UNRBA Path Forward Committee Meeting

MRS Project
Status Update

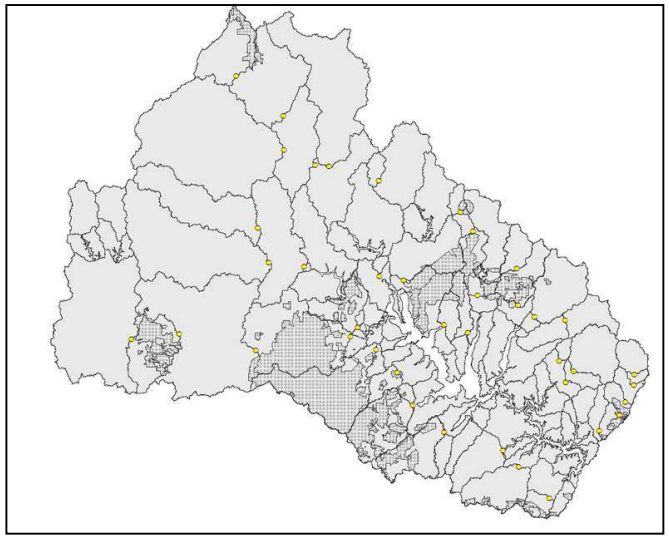
August 22, 2018

Preparations for the Fall Stakeholder Meeting

- Main goals
  - Provide a status update on model development
  - Provide an opportunity for stakeholders to comment
  - Elicit feedback on specific topics
- Preparation
  - Continue drafting data memorandum 1
  - Review and finalize for distribution
  - Discuss potential meeting date for October

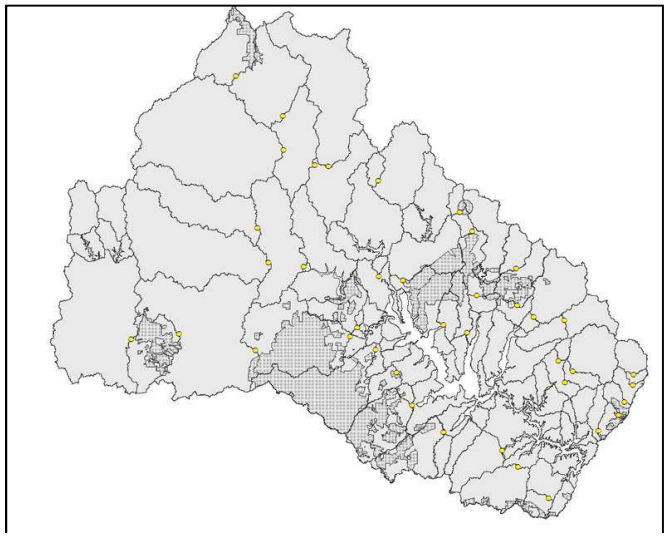
Next Steps for Data Memo 1

- Past PFC meetings discussed the following data types
  - May: Catchment delineation, development of EFDC model grid, and preliminary analyses regarding segmentation of the lake
  - July: major wastewater treatment plants, minor facilities and MS4 permits, and USGS flow and stage data
- August
  - Present data compiled for meteorological data and impoundment data
  - Begin review process for memorandum
- September/October finalize memorandum and distribute to the stakeholders
- October 24th hold stakeholder meeting



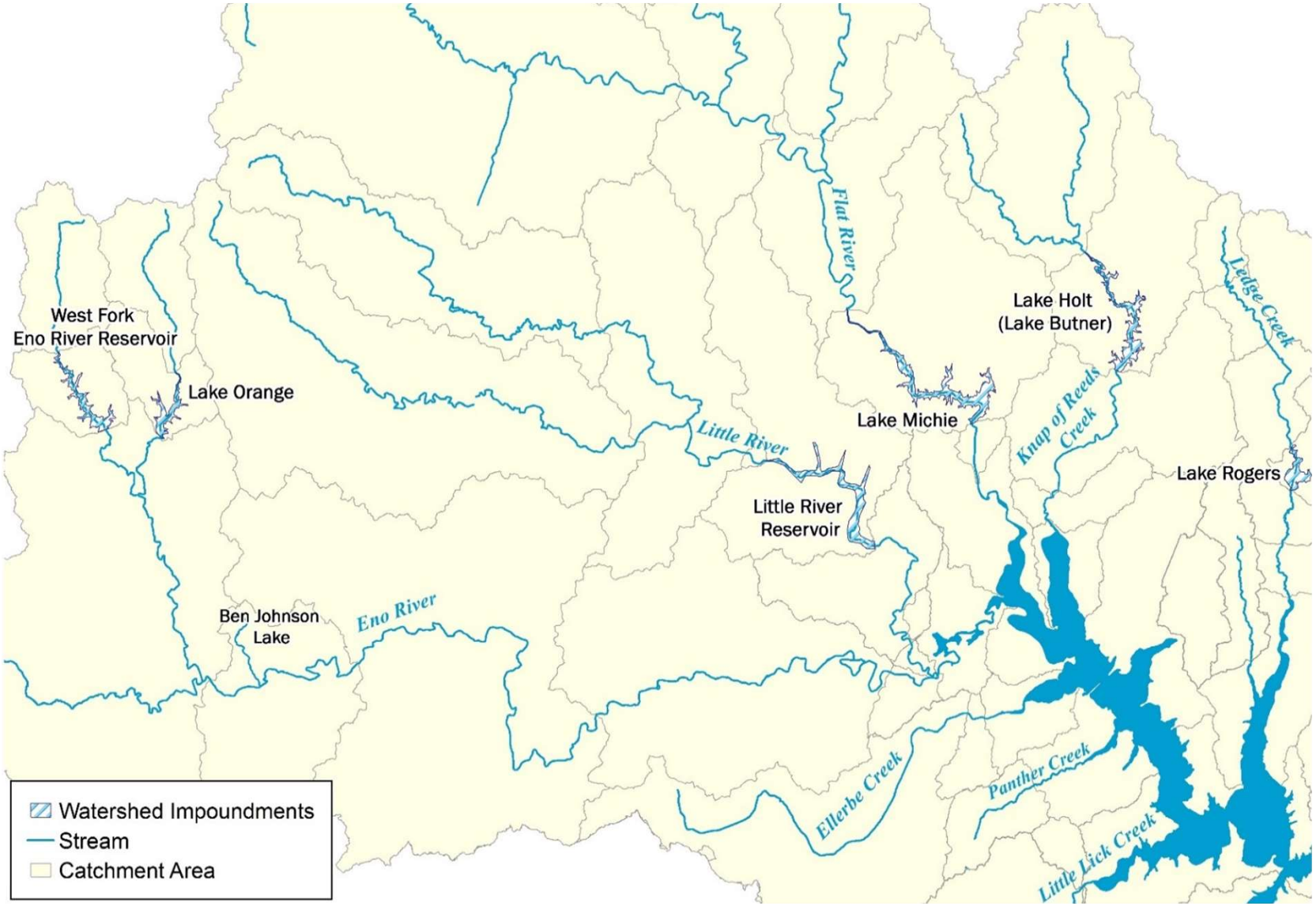
Modeling Progress and Data Overview

- Team is continuing to compile available data from watershed stakeholders and public sources
- Data gaps are being filled prior to development of model input files
  - Impoundment data
  - Meteorological data
- For complete datasets, model input files and calibration files are being processed using automated scripts to allow for additional data as it is available (i.e., 2018 data)
  - Flow and elevation data from USGS
  - Air quality data
  - Wastewater treatment plant data



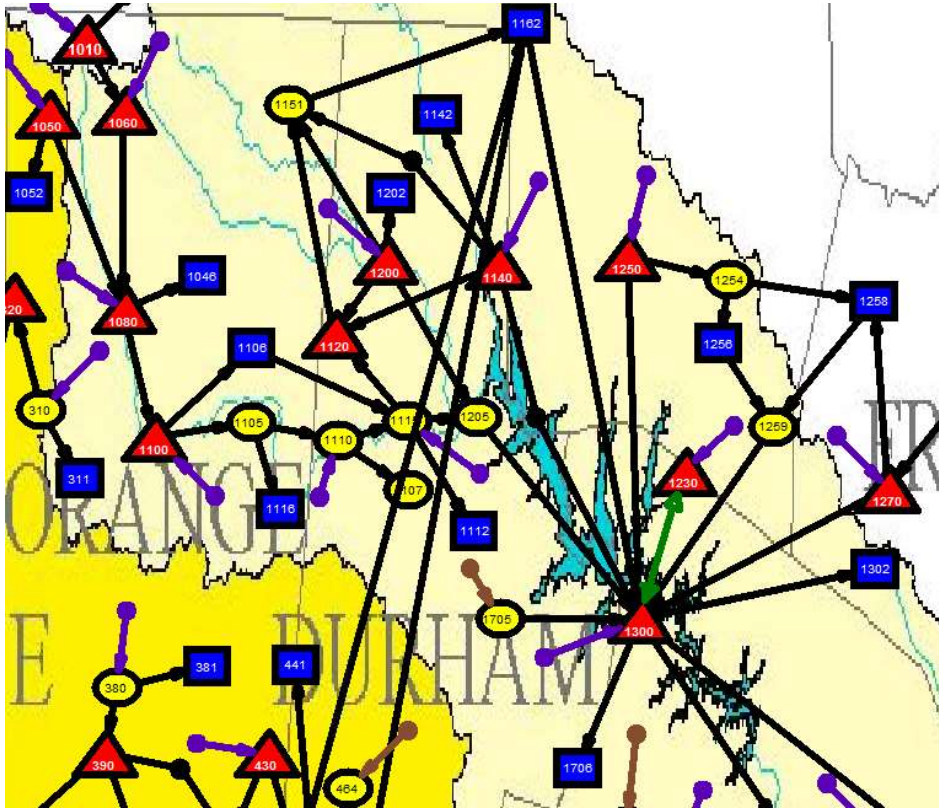
Watershed Impoundments

Impoundment Locations



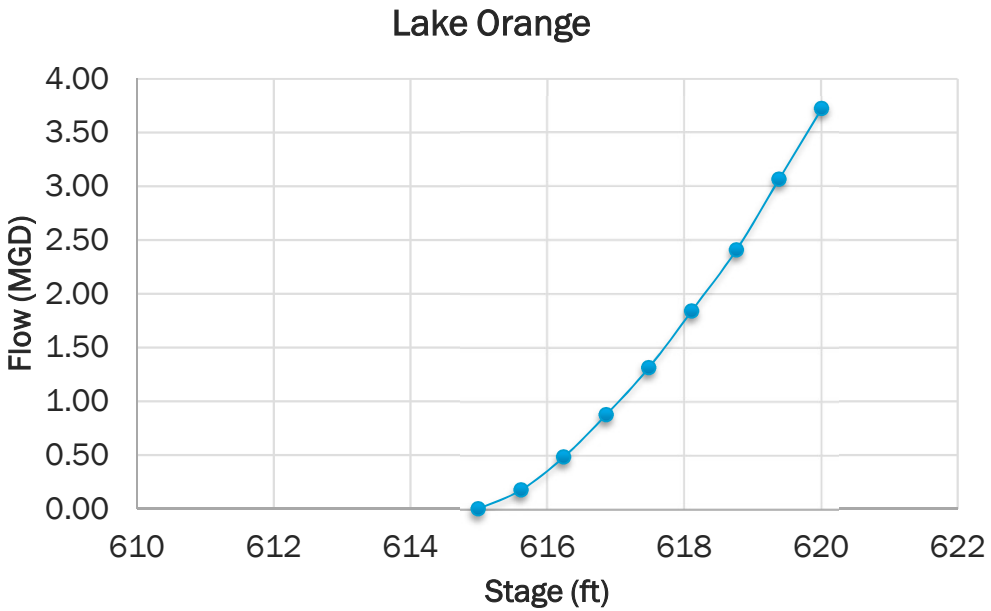
Sources of Impoundment Data – Neuse River Basin Hydrologic Model (OASIS)

- Mass balance, water resources simulation/ optimization model developed in 2008 for DWR
- Impoundment data includes:
  - Stage-Storage Curves
  - Stage-Surface Area Curves
  - Withdrawal Rates (2005-2007 only)
- Model will possibly be updated by DWR to include forecasts for 2014-2018 modeling period
- Data available for all seven impoundments and an additional agricultural pond that was required to calibrate the OASIS model



Sources of Impoundment Data – City of Durham WARMF Model

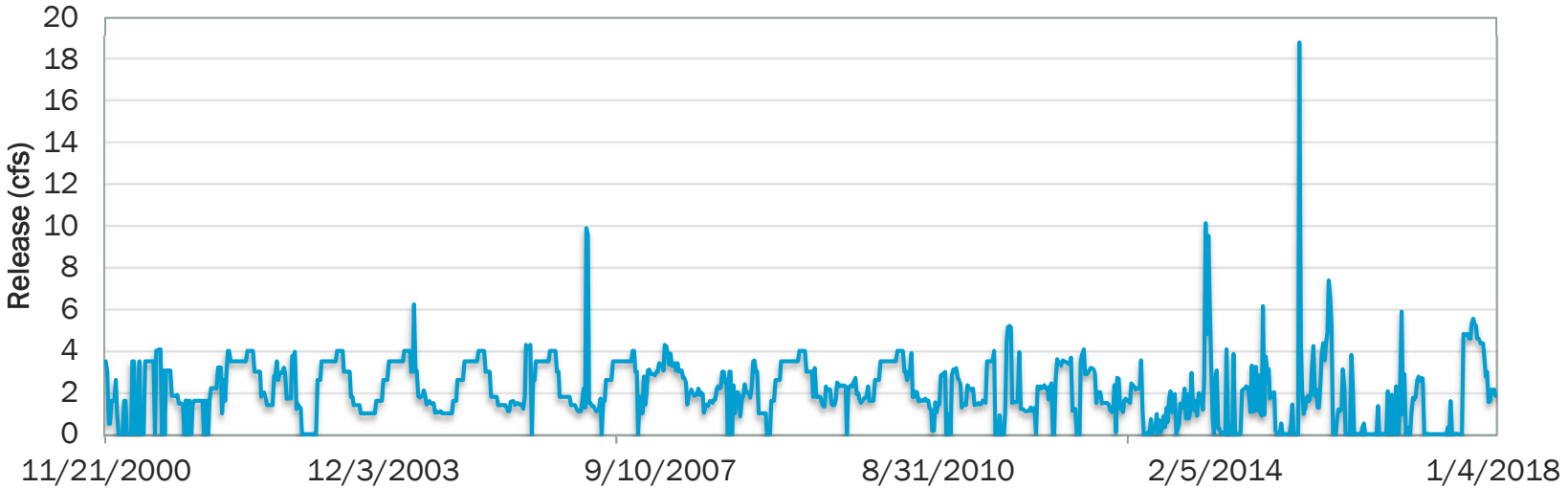
- Recent models developed for the Eno River watershed with updates to Ellerbe Creek and Little Lick models (in review)
- Available information includes stage-surface area curves, stage-discharge curves, locations and dimensions of control structures and spillways
- Data available for 5 impoundments, but not does include water supply withdrawals



Lake Orange Outflow Structures		
	Elevation (ft)	Width (ft)
Uncontrolled Spillway	615.0	100.0

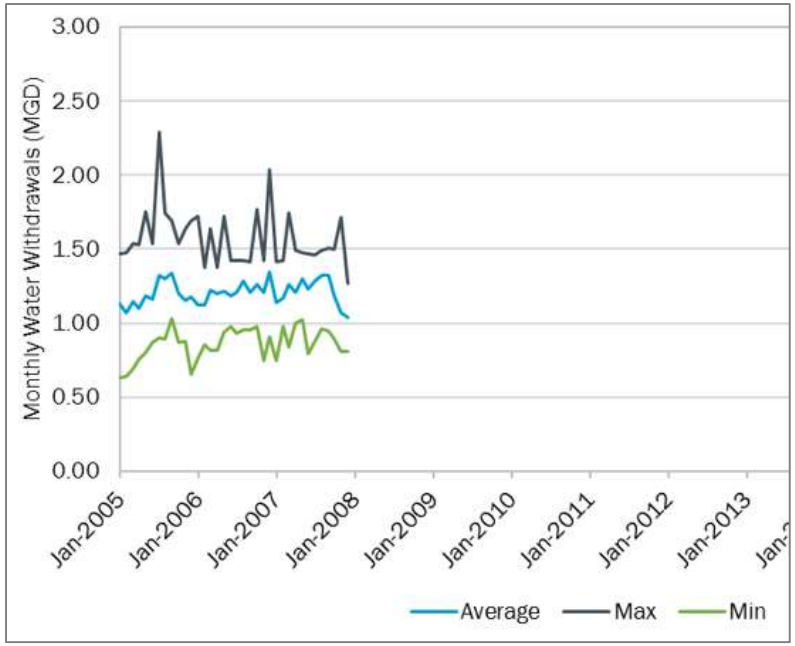
Summary of Available Data – Local Studies

- Reservoir surveys
  - 1986 Water Supply Capacity study of Lake Holt (Butner)
  - 1998 Survey of Lake Rogers
- Measured Water Withdrawals/Releases
  - Withdrawals from Lake Holt by SGWASA for both modeling periods
  - Releases into the West Fork Eno River by the Town of Hillsborough
  - Withdrawals from Lake Ben Johnson by the Town of Hillsborough



Current Data Gap for Impoundments

- Measured or Estimated Water Withdrawals/Releases for 2014 to 2018 for
  - Lake Michie
  - Little River Reservoir
  - Lake Orange and the agricultural pond upstream
  - Lake Rogers
- Potential sources of information
  - Local government records
  - Minimum release guidelines (Lake Orange)
  - Updated OASIS modeling for 2014 to 2018 water withdrawals (if updated)
  - Estimates based on population statistics and historic withdrawal rates or reservoir releases

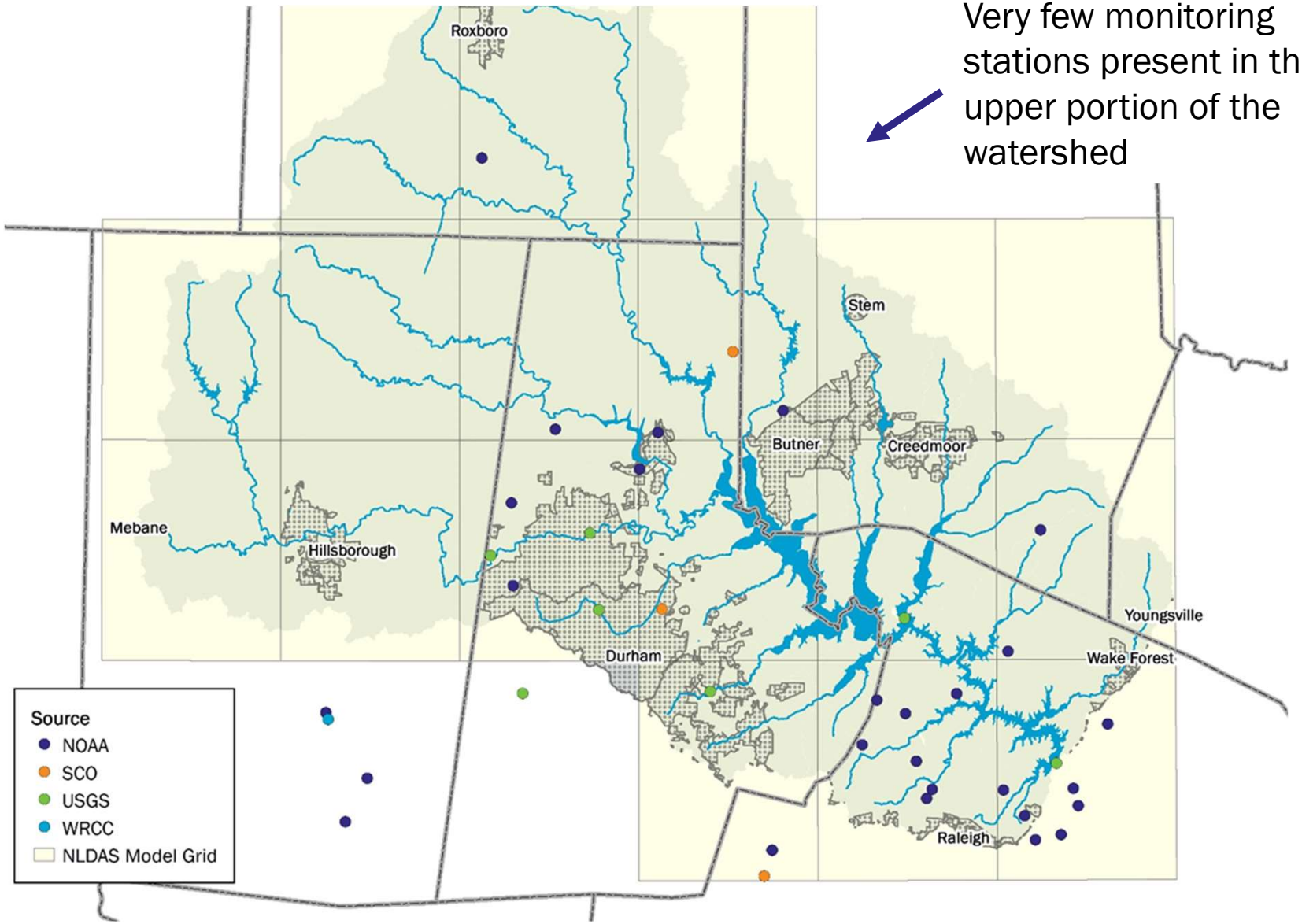


Meteorological Data

Sources of Weather Data for the Modeling

- NC CRONOS/ECONet
  - Database developed by the State Climate Office of North Carolina
- USGS
- Western Regional Climate Center (WRCC)
- National Climatic Data Center (NCDC)
  - Clearinghouse for weather measurements collected by various organizations across the US including NOAA
- North American Land Data Assimilation System (NLDAS)
  - Spatially and temporally consistent, land-surface model (LSM) datasets from the best available observations and model output
  - Higher resolution than other datasets
- NEXRAD Radar Data
  - NOAA data that can be processed to generate precipitation estimates
  - Highest resolution data for precipitation data

Locations of Weather Data Sources



Very few monitoring stations present in the upper portion of the watershed

Comparison of Modeled Data to Weather Observations

Comparison of NLDAS MODEL OUTPUT to NCDC Data			
Parameter	Basis	Season	R^2
Min Temperature	Daily		0.90
Max Temperature	Daily		0.86
Precipitation	Daily		0.15
Precipitation	Weekly		0.42
Precipitation	Weekly	fall	0.61
Precipitation	Weekly	spring	0.62
Precipitation	Weekly	summer	0.56
Precipitation	Weekly	winter	0.16
Precipitation	Monthly		0.67
Precipitation	Monthly	fall	0.81
Precipitation	Monthly	spring	0.53
Precipitation	Monthly	summer	0.48
Precipitation	Monthly	winter	0.76

NEXRAD Precipitation Data

- NOAA operates the Next Generation Weather Radar (NEXRAD) system
- Comprised of 160 regional radar sites in the US
- Modeling team is currently evaluating the radar data to determine if better coverages of precipitation can be generated for the modeling

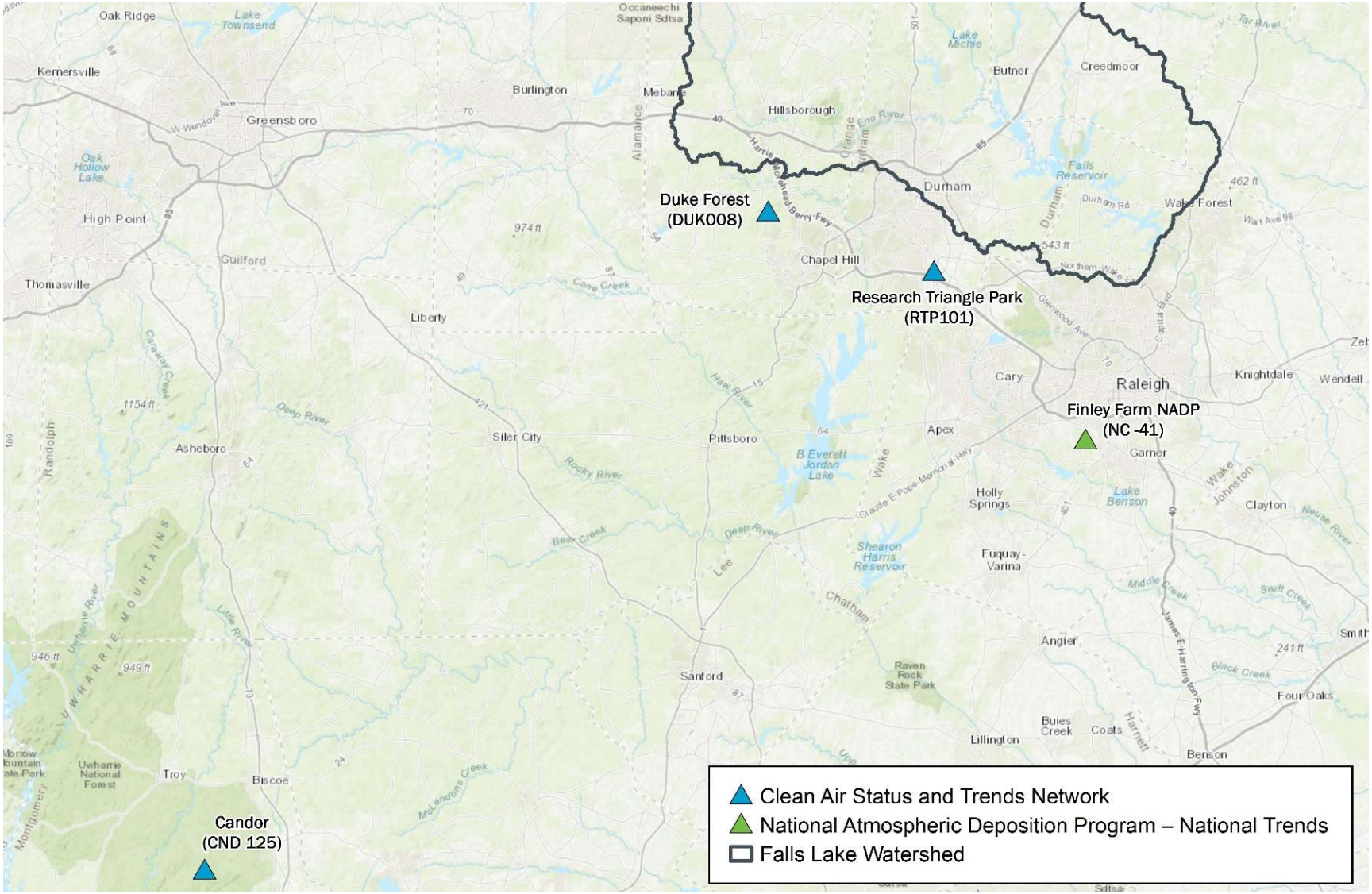
Image courtesy of NOAA

Air Quality Data

Sources of Air Quality Data for the Modeling

- Clean Air Status and Trends Network (CASTNET)
  - Measures the dry deposition of particles at 90+ site locations across the United States
- National Atmospheric Deposition Program – National Trends Network (NADP-NTN)
  - Collects wet deposition data
- City of Durham Atmospheric Deposition Monitoring Study
  - Study recently conducted to investigate how local deposition rates may differ from estimates provided by the national networks and to evaluate the contribution of organic nitrogen to the total nitrogen load from atmospheric sources

Locations of Air Quality Data Sources



Questions ?

Work Plan for the MRS Program