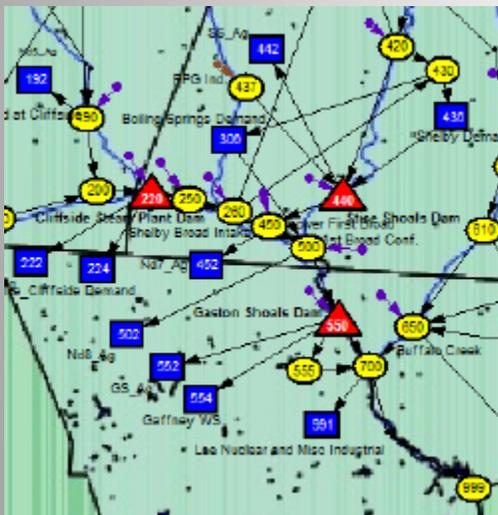




# HYDROLOGIC MODELING OVERVIEW AND 2014 SCHEDULE

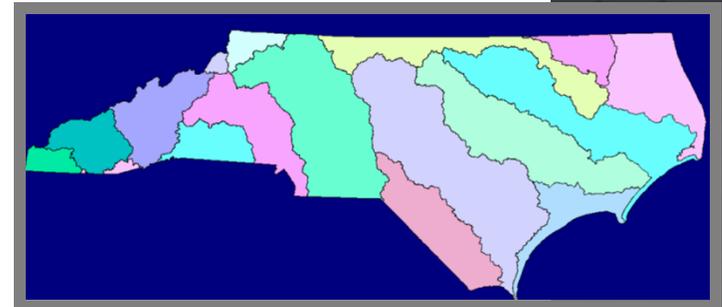
Kathy Stecker

DWR Modeling and Assessment Branch



# HYDROLOGIC MODELS

- ✓ **YES** - Tools for water resources planning
  - Water quantity
  
- ✗ **NOT** - Regulatory tools for water allocation
  - *Not* for flood analysis
  - *Not* for water quality
  - Does *not* directly model groundwater



# HYDROLOGIC MODELS

- ◉ Water Balance Model
  - $\text{Inflow} - \text{Outflow} = \text{Change in Storage}$
- ◉ Complexity is developing data and equations to describe the 3 variables
- ◉ Key assumption - future conditions will be statistically indistinguishable from past

# SL 2010-143

## IMPROVE RIVER BASIN MODELING

- Each hydrologic model shall include:
  - Surface water and groundwater resources
  - Registered transfers into and out of basin
  - Other withdrawals
  - Ecological flow
  - Instream flow requirements
  - Projections of future withdrawals
  - Estimate of return flows within basin
  - Inflow data
  - Local water supply plans

# SL 2010-143

## IMPROVE RIVER BASIN MODELING

- ◎ Each hydrologic model shall:
  - Simulate flows for registered surface water withdrawal sources in response to different variables, conditions, and scenarios
  - Predict places, times, frequencies, and intervals
    1. Yield inadequate to meet all needs
    2. Yield inadequate to meet all essential uses
    3. Ecological flow adversely affected

# SL 2010-143

## IMPROVE RIVER BASIN MODELING

### ◎ Interstate cooperation

- Work with neighboring states to develop hydrologic models

### ◎ Approval of hydrologic models

- North Carolina Register notice
- 60-day comment period
- Submit model to EMC for approval

# DWR'S HYDROLOGIC MODELS

- ◉ Developed at basin scale
  - Can be used at smaller scales
  
- ◉ Other uses
  - Screen alternative water supplies
  - Evaluate water shortage response plan triggers
  - Hydroelectric generation impacts
  - Recreational impacts
  - Real-time drought management
  - Evaluate IBT permit applications

# DWR'S HYDROLOGIC MODELS

- ◎ "OASIS" developed by HydroLogics

- Cape Fear
- Neuse
- Roanoke
- Tar
- *Broad (EMC-approved)*

- ◎ "CHEOPS" developed by HDR

- Catawba



# PROCESS

- ◉ Data compilation
- ◉ Model development
- ◉ **Calibration**
- ◉ **Validation**
- ◉ **Certification**
- ◉ Public review and comment
- ◉ Revision, if needed
- ◉ **EMC approval**
- ◉ Application

# TERMS

## ◎ Calibration

- Adjustments to improve agreement between model and real system (contractor)

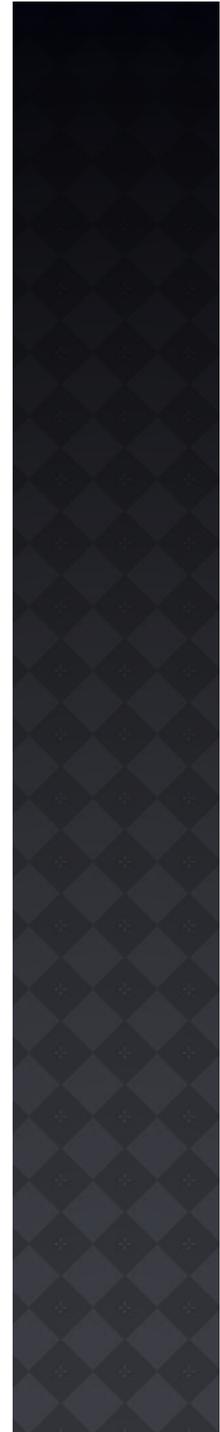
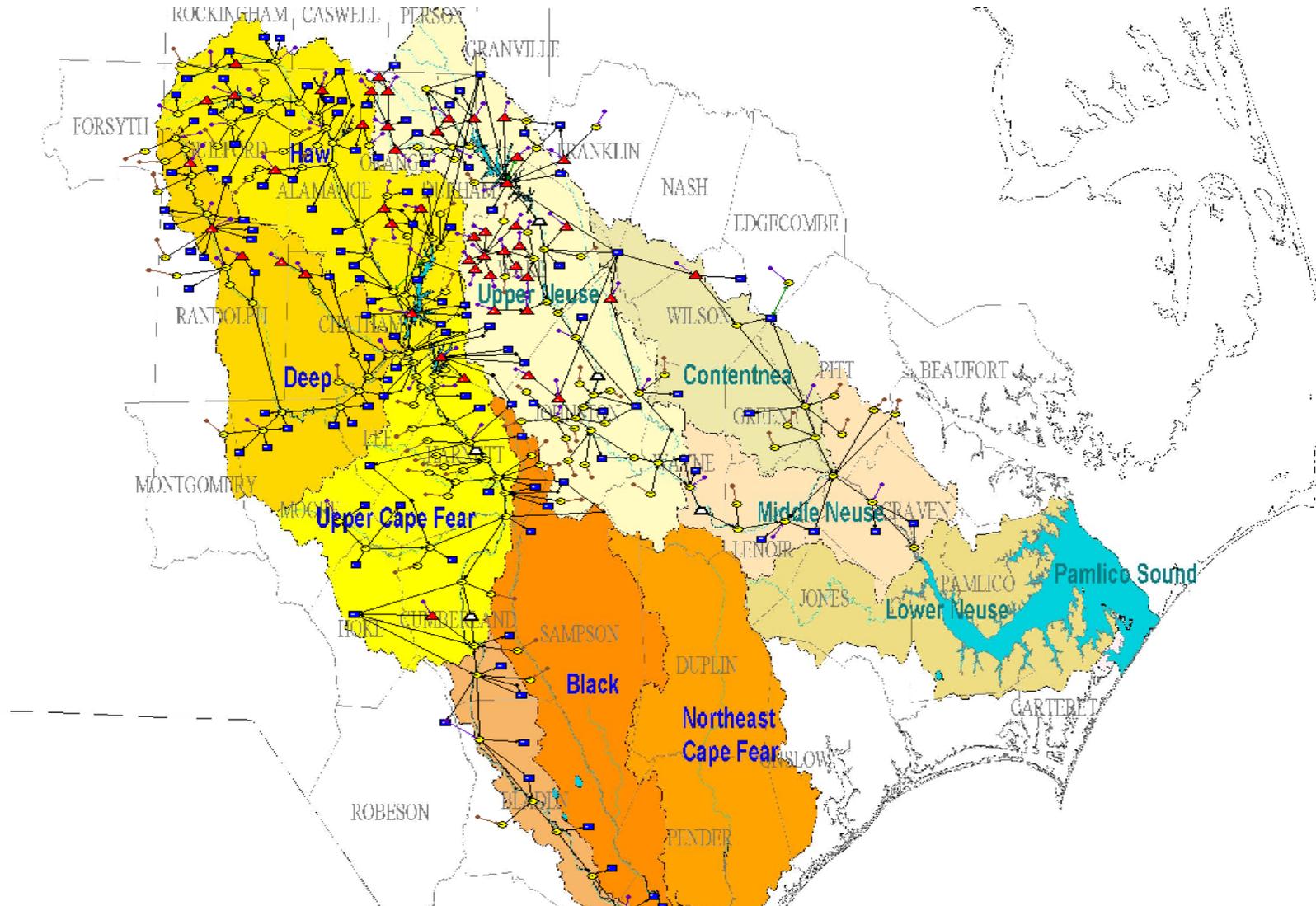
## ◎ Validation

- Demonstration of model performance with data set not used in calibration (contractor + DWR)

## ◎ Certification

- Model and documentation have been reviewed and judged sufficient for their intended use (DWR)

# MODEL SCHEMATIC



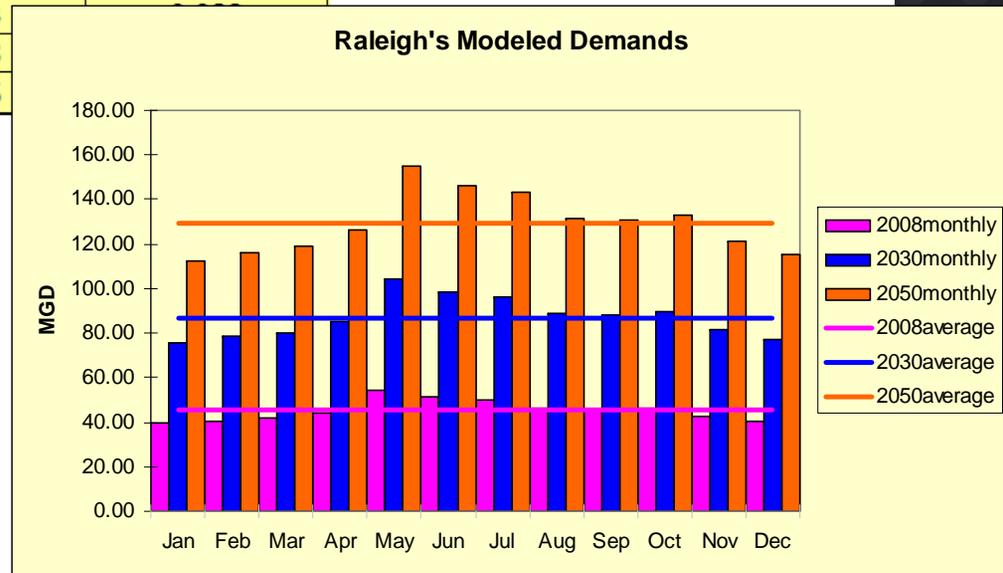
# FUTURE SCENARIOS

## Annual Average Use

Systems	2008 Demand (MGD)	2030 Demand (MGD)	2050 Demand (MGD)
Orange-Alamance	0.161	0.19	0.21
Hillsborough	1.136	2.029	2.76
Durham	24.385	35.826	40.923
South Granville WASA	2.576	5.966	10.006
Raleigh	45.22	86.99	129.23
Wilson	8.92	11.214	13.557
Johnston County	7.201	11.854	19.598
Smithfield	2.988	4.64	5.951
Progress Energy - Lee	7.67	7.67	7.67
Goldsboro	4.645	7.733	
Neuse Regional WASA	6.08	12.58	
Weyerhaeuser	15.37	17.75	

Source: NCDENR, Division of Water Resources

## Seasonal Use Patterns



# EMC APPROVAL

## ◎ Based on

- DWR certification and supporting documentation
- Public comment
- “TAG”? and WAC concurrence
- Other considerations?

# DRAFT 2014 SCHEDULE

	Cape Fear /Neuse	Tar	Roanoke	Catawba
Public review	December - January	December - January	January - February	January - February
WAC	March	March	May	May
EMC	March	March	May	July

More information:  
[www.ncwater.org/Data\\_and\\_Modeling](http://www.ncwater.org/Data_and_Modeling)

QUESTIONS?

