

Improving the Characterization of Drought and Understating of Impacts on Water and Ecological Resources

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CAROLINAS INTEGRATED SCIENCES & ASSESSMENTS



Climate Science for Decision-making

About CISA



CISA principal investigators and staff are based at

- NOAA Southeast Regional Climate Center, UNC-Chapel Hill
- NC Sea Grant and SC Sea Grant Consortium
- University of South Carolina (main program office)

Supported by NOAA's Regional Integrated Sciences and Assessments (RISA) program in the Climate Programs Office. Current Funding: 2011–2016



Drought

- Dynamic Drought Index Tool (DDIT)
- Salinity Intrusion Project
- Drought and Coastal Ecosystems State of Knowledge Report
- NIDIS Pilot Project



DYNAMIC DROUGHT INDEX FOR BASINS IN NORTH AND SOUTH CAROLINA

Steps

- Select time scale
- Select drought index
- Select display type

Results

Map

Selected variables:

- Monthly time scale
- Raw values
- > 100 % Monthly PDS
- Map
- > July 2002
- > Standard Classes for Palmer Drought Index
- > 11 classes
- > Same class intervals

Result Map

Station List

Hide Tools

Create Graph

Hide Layers

Create Table

Hide Legend

Status: Feature selected

X: 505,951 m Y: 3,035,002 m

Layer

- ☐ USGS Stream Gages
- ☒ NWS Weather Stations
- ☐ States
- ☐ SC Drought Management Areas
- ☐ Climate Divisions
- ☐ Counties
- ☐ 2-Digit HUC Areas
- ☐ 4-Digit HUC Areas
- ☐ 6-Digit HUC Areas
- ☒ Watersheds of Interest
- ☒ 8-Digit HUC Areas
- ☒ Hydrology
- ☒ Shaded Relief

Legend

8-Digit HUC Areas

- 7.77 < to -4.00 (Extreme drought)
- 4.00 < to -3.00 (Severe drought)
- 3.00 < to -2.00 (Moderate drought)
- 2.00 < to -1.00 (Mild drought)
- 1.00 < to -0.50 (Incipient drought)
- 0.50 < to 0.50 (Near normal)
- 0.50 < to 1.00 (Incipient wet spell)
- 1.00 < to 2.00 (Slightly wet)
- 2.00 < to 3.00 (Moderately wet)
- 3.00 < to 4.00 (Very wet)
- 4.00 < to 5.00 (Extremely wet)
- No Data

Blend index value

-4.83

Region

03

South Atlantic-Gulf Region

Subregion

0305

Edisto-Santee

Accounting unit

030501

Santee

Cataloging unit

03050103

Lower Catawba, North Carolina, South Carolina

Home Drought Indices Help Contact Us

Weather Station List - Microsoft Internet Explorer

Selected layer: Watersheds of Interest

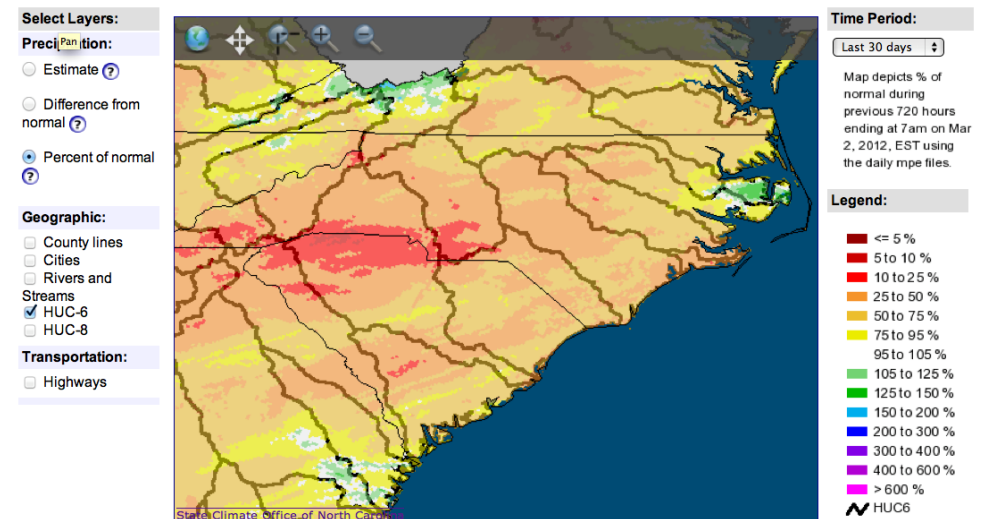
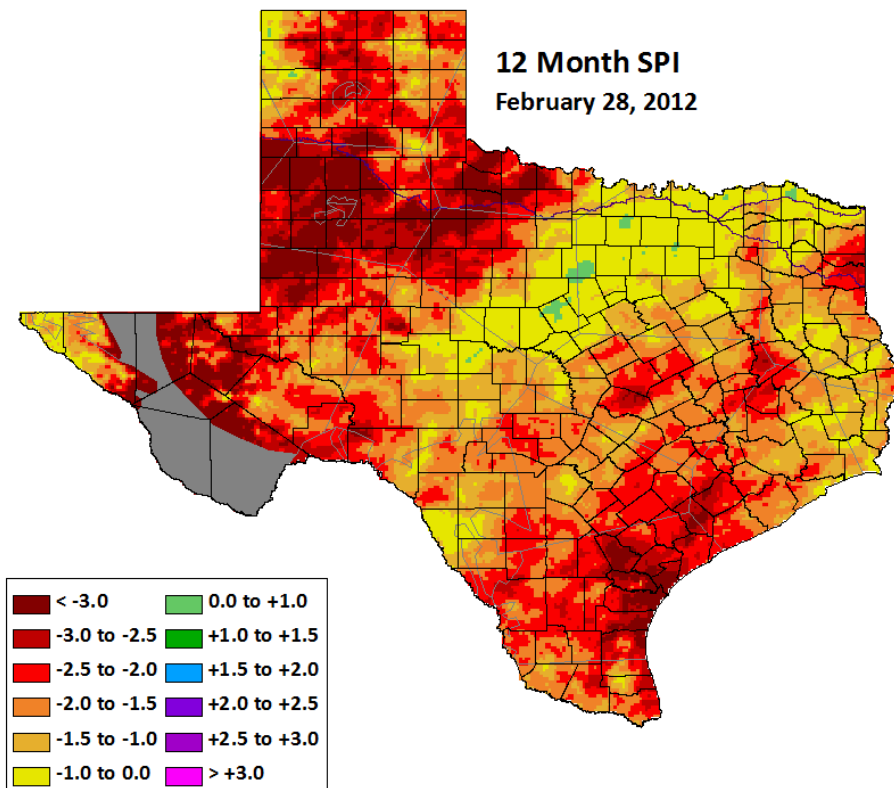
Selected number of features: 1

Feature (AOI)	Feature Name	Station Used	Station Name
0	Catawba-Watersee	310300	Asheville Wso Ap
		310301	Asheville
		310506	Banner Elk
		310724	Bent Creek
		310843	Black Mountain 2 W
		310901	Blowing Rock 1 NW
		311624	Celo 2 S
		311690	Charlotte Douglas Ap

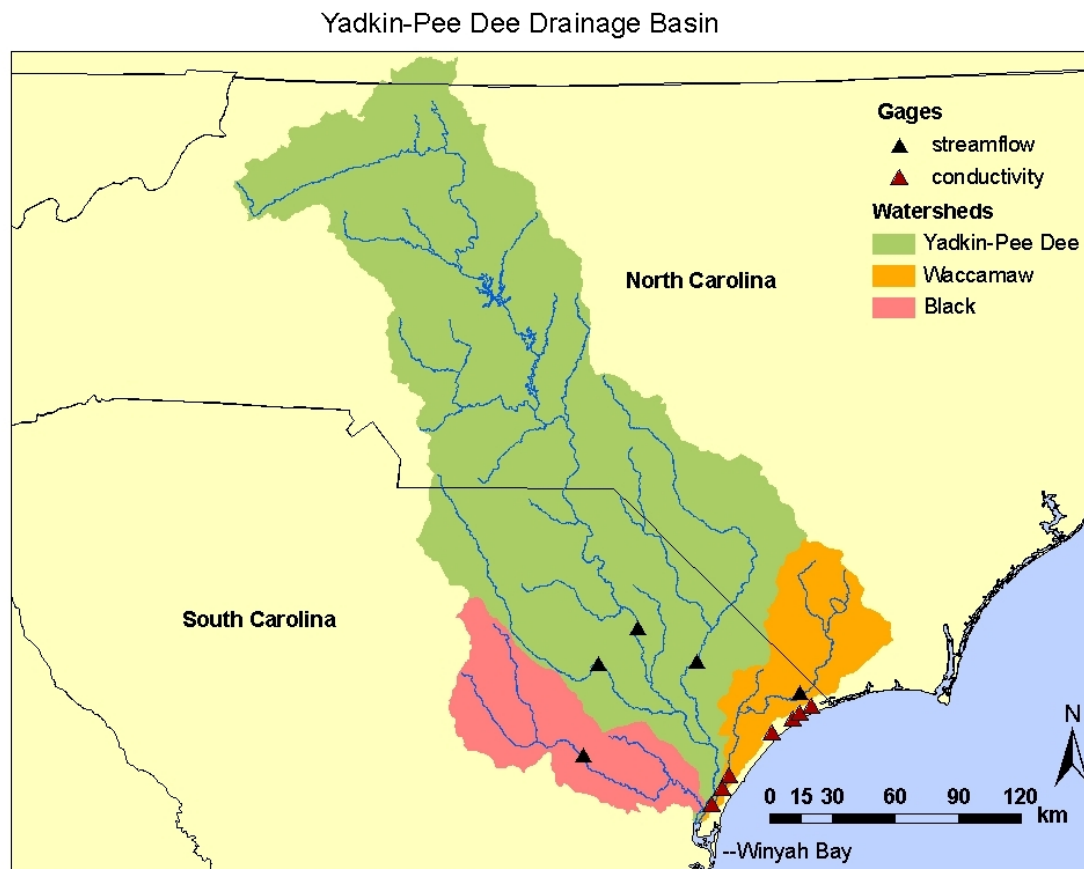
User-defined
Index, region,
time period,

Map Tools
Navigation
Metadata
Tools

Adding radar to the DDIT



Winyah Bay Watersheds

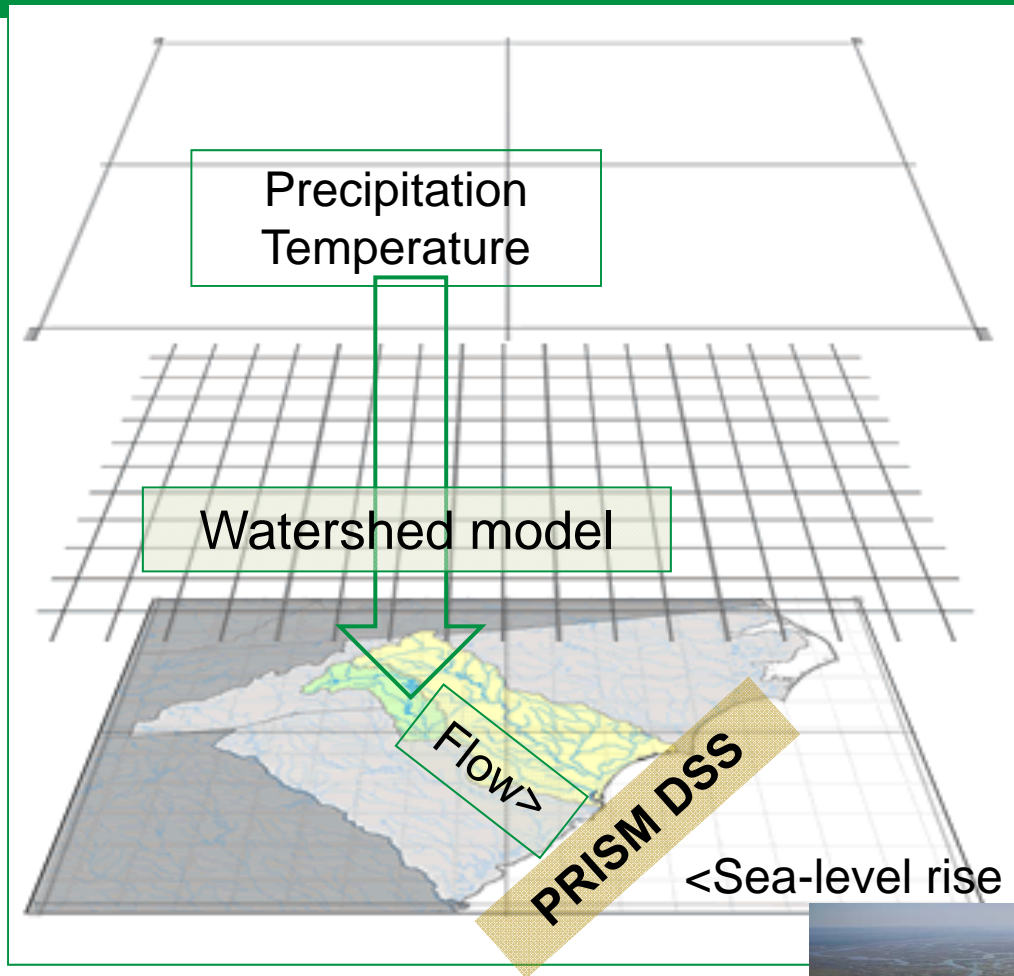


Salinity Intrusion Project

Global & regional
circulation models

Gridded rainfall input
to watershed model

Salinity intrusion model



Input Data for Models

Freshwater

Saltwater

Riverine Flows

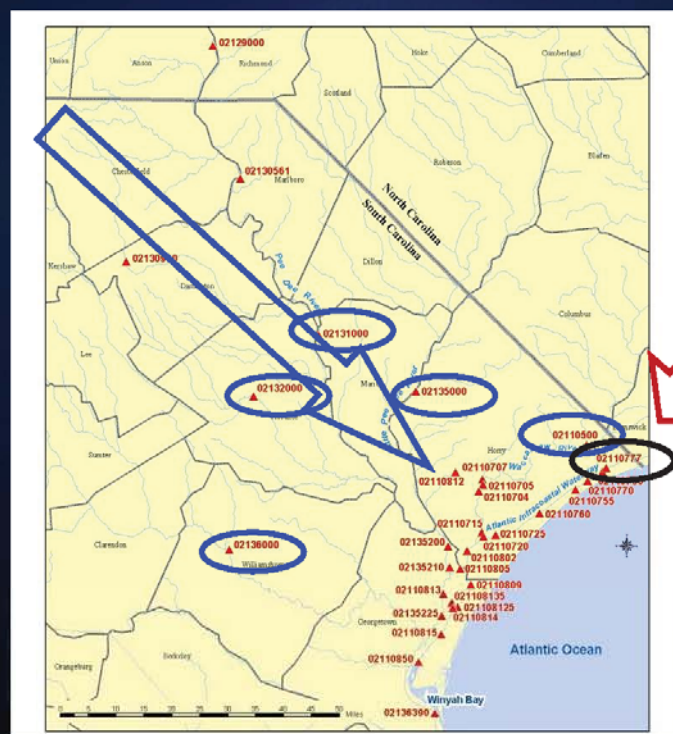
Pee Dee*

Little Pee Dee

Lynches

Black

Waccamaw



Tidal Forcing

Mean Water level

Tidal Range

Little River Inlet

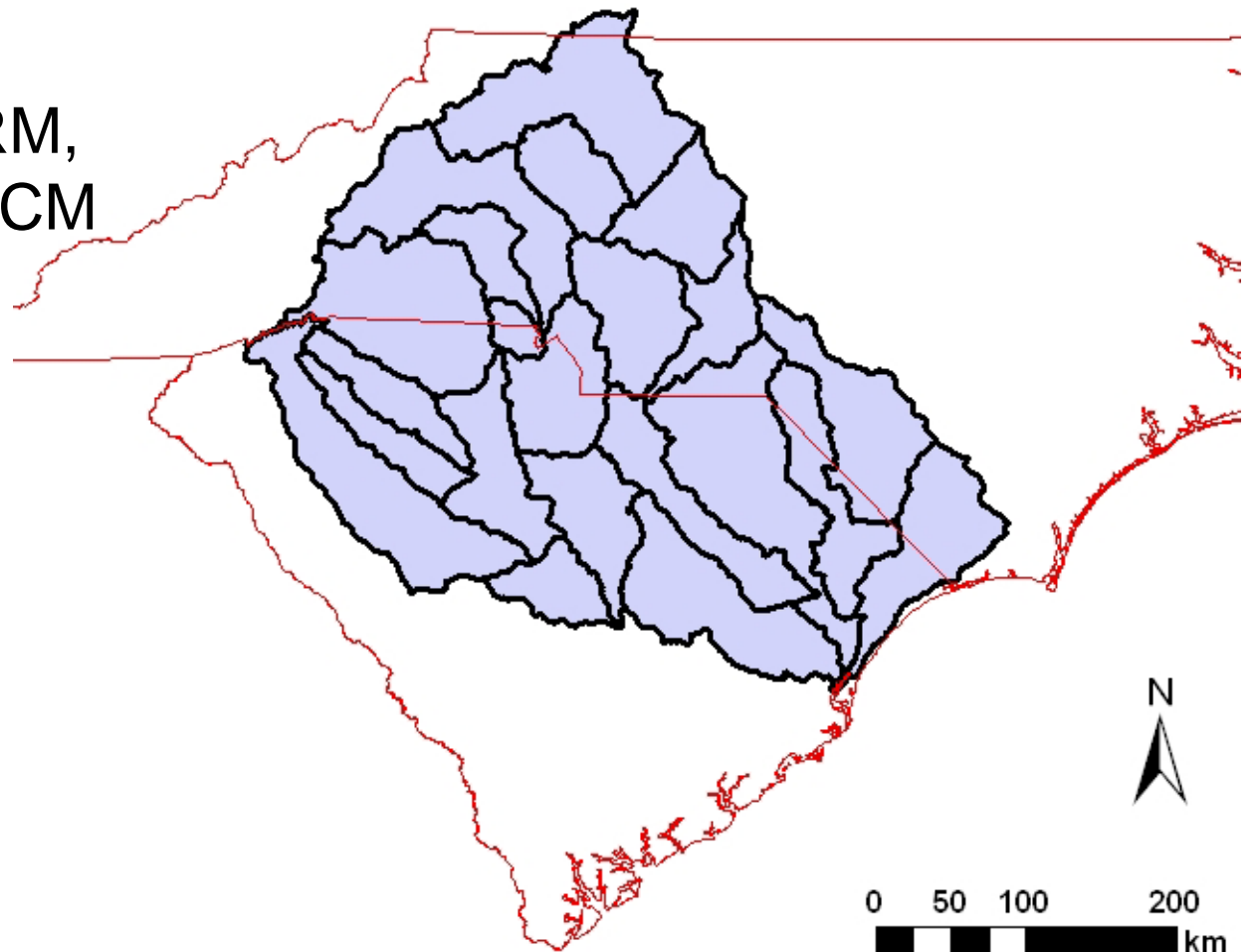
Note: Specific conductance is not used as an input

*User controlled input

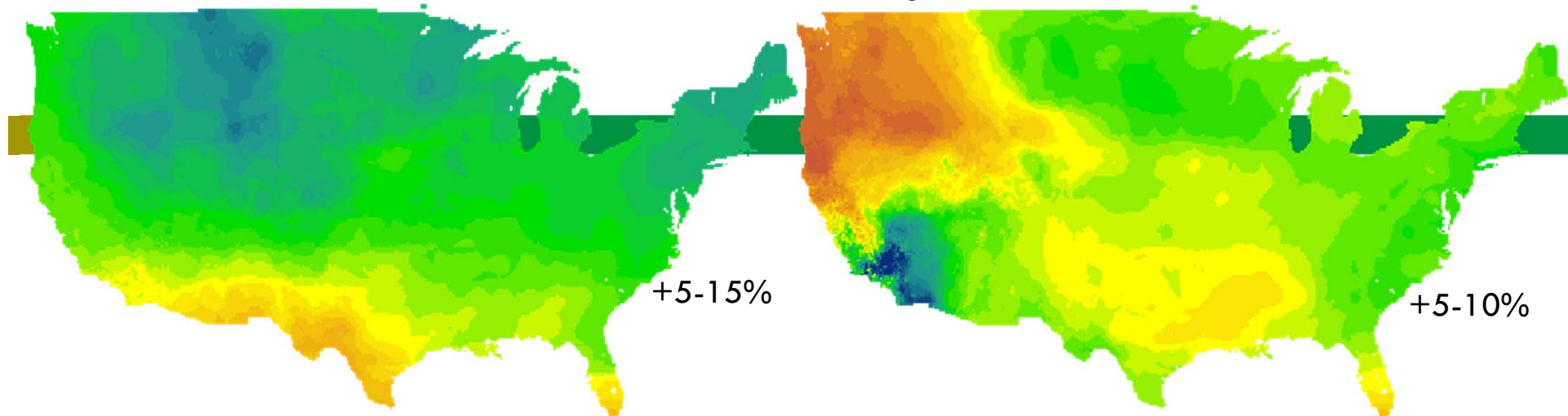
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Climate Change Scenarios

- Historical: 1980-2010
- Future: 2040-2070
- Models: CCSM, CNRM, **ECHO**, GFDL, and PCM



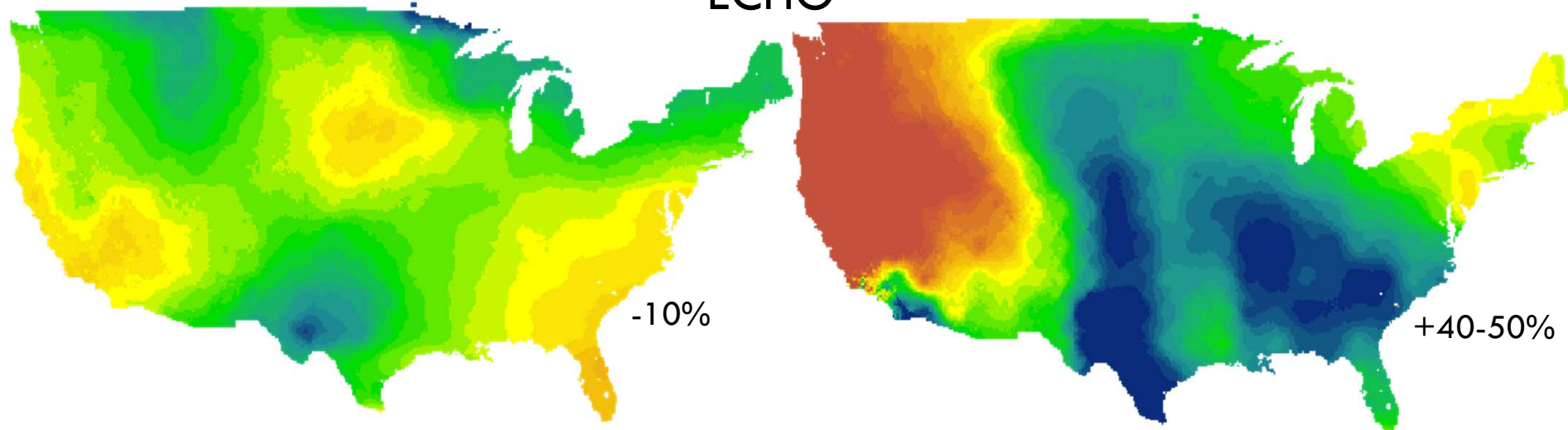
Ensemble average



WINTER

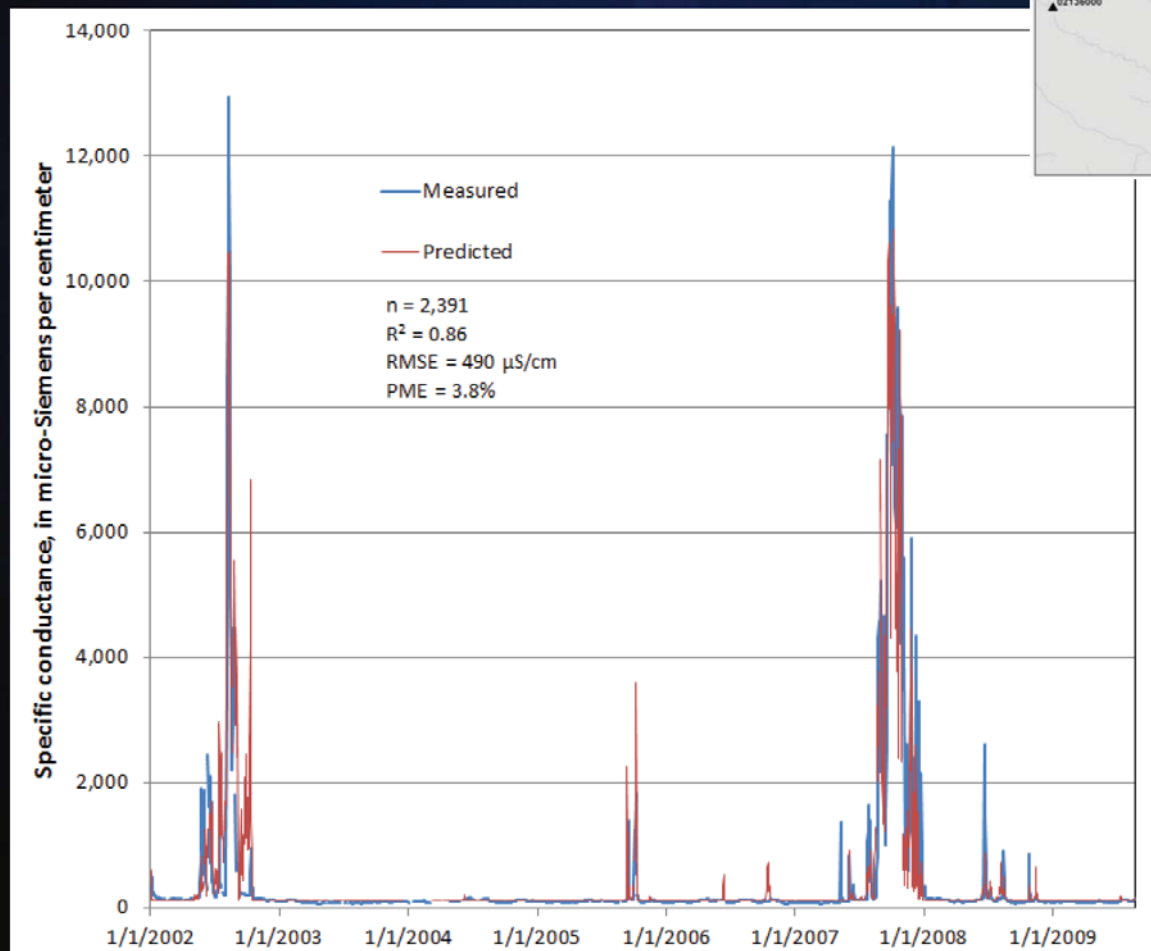
SUMMER

ECHO



Model Performance

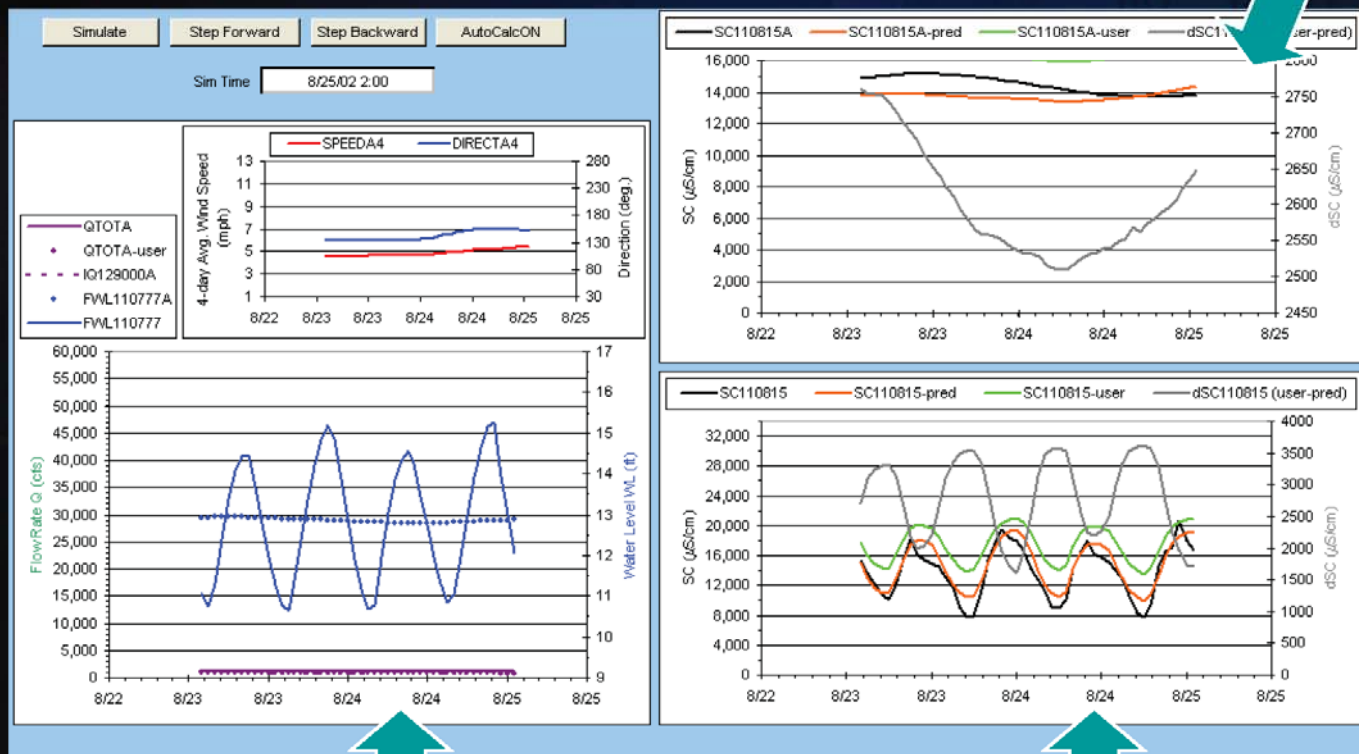
Pawleys Island



Paul Conrads

Graphical Display

Specific Conductance – daily predictions



Actual data – black

Model prediction – red

User specified condition – green

Difference b/w user and actual - gray

Input data - wind, water level, and flow

Specific Conductance – hourly predictions

Paul Conrads



The Impact of Drought on Coastal Ecosystems in the Carolinas

State of Knowledge Report January 2012

Steve Gilbert
Kirsten Lackstrom
Dan Tufford

cisa 
carolinas integrated sciences & assessments

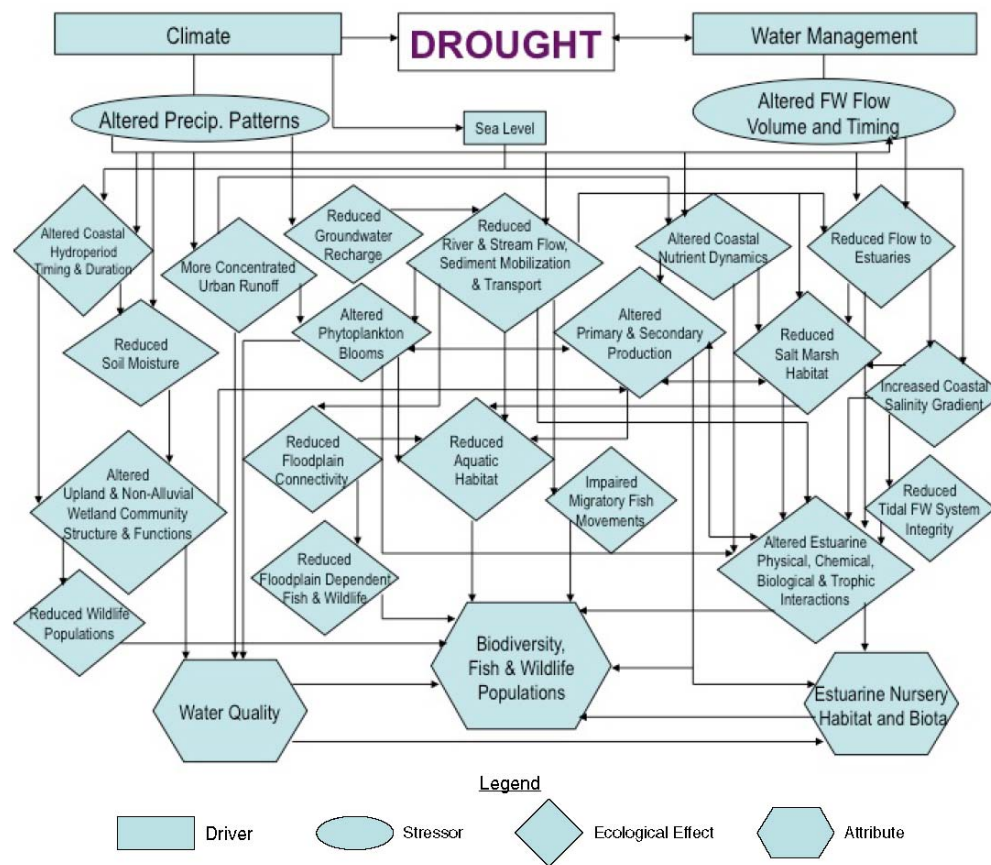


Figure 2. Conceptual Ecological Model for Drought Impacts on Coastal Southeast Atlantic Ecosystems.