDROLOGICS**
Advancing the management of water resources

Agenda

- 10:00 – 10:05 – Opening Remarks
- 10:05 – 10:15 – Lesson Learned
- 10:15 – 10:50 – Model Schematic
- 10:50 – 11:25 – Model Improvements
- 11:25 – 12:00 – Funding
- 12:00 – 12:15 – Wrap Up and Next Steps

Proposed Water Resources Policy Act of 2009
Cape Fear River Basin Demonstration

Summer 2009

Division of Water Resources, NCDENR

Goals

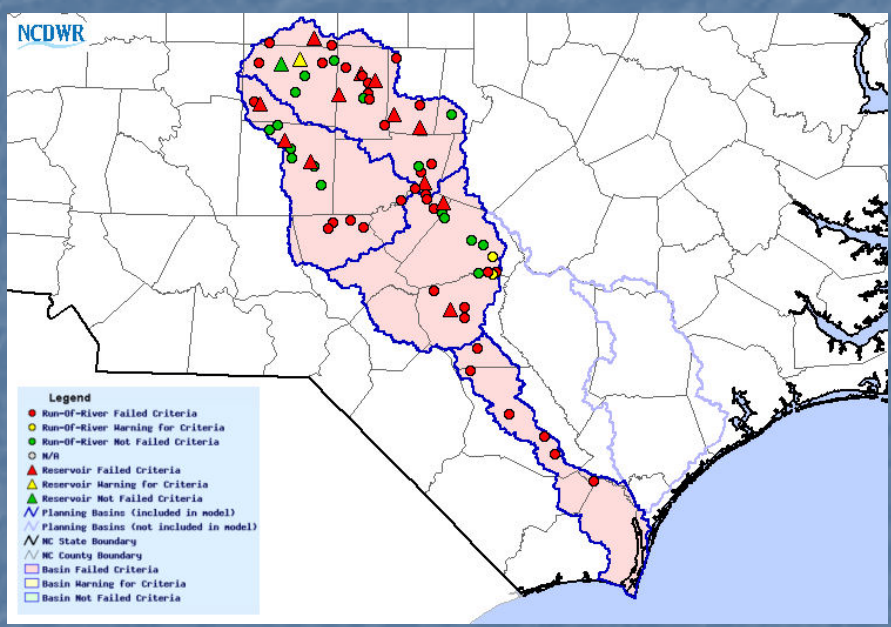
- Test limitations of the current modeling approach.
- Develop a prototype permitting Decision Support System (DSS).
- Determine if any changes are needed to S907v1 to be able to implement a permitting program.

Summary Of The Work Done In June

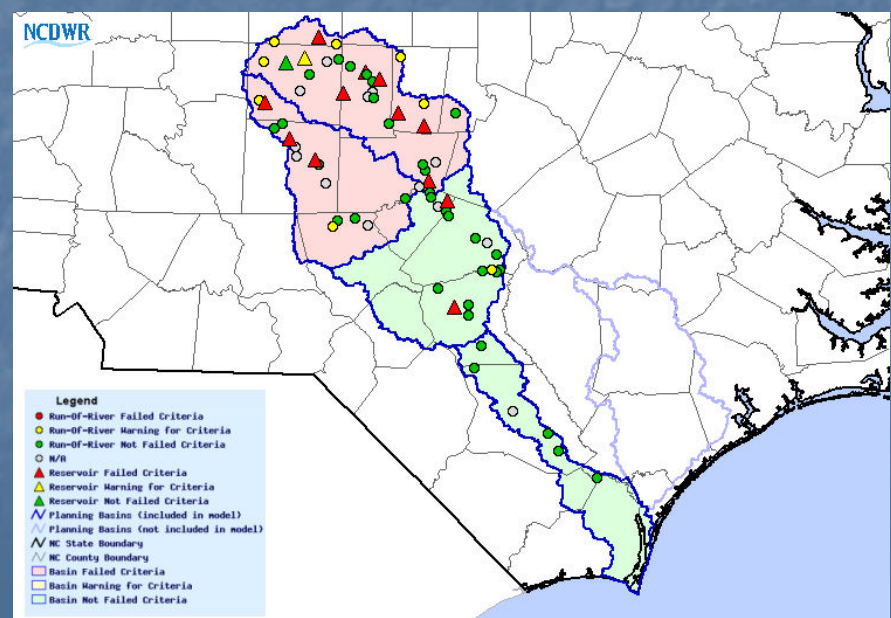
- 4 Model Simulations
 - Each simulation was daily with a record from 1/1/1930 through 12/31/2005
 - 672 input values change for the 4 simulations.
 - The baseline required approximately 150 simulations to determine the yield for the 14 reservoirs.
- Develop A Water Withdrawal Decision Support System (DSS)
 - For the 4 simulations the DSS processed 79,057,632 output data values.
 - DWR staff used their best professional judgment to develop a first cut at a simplified approach for the integrity criteria.

Example Results

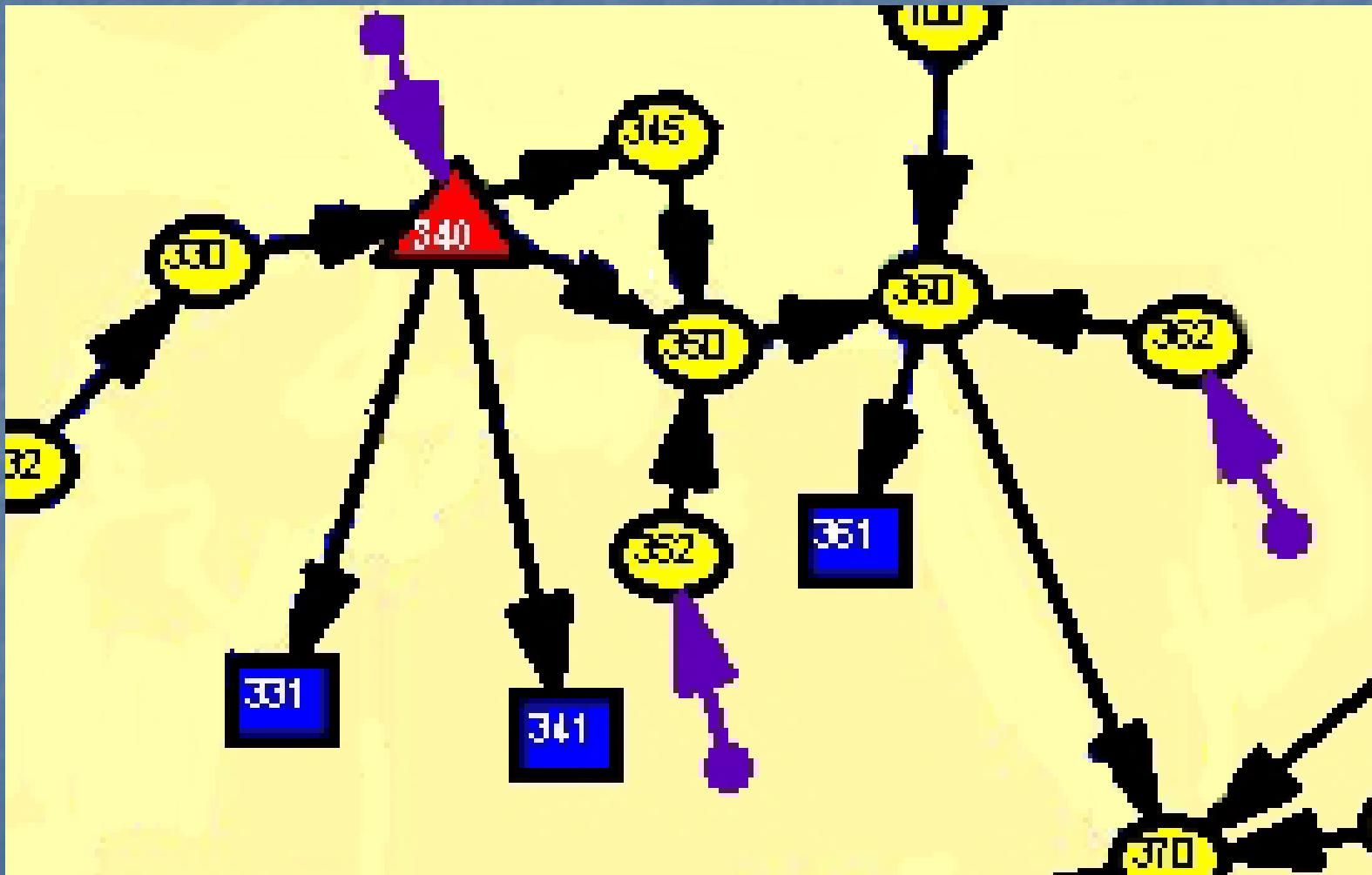
Overall Summary



Withdrawal Yield Analysis



Nodes And Arcs



Alternative Approach That Did NOT Work

Compared Modeled 7Q10 to the 7Q10 used for NPDES Permits

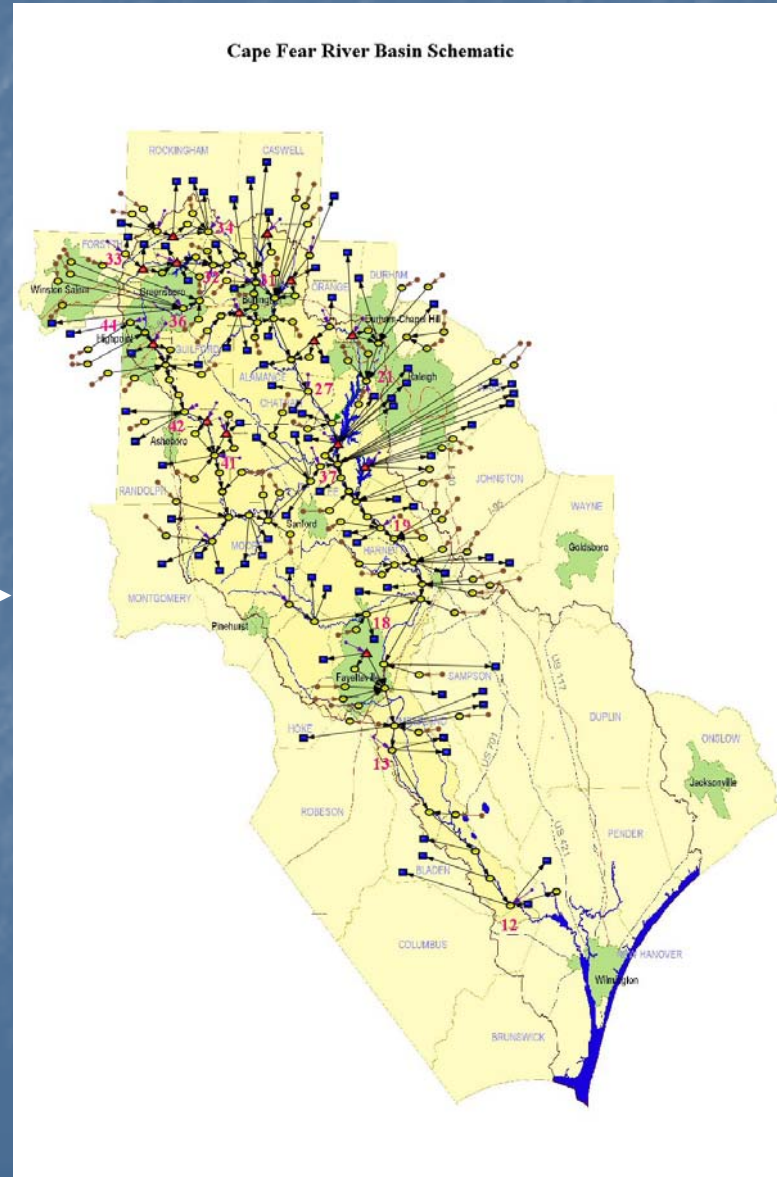
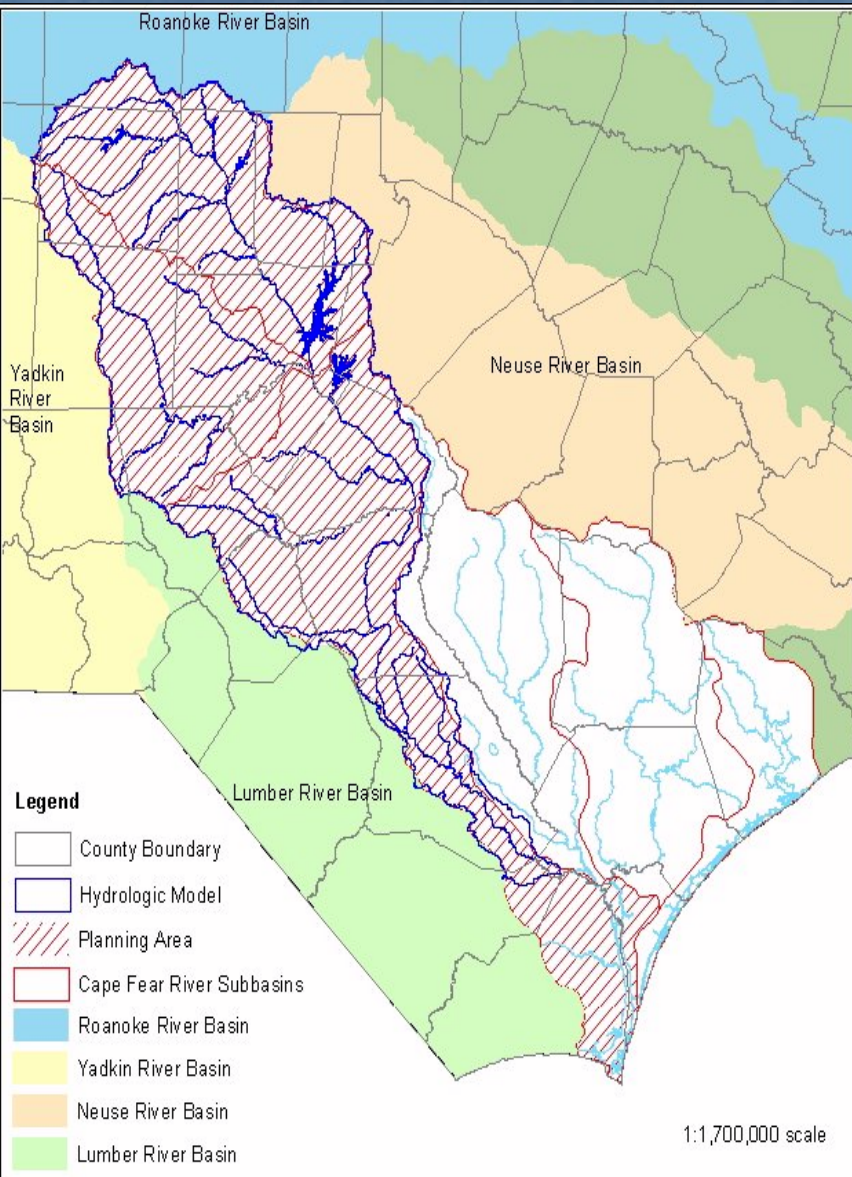
System	Permit	Permit 7Q10 cfs	Base 7Q10 cfs	2008 7Q10 cfs	2020 7Q10 cfs	2050 7Q10 cfs	Gage 7Q10 cfs
Burlington Eastside WWTP	NC0023868	33.5	36.7 9.3%	21.2 -36.7%	28.3 -15.5%	60.4 80.0%	
Fayetteville - Cross Creek WWTP	NC0023957	759.6	346.2 54.4 %	338.8 -55.4%	213.9 -71.8%	189.3 -75.1%	
Graham WWTP	NC0021211	34.0	36.7 8.0%	21.2 -37.4%	28.3 -16.6%	60.4 77.8%	
Randleman WWTP	NC0025445	5.0	57.4 2.1 %	11.5 129.8%	23.5 369.8%	29.9 497.6%	12.4

Lessons from demonstration project.

- Model Changes Needed For Future Models
 - Local inflow at all flow nodes.
 - Better historical information.
 - Link system withdrawals and discharges.
 - Link multiple intakes for a systems.

Schematic

Model Coverage



Model Updates

Additional Updates

No cost or time estimates.

- Add Siler City's reservoir.
- Add Buckhorn and the Locks & Dams as reservoirs.
- Add Progress Energy skimming.
- Add instreamflow ecological flow nodes.
- Include water shortage plans and switch to turn on/off.
- Sensitivity analysis parameters (\pm percentage) – inflows, evaporation, precipitation, and/or withdrawals.
- Combine Cape Fear and Neuse models.
- Add a feature to let users select runs, plots and tables from a "common directory."

Funding

Minimum Updates

Estimated Cost \$75,000 and 6 months to complete.

- Update inflows from 2005 to current.
 - Update of withdrawals, discharges, agricultural uses, and reservoir operations.
- Calibrate smaller reservoirs, if historical data is available.
- Simplify Jordan Lake drought code.
- Improve coding of operations of OWASA and Fayetteville.
- Link withdrawal and discharges.
- Update documentation.

Funding

- DWR may be be able to contribute 50% of the funding for this update.
 - DWR will be doing the data collection for this update.
- If it is acceptable to the potential funding partners DWR has asked Triangle J to assist with coordinating the funding and contracting.

Next Steps

- Join the model email list.
 - Cape-Fear-Model-join@lists.ncmail.net

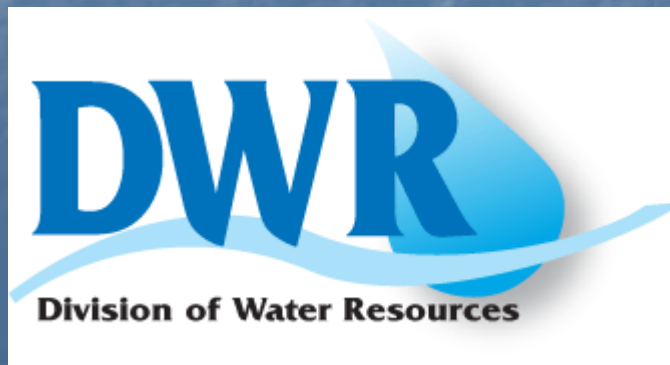
Questions

Contact Information

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Contact Information

■ Email Lists

- Cape-Fear-Plan-join@lists.ncmail.net
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