

DELIVERING CLIMATE SERVICES AT REGIONAL / LOCAL LEVELS: ENGAGING PARTNERS

Moderator: **Tami Houston**, National Partnership Liaison, NCEI

Wayne Higgins, Director NOAA Climate Program Office

Ellen Mecray, Regional Climate Services Director (ER), NCEI

Beth Hall, Director, Midwestern Regional Climate Center

Nancy Selover, Arizona State Climatologist, Arizona State University

David Robinson, NJ State Climatologist, Rutgers University

Mark Shafer, Southern Climate Impacts Planning Program (SCIPP RISA)

DELIVERING CLIMATE SERVICES AT REGIONAL / LOCAL LEVELS: ENGAGING (NOAA) PARTNERS

Wayne Higgins

May 9, 2016

*Delivering Climate Services at Regional/Local Levels: Engaging Partners
National Meeting of NWS' Climate Services Program*

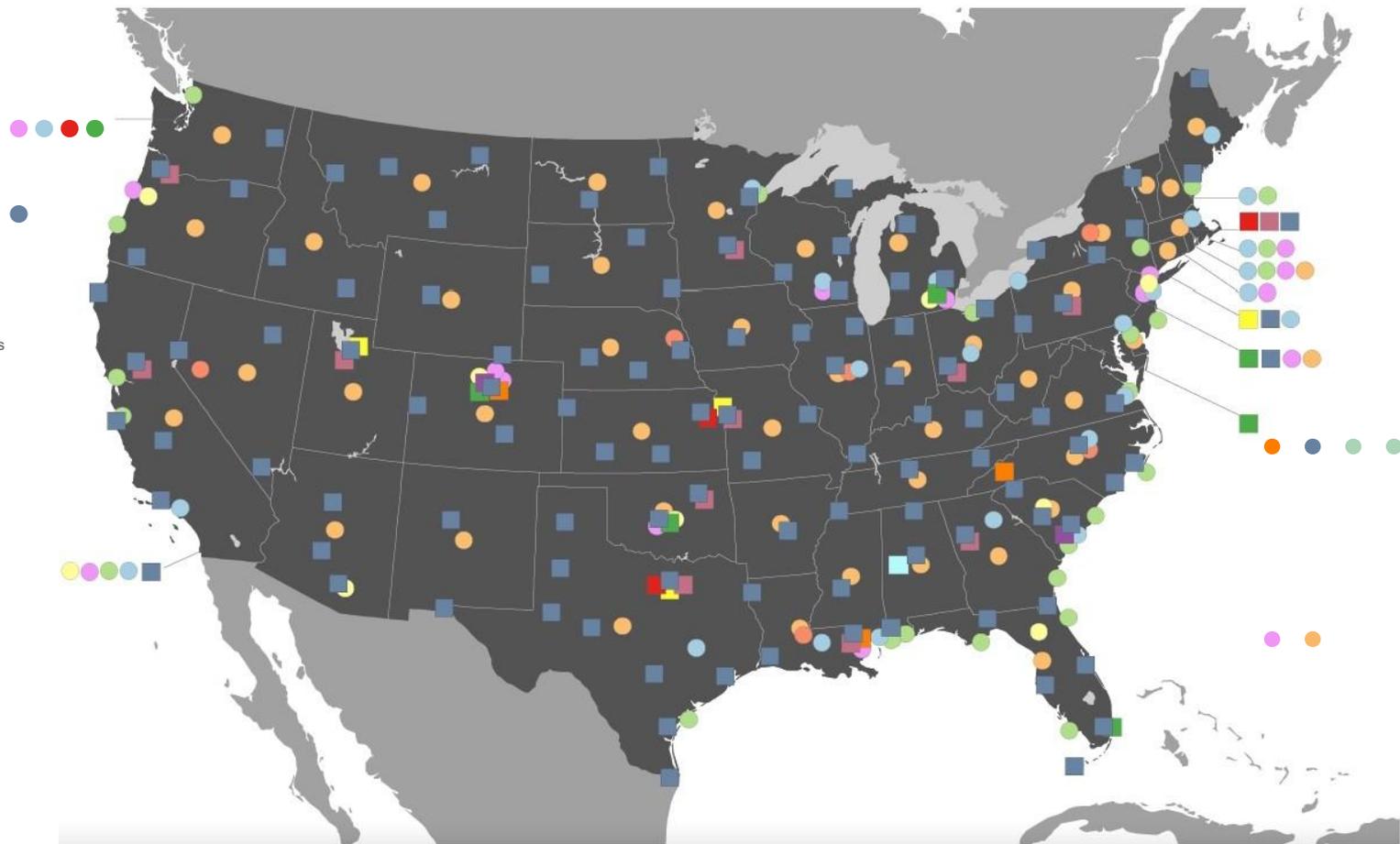
Climate Engagement Entities

NOAA

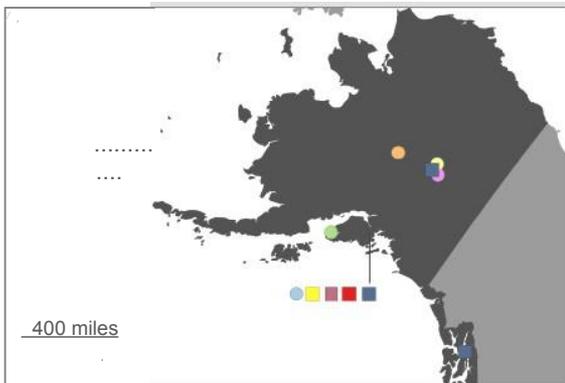
- ◻ NWS National Water Center
- NWS Regional Climate Services Directors Laboratories
- NWS River Forecast Centers
- Data and Prediction Centers
- NWS Regional Headquarters
- Program Offices and Headquarters
- NWS Weather Forecast Offices

NOAA Partners

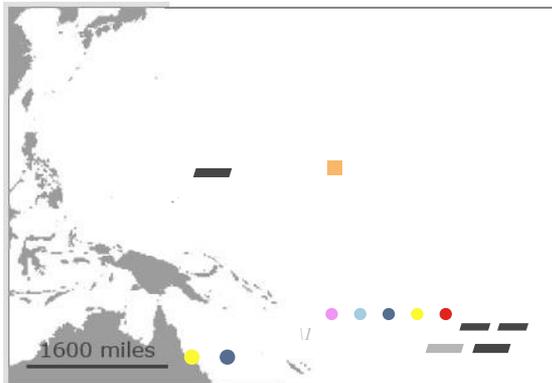
- Sea Grant
- National Estuarine Research (NERR)
- Cooperative Institutes
- Regional Climate Centers
- ◻ RISA
- State Climatologist



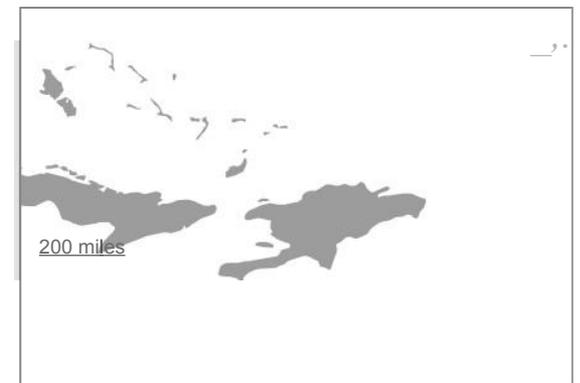
Alaska



Pacific Island Locations



Puerto Rico



NOAA is structured to have multiple entry points at regional, state, and local levels



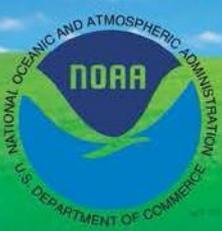
CLIMATE COORDINATION TEAM

BACKGROUND

D May 2015, the NOAA Climate Board asked the Climate Coordination Team (CCT): **“Is the information provided by NOAA climate entities consistent across the agency and is this network of climate information outlets effective and efficient?”** To answer this question, the team first identified the entities within NOAA that supply climate information to the public (see next page). Next, the CCT designed an approach to answering the following constituent questions:

- Where does the public (including other governmental agencies as well as other NOAA Line Offices) go for NOAA climate information?
- Is there duplication or overlap in sources and/or answers?
- Is information provided consistently across the agency?
- Is NOAA providing climate information in a coordinated, efficient, and effective manner?

The CCT agreed to complete four case studies to answer these question while also informing a future, more detailed study, if necessary.



CLIMATE COORDINATION TEAM

Climate Engagement Entity: Where does the "public" reach into NOAA to find someone to talk to about

NESDIS NMFS

- National Centers for Environmental Information (NCEI)
- Center for Weather and Climate (CWC)
- Center for Coasts, Oceans, and Geophysics (CCOG)
- Regional Climate Services (CWC)
- Regional Climate Centers - 6 Centers
- Regional Climate Service Directors - 6 Directors
- Climate Data Records
- Data Center Operations
- Center for Satellite Applications and Research
- Climate Satellite Services

- Fishery Science Centers (Northeast, Southeast, Southwest, Northwest, Alaska, Pacific Islands)
- Regional Offices (Greater Atlantic, Southeast, West Coast, Alaska, Pacific Islands)
- Office of Science and Technology

NOS

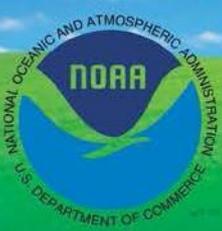
- Coral Reef
- Digital Coast
- NERRs - 28 Coastal Sites
- NGS Ecosystem and Climate Operations
- Office for Coastal Management
- Regional Reps [?]
- State CZM Programs - 35 states and territories
- National Marine Sanctuaries

NWS

- Climate Prediction Center
- Headquarters
- Regional Headquarters Offices, including the Climate Services Program Managers (CSPMs) and the Regional Operations Centers
- 122 Weather Forecast Offices, 13 River Forecast Centers, 15 Weather Services Offices, all which have Climate Services Focal Points, and additionally, 126 Observations Program Leaders in 126 of these offices

OAR

- Atlantic Oceanographic and Meteorological Laboratory
- Climate Program Office (Climate.gov, Climate Resilience Toolkit, NIDIS)
- Earth System Research Laboratory - 3 Divisions
- Geophysical Fluid Dynamics Laboratory - 9 Offices
- National Severe Storms Laboratory
- Pacific Marine Environmental Laboratory
- RISA - 11 Regional Offices
- Sea Grant - 33 Sea Grant Programs



CLIMATE COORDINATION TEAM

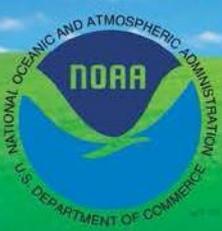
CASE STUDIES: APPROACH

Case study teams answered the questions by contacting individuals representing a subset of the NOAA climate engagement entities. The subset of the NOAA climate engagement entities was chosen based on their association with the case study subject. Case study areas and teams :

- California drought/El Niño (Tim Owen/David Herring)
- Climate impacts on marine resources, Northeast region (Roger Griffis/Ellen Mecray)
- Recurrent coastal flooding in the Southeast (John Marra/Billy Sweet)
- Alaska, including both terrestrial & marine components (Jeremy Mathis/Amy Holman)

Each case study team wrote up a preliminary synthesis of their case study findings, including sections on introduction, process, response strategy, and challenges and opportunities.

What follows is a “High Level Summary of Findings” from all 4 case studies



CLIMATE COORDINATION TEAM

CASE STUDIES: HIGH LEVEL SUMMARY OF FINDINGS

WHAT ARE THE CLIMATE QUESTIONS COMING INTO NOAA?

- Why / how did this happen?
- Will it happen again? If so, how soon and how often?
- How will [climate issue X (El Niño)] impact my [area of interest Y (crop)]?
- What does it mean where I live? How will this affect or impact my life or livelihood?
- Could the problem get worse in the future?
- What can we do to prevent such events?
- Should we rebuild? Should we relocate?
- What can we do to increase our resilience to such events?



CLIMATE COORDINATION TEAM

CASE STUDIES: HIGH LEVEL SUMMARY OF FINDINGS

WHO ARE SOME OF THE CUSTOMERS WE SERVE?

Everyone!

- | | |
|---|---|
| • Business owners | • City planners |
| • Coastal communities | • Commodity Brokers |
| • Conservative organizations | • Cooperative Institutes |
| • Emergency Response Managers | • Energy Producers |
| • Estuary Reserves & coastal stewardship programs | • Farmers & Ranchers |
| • Federal agencies | • Fisheries managers (federal, state, tribal) |
| • Fishers | • Fishing industry (processors, shell-fish growers) |
| • Indigenous communities | • Local officials thinking about zoning decisions, especially coastal areas |
| • Municipal Water Suppliers | • Natural Resource Managers |
| • Other nations | • Policy-makers |
| • Protected species managers (federal, state, tribal) | • Public health officials |
| • Recreational sectors (marine fishing, boating, tourism, etc.) | • Renewable Energy Development & Resources Programs |
| • River & Lake Management Authorities | • River Water Coalitions |
| • State Climatologists | • Tourism and Recreation |
| • Water resource officials considering development plans | • Weather Forecasters |



CLIMATE COORDINATION TEAM

CASE STUDIES: HIGH LEVEL SUMMARY OF FINDINGS

WHAT ARE NOAA'S OPPORTUNITIES TO IMPROVE CLIMATE DATA AND INFORMATION COMMUNICATION?

- Improve the flow of information within NOAA:
 - Connectivity is weak (both from regions to NOAA HQ & from NOAA HQ to regions);
 - Reporting on certain events/impacts is not being conducted in an organized manner.
- Improve access to information:
 - Improve early warnings, projections, and communications to impacted areas;
 - Improve underlying data and tools/products;
 - Provide a more strategic approach to products and services development and delivery that leads to a centralized source of information and/or the creation of a recognized product suite, like what can be found for National Integrated Drought Information System (NIDIS) .
- Improve components of messaging:
 - Some of NOAA's information services are of limited utility for decision-making;
 - Need to focus more on answering the questions that people are asking
 - Consistent messaging at local scales and on shorter timeframes is a challenge.



CLIMATE COORDINATION TEAM

NEXT STEPS

What NOAA products are available to answer those climate questions?

- Climate Products Spreadsheet (~500 products)
- Coordination with NOSIA

How are climate questions coming into NOAA?

- Climate Resilience Toolkit “Find an Expert” Page
- Climate Helpdesk

How can we best open the lines of communication and exchange data / ideas?

- Propose a Regional Climate Engagement Entities Summit
 - NOAA
 - Interagency Partners (e.g. USDA Hubs, DOI CSC’s)



CLIMATE COORDINATION TEAM

Climate Resilience Toolkit's “Find an Expert” page

How are climate questions coming into NOAA?

- Results of the social network analysis rest on the Climate Resilience Toolkit's “Find an Expert” page (<https://toolkit.climate.gov/help/partners>) as a separate webpage dedicated to NOAA's climate experts.

U.S. Climate Resilience Toolkit

About | Contact | Funding Opportunities | FAQ

Get Started Taking Action Tools Topics Expertise Search

Help > Find Experts >

Find Experts

Regional and locally-focused centers across the nation are available to help you build resilience to climate-related changes and impacts in your community. Browse the maps below, then click on an orange marker to see that office's location, the services it provides, and other information. For more information about how federal agencies collaborate, see [Federal Agency Coordination](#).

Last modified: 21 September 2015 - 12:37pm

Regional Integrated Sciences & Assessments (Lower 48 States)

- State Climatologists
- U.S. Offices
- NOAA
- RISA
- Regional Climate Centers
- NOEI Regional Climate Services Dir.
- National Weather Service
- River Forecast Centers
- Sea Grant
- National Estuarine Research (NERR)
- USDA
- Department of the Interior

Climate Impacts Research Consortium (CIRC)

Western Water Assessment (WWA)

California-Nevada Applications Program (CNAP)

Climate Assessment for the Southwest (CLIMAS)

Southern Climate Impacts Planning Program (SCIPP)

Great Lakes Integrated Sciences & Assessments Center (GLISA)

Carolinian Integrated Sciences & Assessments (CTSA)

Consortium on Climate Risk in the Urban Northeast (CCRUN)

Southeastern Climate Consortium (SECC)



CLIMATE COORDINATION TEAM

EXTRAS



CLIMATE COORDINATION TEAM

California Drought / El Niño

Study Overview

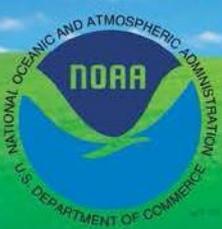
During 2011-15, California experienced the driest four successive winters since 1895. Dry conditions have been widespread and, according to the U.S. Drought Monitor for August 2015, all of California is in severe to exceptional drought.

A developing El Niño, with strong warming of the east equatorial Pacific and cooling of the tropical west Pacific and North Pacific, reverses many of the anomalies prevailing during 2011-15. This El Niño ranks among the strongest in the historical record for this time of year and forecast models predict it to last into 2016.

Technical Approach

The questionnaire was distributed to the RCSD's and the collaborators (Western Region NWS Western RCC, Southwest CLIMAS) of the ENSO webinar event that was held in early November. Out of those who were asked to participate, five responses were received which contained varying levels of detail.

POCs: David Herring, Tim Owen, and Toni Parham

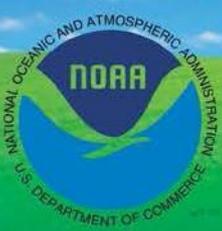


CLIMATE COORDINATION TEAM

California Drought / El Niño

Preliminary Findings

- Information requests come from a wide variety of sources via multiple channels
 - ✓ NOAA responses are provided via multiple channels: i.e., email, quarterly outlooks, public briefings, webinars and meetings, & web blogs.
 - ✓ NCEI is a routinely named source & filter for information requests, which are typically coordinated by RCSDs within their regions.
 - ✓ “Go-to” sources include websites (e.g., CPC outlooks, WRCC Dashboard) and public briefing sheets.
- Consistent messaging is still a challenge to overcome, considering that ENSO has different effects in different parts of the country.
- Some duplication. We could benefit from better coordination.
 - ✓ Regional & local offices have self-organized into networks
 - ✓ RCSDs collect & characterize info requests.
 - ✓ Dialog is essential, both within NOAAs networks and with stakeholders.
- Some requests could lead to new requirements / more work.
 - ✓ Need an internal NOAA process to address such requests.
 - ✓ Focus on the “where,” the “when,” and stakeholders’ key thresholds.



CLIMATE COORDINATION TEAM

Alaska (Terrestrial and Marine)

Study Overview:

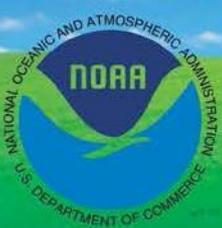
- AK Case Study leverages NOAA regional and Arctic team experiences to provide the climate board with insights on the effectiveness of NOAA climate services in Alaska

Technical Approach:

- Google form survey
- ACCAP Social Network Analysis of Climate Research, services and Decision-making in AK



POCs: Jeremy Mathis and Amy Holman



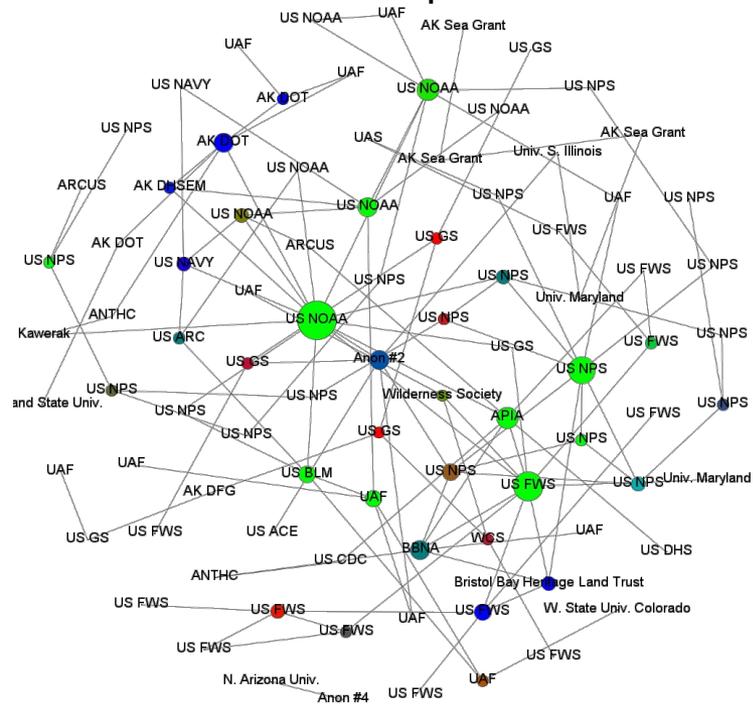
CLIMATE COORDINATION TEAM

Alaska (Terrestrial and Marine)

The climate science practice interface in Alaska

Preliminary Findings:

- Coordination occurs broadly across organizations and disciplines in AK
- Consistency benefits from the coordination and relationship networks
- Key barriers are lack of underlying data and tools/products that work for AK
- NOAA supports several key network functions and networks most frequently with federal agencies and the University of Alaska



ACCAP Social Network Analysis of Climate Research, services and Decision-making in AK

Nathan Kettle, PI, ACCAP



CLIMATE COORDINATION TEAM

Recurrent Coastal Flooding in the Southeast

Study Overview

Coastal flooding takes many forms. Nationwide, **decision-makers and the public have begun to take notice** of the potential impacts of chronic, or **'recurrent' coastal flooding** and there is growing recognition that the frequency of such events will increase dramatically with rising sea levels.



Technical Approach

As per the CCT Case Study Development Plan , a cross LO case study team was formed, contacted individuals representing a subset of the NOAA climate engagement entities, and asked them to complete a questionnaire. The subset of the NOAA climate engagement entities was chosen based on their association with the case study subject. The questionnaire went out to 52 individuals and responses were received from 25.



CLIMATE COORDINATION TEAM

Recurrent Coastal Flooding in the Southeast

Preliminary Findings

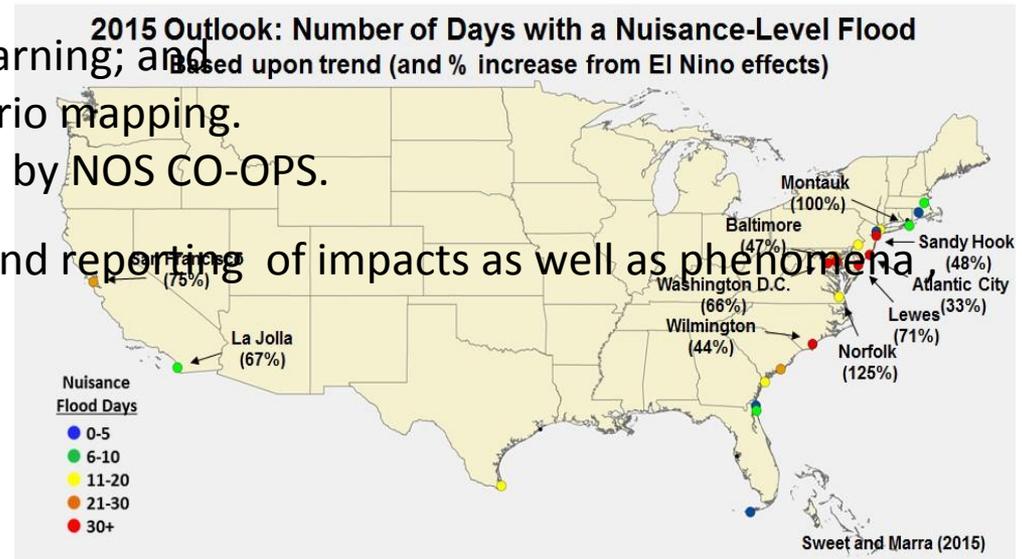
Products and services related to recurrent coastal flooding events are limited in scope and not well integrated.

Centers of actions exist within the:

- NWS WFOs with respect to event warning; and
- NOS OCM with respect to SLR scenario mapping.

Both make use of information provided by NOS CO-OPS.

Gaps exist with respect to monitoring and reporting of impacts as well as phenomena and seasonal forecasting.





CLIMATE COORDINATION TEAM

Climate Impacts on
Marine Resources in
the Northeast

Study Overview: Assess responses to requests for information on climate-related changes in the NE marine ecosystem.

Technical Approach:

- Used Google survey.
- Sent request to reps from all LOs (30 targets).
- Received responses from all Line Offices (18).



POCs: Roger Griffis (NMFS), Ellen Mecray (NESDIS)



CLIMATE COORDINATION TEAM



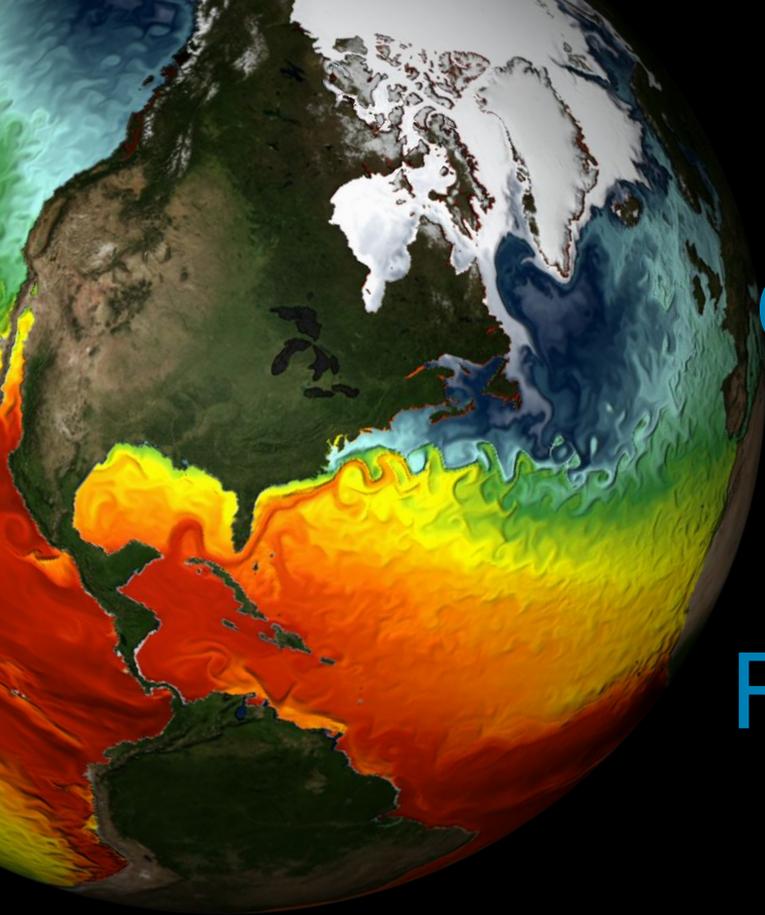
Climate Impacts on Marine Resources in the Northeast

Preliminary Findings:

- Requests originate from diversity of sources (media, academia, industry etc.).
- Requests enter NOAA through multiple people.
- Requests referred to a small set of regional experts (e.g., NMFS Fisheries Science Center and RCSD).
- Responses based on individual knowledge & multiple sources.
- Consistent responses but no organized process, no one-stop sources.

Barriers & Solutions:

- High interest in region- and sector-specific information.
- Additional outlets may help meet need (e.g., quarterly climate outlooks, web-based portals).
- Social Network Analysis may be useful to help ID key connectors between science and operations.



CLIMATE SERVICES: ENGAGING CUSTOMERS AT REGIONAL TO LOCAL SCALES

Ellen L. Mecray

National Oceanic and Atmospheric Administration (NOAA)

Eastern Region Climate Services Director

Taunton, MA

Ellen.L.Mecray@noaa.gov

508-824-5116 x263



Regional Climate Services

The development and delivery of climate products and services that are on time and spatial scales needed most by decision-makers

Development and Delivery: requires an end-to-end system that links research, modeling and assessment activities to product and services development, along with delivery systems and capacity building to help users incorporate new knowledge into their decision making.

Products and Services: climate information and decision support tools that expand one's understanding of risk and impacts and promote identification of adaptation and mitigation options

Time and spatial scales: climate impacts are felt closest to home. Users need timely, place-based information on climate risks and impacts in order to make informed decisions.

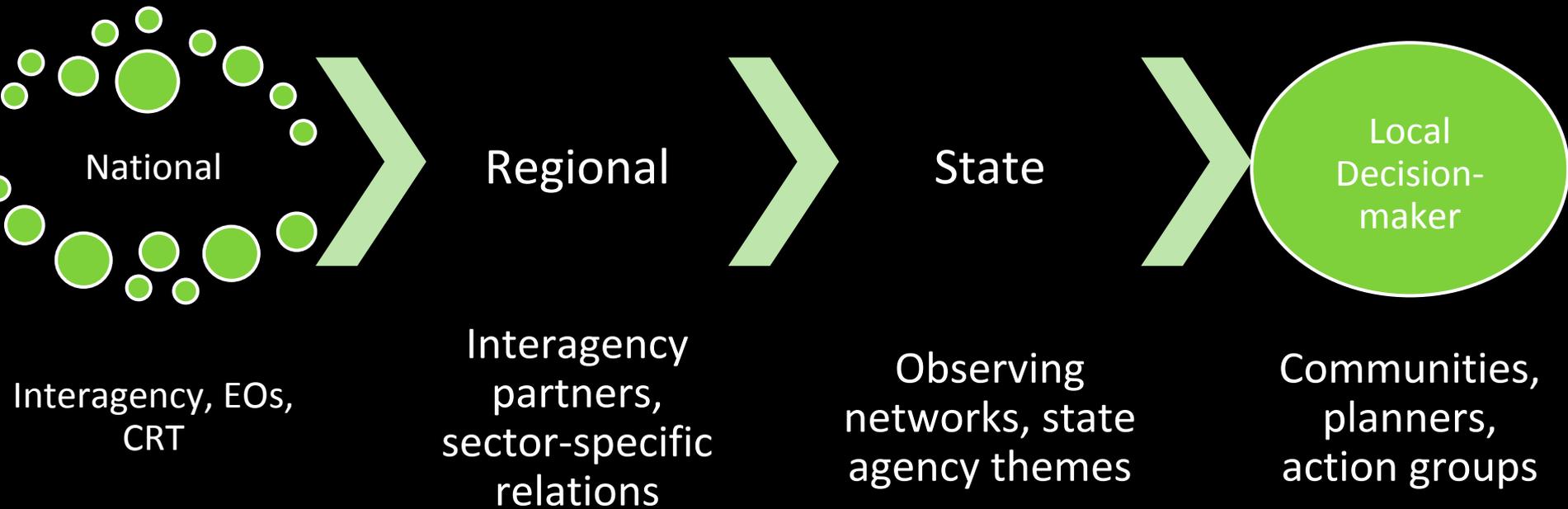
Decision-makers: users of climate information representing all public and private sectors of activity. These are our climate stakeholders.

Key Services

Generate, transmit, transform, translate

- **Monitoring** – value add, trends, anomalies
- **Data** – instrumentation, collection, database
- **Prediction** – interpretation, place/sector based
- **Outreach** – informing decisions, accessibility
- **Education** – capacity building for understanding
- **Research** – applied, useable
- **Networks** – awareness, linkages, sharing

The Scales of Regional Climate Services

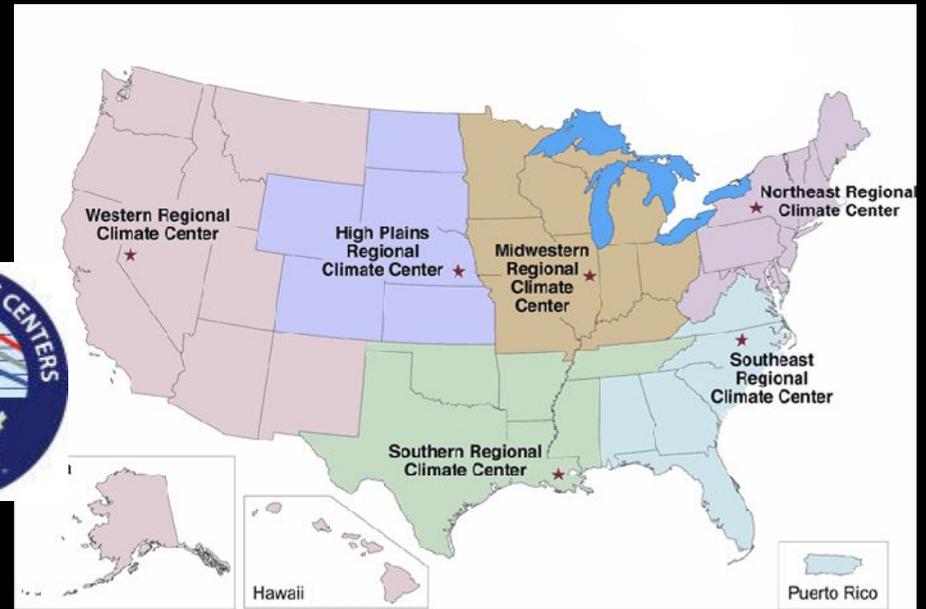


- RCSDs focus on:

- National and regional scale partnerships (fed partners, LCC, CSC, USDA, NIDIS, others)
- Sector-based focus areas (ROG, Ag, health, energy, transportation, finance)
- Requirements gathering and delivery of NOAA information

Regional Climate Services

- Regional Climate Centers
- State Climatologists
- NOAA- OAR, NWS, NOS, NMFS
- Federal
- State
- Academia
- NGOs
- Tribes



NOAA's Regional Climate Services Directors



NOAA Regionally Integrative Programs

NOAA Regional Collaboration Teams

8

National Marine Fisheries Service

1. Alaska
2. Greater Atlantic
3. Pacific Islands
4. Southeast and Caribbean
5. West Coast
6. Northwest (Science Center)

6

Office of Atmospheric Research

Climate Program Office
Regional Integrated Sciences & Assessments

10

Currently Funded RISAs

National Ocean Service
Office for Coastal Management

1. Pacific Island Region
2. West Coast Region
3. Northeast Region
4. Gulf Coast Region
5. Great Lakes Region
6. Mid-Atlantic Region
7. Southeast & Caribbean Region

7

National Weather Service

6

National Ocean Service
Integrated Ocean Observing System

11



What is at Risk? What Can We Do?



Reservoir
Control



Infrastructure



Construction



Agriculture



Recreation



Ecosystems



Health



Environment

National Resources

✓ US Global Change Research Program: www.globalchange.gov

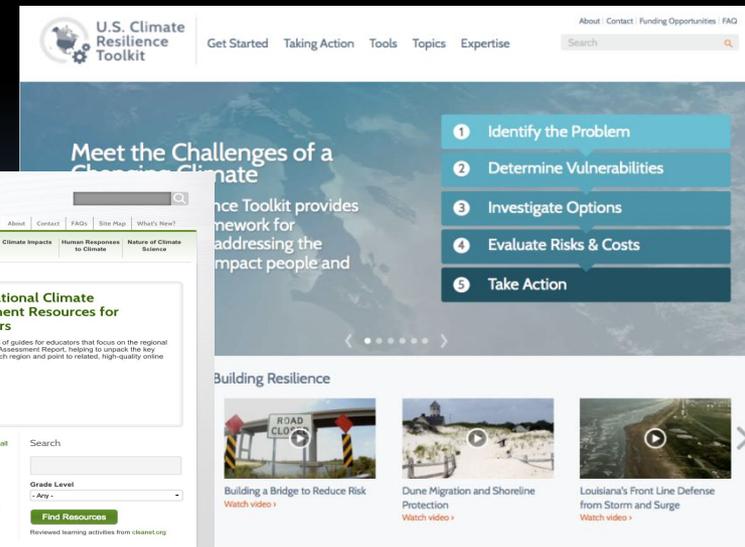
✓ Third National Climate Assessment portal: nca.gov

✓ Federal Adaptation Resources: <http://www.globalchange.gov/browse/federal-adaptation-resources>

✓ U.S. Climate Resilience Toolkit: <http://toolkit.climate.gov/>

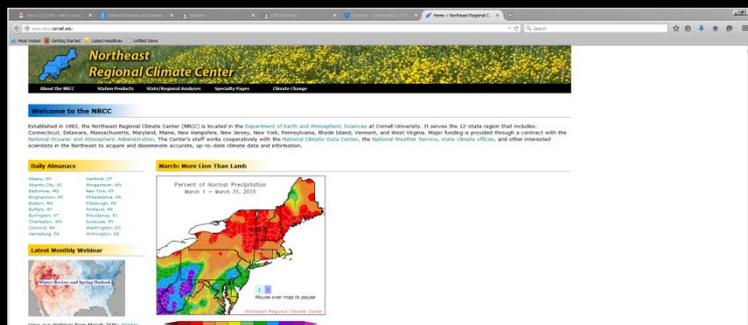
✓ Climate Data: <http://www.data.gov/climate/>

✓ Climate Information: <https://www.climate.gov/>



Regional Resources

- State Climatologists: <http://stateclimate.org/>
- Regional Climate Centers: <http://www.ncdc.noaa.gov/customer-support/partnerships/regional-climate-centers>
- Regional Climate Services Directors: <http://www.ncdc.noaa.gov/rcsd>
- Quarterly Climate Summaries/Outlooks (2 page Summaries): <http://www.drought.gov/drought/content/resources/reports>
- Climate Information Dashboard: <http://org/dashboard/>



Monthly Climate Webinars

- CR- Began November 2011; ER- Began February 2015
- Focus where concerns are highest in “real-time”
- Early Warning System
- Flexible response to climate extremes
- Popular w/states, feds, tribes, private interests
- Presenters: AASC, NDMC, RCC, USDA, NWS/RFC, CDC, RISA, NOS, etc...

Midwest and Great Plains Drought and Climate Webinar

September 19, 2013

“Central Region Agricultural Update”

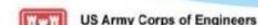
Brad Rippey
USDA Meteorologist
Washington, D.C.

Photo by B. Rippey



Missouri River Basin Climate Outlook 1 May 2014

Dr. Dennis Today
State Climatologist
South Dakota State Univ.
dennis.today@sdstate.edu
605-688-5141



Attribution and Assessments

Devil's Lake Attribution

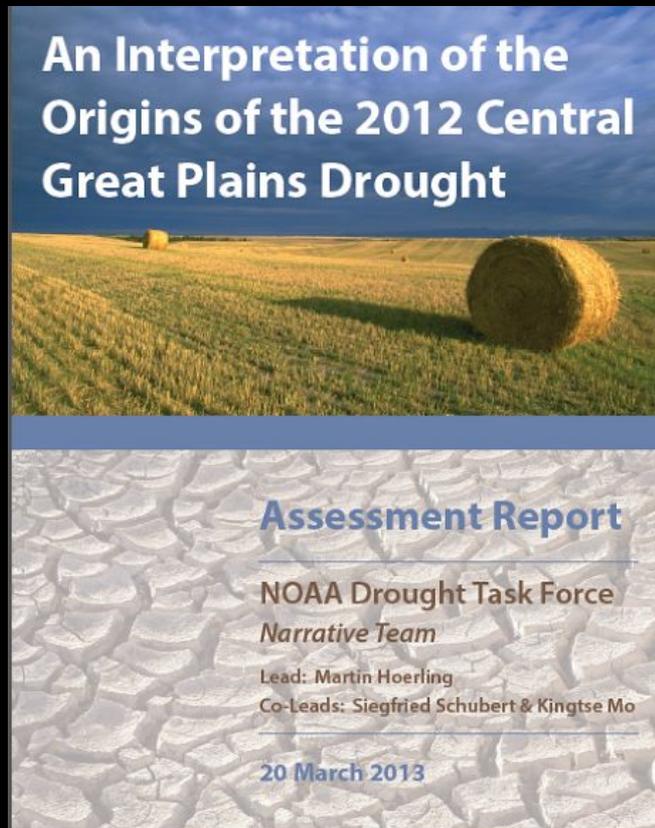
2011 Flood Attribution Study

2012 Drought Assessment

2012 Drought Attribution Study

2007 April Freeze <http://www1.ncdc.noaa.gov/pub/data/techrpts/tr200801/tech-report-200801.pdf>

2008 April Freeze <http://www1.ncdc.noaa.gov/pub/data/techrpts/tr200801/tech-report-200801.pdf>



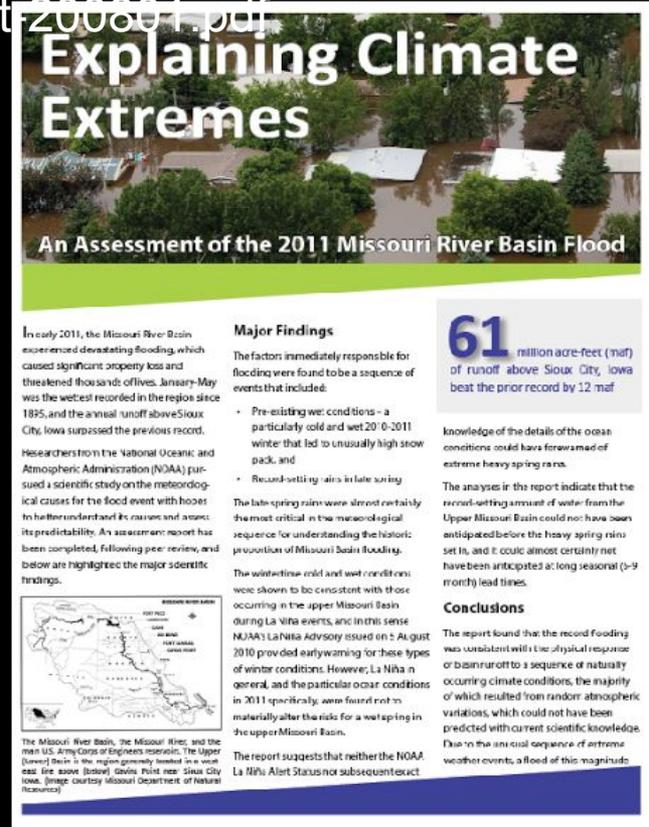
An Interpretation of the Origins of the 2012 Central Great Plains Drought

Assessment Report

NOAA Drought Task Force Narrative Team

Lead: Martin Hoerling
Co-Leads: Siegfried Schubert & Kingtse Mo

20 March 2013



Explaining Climate Extremes

An Assessment of the 2011 Missouri River Basin Flood

61 million acre-feet (maf) of runoff above Sioux City, Iowa beat the prior record by 12 maf

Major Findings

The factors immediately responsible for flooding were found to be a sequence of events that included:

- Pre-existing wet conditions – a particularly cold and wet 2010-2011 winter that led to unusually high snow pack, and
- Record-setting rains in late spring

The late spring rains were almost certainly the most critical in the meteorological sequence for understanding the historic probability of Missouri Basin flooding.

The wintertime cold and wet conditions were shown to be consistent with those occurring in the upper Missouri Basin during La Niña events, and in this sense NOAA's La Niña Advisory issued on 5 August 2010 provided early warning for these types of winter conditions. However, La Niña in general, and the particular ocean conditions in 2011 specifically, were found not to materially alter the risks for a wet spring in the upper Missouri Basin.

The report suggests that neither the NOAA La Niña Alert Status nor subsequent exact knowledge of the details of the ocean conditions could have forewarned of extreme heavy spring rains.

The analyses in the report indicate that the record-setting amount of water from the Upper Missouri Basin could not have been anticipated before the heavy spring rains set in, and it could almost certainly not have been anticipated as long seasonal (3-9 month) lead times.

Conclusions

The report found that the record flooding was consistent with the typical response of basin runoff to a sequence of naturally occurring climate conditions, the majority of which resulted from random atmospheric variations, which could not have been predicted with current scientific knowledge. Due to the unusual sequence of extreme weather events, a flood of this magnitude



The Missouri River Basin, the Missouri River, and the main U.S. Army Corps of Engineers reservoir, The Upper Missouri Basin is the region generally located in a west-east line above (below) Gavins Point near Sioux City, Iowa. (Image courtesy Missouri Department of Natural Resources)

<http://www.esrl.noaa.gov/psd/csi/factsheets/>

Climate Information Dashboards

Gulf of Maine Region

Dashboard

Recent and Real-Time Data and Resources

- Click on each image to enlarge
- Click on each source URL to reach the original site
- Scroll over each image for additional information

US Eastern Region

Temperature & Precipitation

Drought & Stream Flow

Winter Weather

Ocean Conditions

US National

Canada—Atlantic Region and National

Global/Oceanic

NOAA/Regional Climate Services/Eastern Region
<http://www.ncdc.noaa.gov/rcsd/eastern>



NOAA

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

Other Regional Services

- **Prepping for Events (e.g., El Nino)**
- **North American Climate Services Partnership**
 - Canada/U.S. climate focus on Great Lakes and Gulf of Maine
 - Mexico/U.S. climate focus on Rio Grande/Bravo Basin
- **Federal Climate Collaborations (Pacific Islands, MO Basin, Midwest, Mid-Atlantic, New England)**
- **National Climate Assessment**
 - Regional and sector interpretation
- **Information Delivery via Interpretation**
 - Synthesizing per audience

Ellen L. Mecray

NOAA National Centers for Environmental Information

Eastern Region Climate Services Director

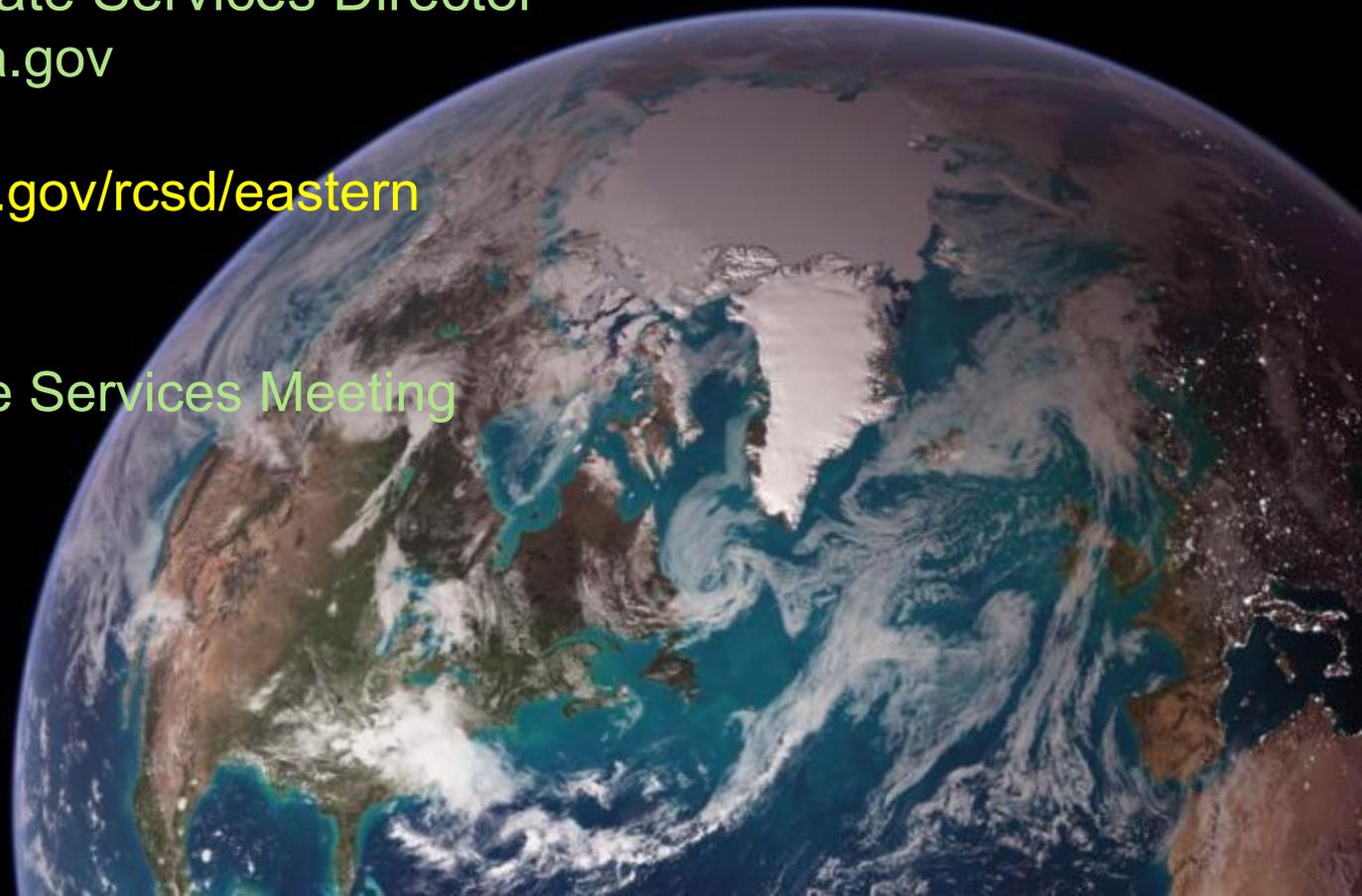
Ellen.L.Mecray@noaa.gov

<http://www.ncdc.noaa.gov/rcsd/eastern>

May 9, 2016

NWS National Climate Services Meeting

Silver Spring



BackUps

Regional Partnerships

Sector	Primary Fed Agency	Fed Plan	State Agency Lead	Regional Coordinating Group	Internat'l and Interstate
Coastal	NOAA	CZ 309s	CZ	NROC, MARCO (ROGs)	GOMC
Nat Resources	DOI	SWAPs	F&W	LCCs	
Forestry	USDA	Plan Guides	State foresters	Cli Hubs	
Health	CDC	BRACE	DOH	CoP, NE states	
Infrastructure	DOT/FH WA	TIPs	DOT	ICNet	
Emergency Mgmt	FEMA	HMPs, THIRA	EMA	NEMAC	IMEG
Environment	EPA	PPAs, PPDs	DEP, DEM	New!	
COORDINATION	NEFP, FCP		State Task Forces		

Climate
Info
Providers

Climate Information Providers

Variables:

Geographic scale (international, national, regional, state, local)

Temporal coverage (historical or projected)

Research or operational information delivery

Regional Group	Temporal coverage	Research or operational delivery
NOAA RCS (RCSD, RCC, and SC)	Historical context, present observations	Operational
NOAA RISAs	Historical and projected	Research, multi-sectoral
NOAA Cooperative Institutes	historical	Research, multi-sectoral
DOI/Climate Science Centers	Historical and projected	Research, primarily for natural resources
Others?		

NOAA Services Across the Weather-Climate Continuum

National &
Global



Drought Monitor



Monthly State of the
Climate Reports



Annual State of the
Climate Reports



National Climate
Assessment

Regional



Hurricane Tracks



Heat Wave
Prediction



Drought Outlook



Climate Normals

Local



Tornado Warnings



Heating and Cooling
Degree Days



Temperature &
Precipitation
Outlooks



Extreme Detection &
Attribution

Weekly

Monthly

Seasonal-
Annual

Decadal

NCEI's Information Services

Objective: Deliver Use-Inspired Environmental Information that Supports the Nation's Prosperity and Resilience

Provide Information

Expand and Enrich Use of NCEI's Environmental Information



Understand Users

Understand User Needs and Translate Them Into Requirements

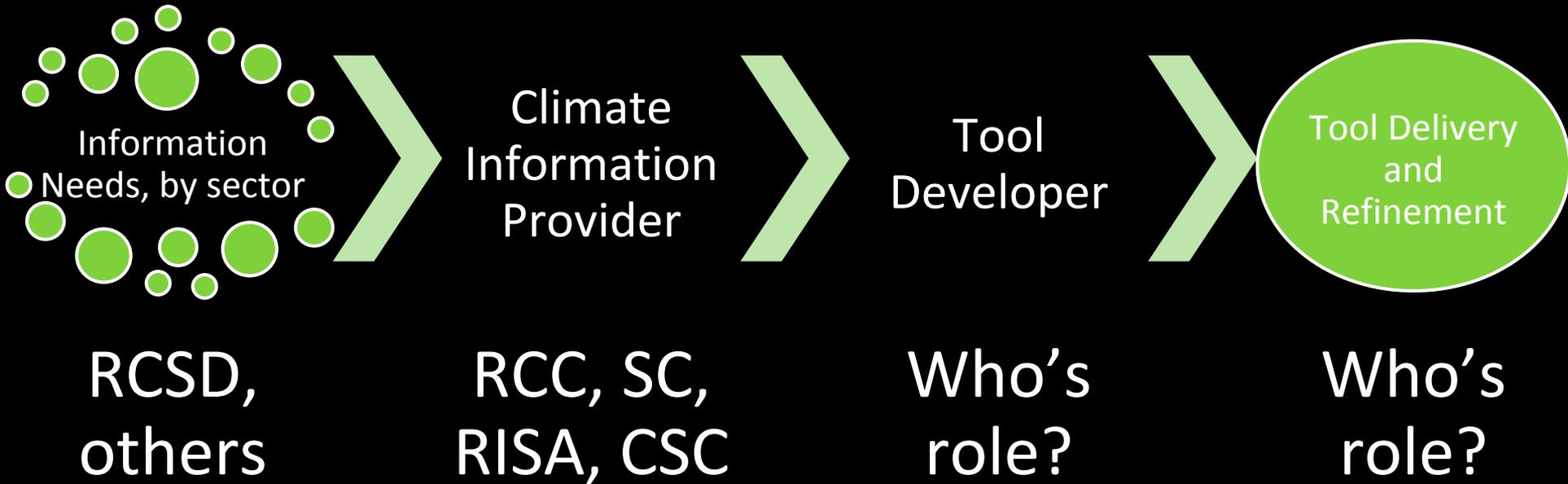


Strengthen Networks

Strengthen Networks for Developing and Delivering NCEI's Products and Services

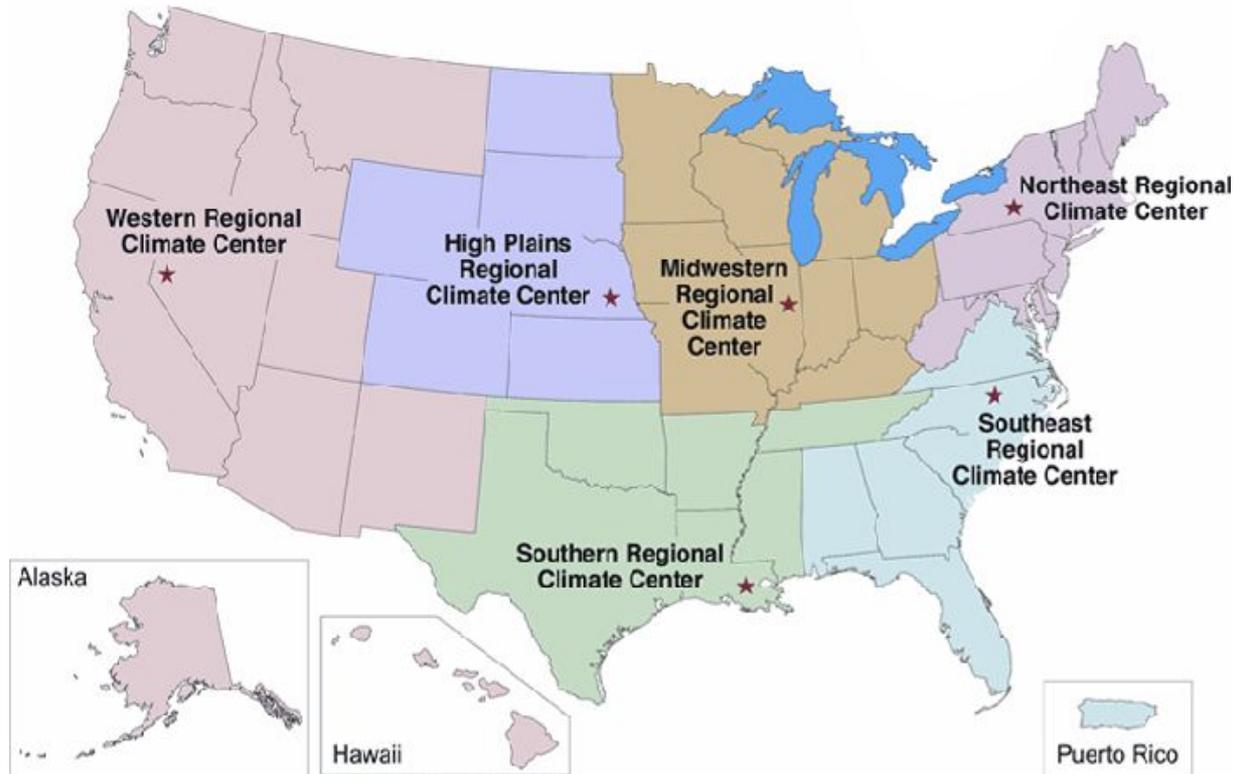


The Continuum of Regional Climate Services Delivery



- Lessons from the Weather Enterprise, application to Climate Enterprise?
- NOAA Big Data Partnership, offer the data, sell the tools
- What about those that can't pay for the tools we've been discussing?

Regional Climate Centers



Dr. Beth Hall

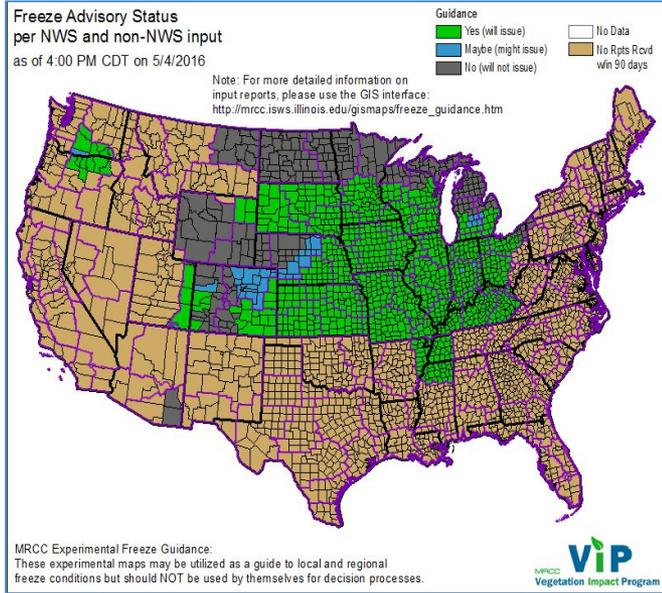
Director, Midwestern Regional Climate Center

May 2016

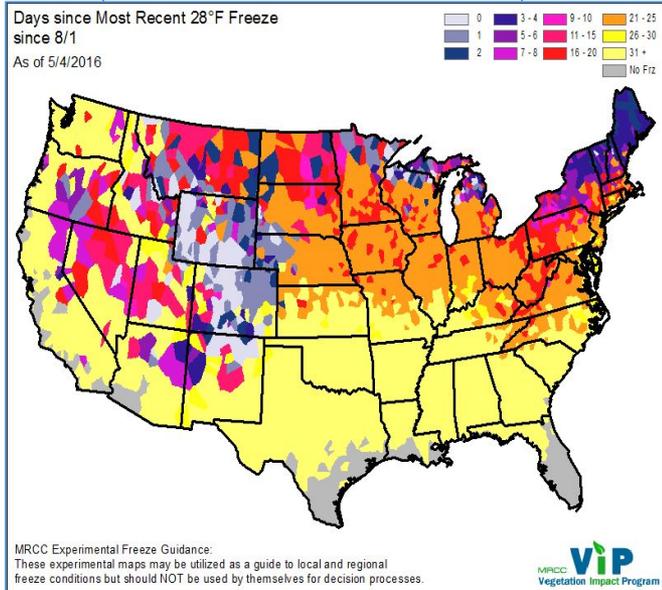
Vision	To be the regional resource for historical, real-time, and projected climate information
Mission	To communicate and respond to the climate information needs of the region through data stewardship, climate science expertise, and decision-support tool development
NOAA Partnership examples	<ul style="list-style-type: none">• NWS• RISA Program• Sea Grant Program• NIDIS• Regional Coordination Teams
Other Partnership examples	<ul style="list-style-type: none">• USGS Climate Science Centers• USDA Climate Hubs• US Army Corps of Engineers

Regional Climate Centers Example Products

xmACIS 2



VIP / Frost-Freeze



Datzilla

Datzilla is based on Bugzilla Version 2.18

Datzilla Main Page

Datzilla is the NOAA data-product error reporting and tracking system.

Begin by selecting an option, below:

- [Search existing error reports](#)
- [Enter a new error report](#)
- [Summary reports and charts](#)
- [Log in to an existing Datzilla account](#)

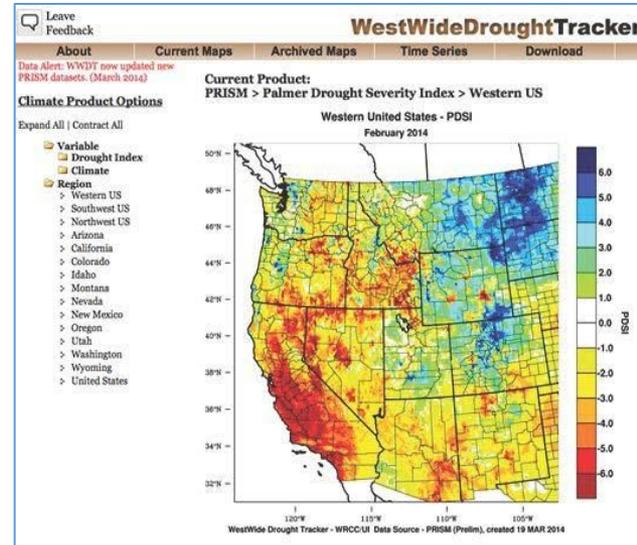
Enter an error # or some search terms:

Am I an outlier or an extreme on the tail of an observed distribution?

Actions: [Datzilla Home](#) | [New](#) | [Search](#) | [Find error #](#) | [Reports](#) | [Log In](#)

Quick: [Request a Login Account](#) | [Report an Error](#) | [Query Errors](#) | [Extended Guidelines](#) | [Datzilla Overview](#)

Help: [Guidelines](#) | [Datzilla Overview](#)



WestWide Drought Tracker

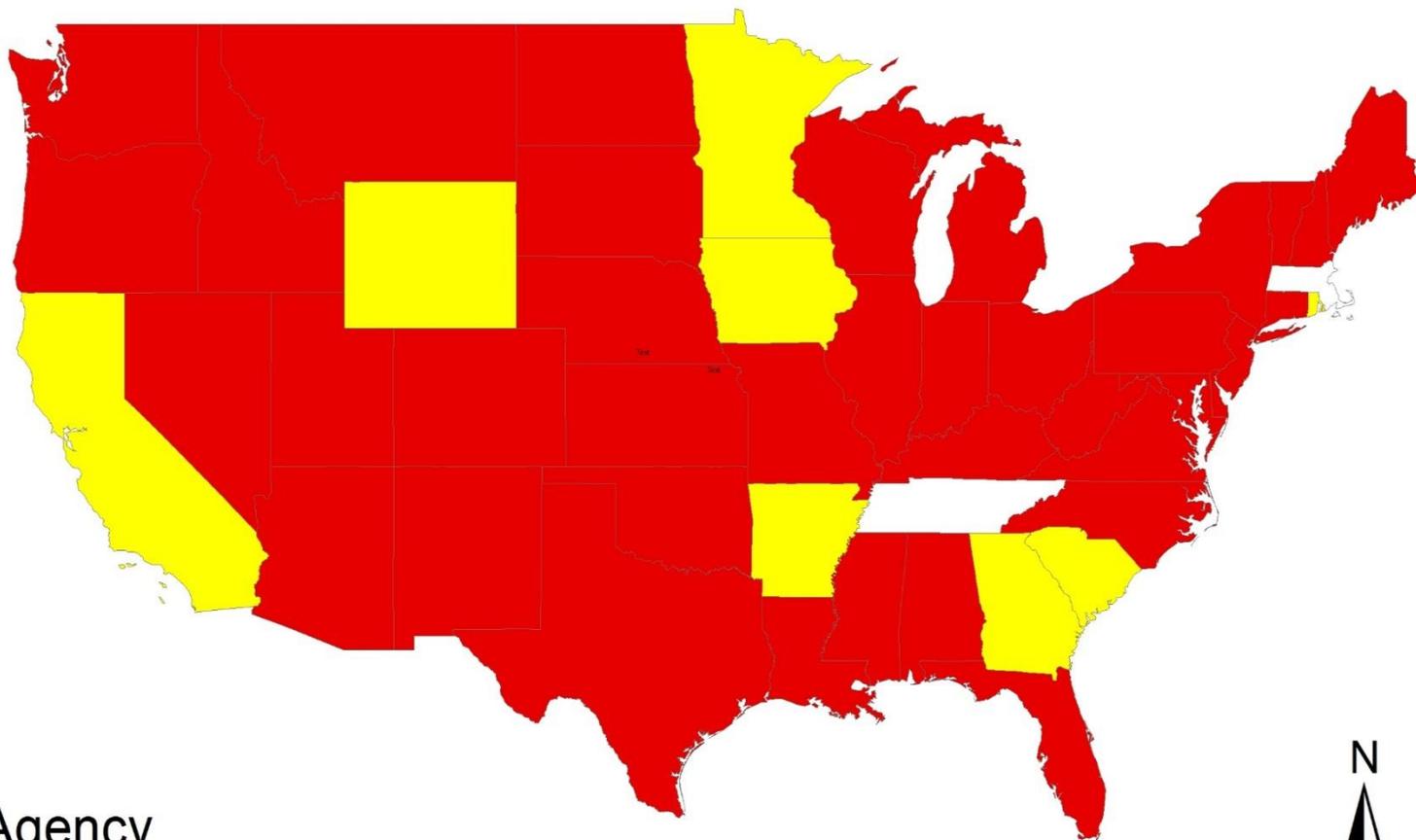
Regional Climate Centers

Looking toward the Future

- Support and coordination for observational data networks
 - *Co-op*
 - *Mesonets*
 - *Sub-daily data*
- Engaging climate service partners and users
 - *Solicit climate needs*
 - *Annual strategic plan and priorities*
 - *Iterative feedback network*
- Innovative local climate services
 - Enhanced region- and sector-specific response and monitoring of extreme events (e.g., coastal storms)
 - Blended datasets (e.g., Great Lakes, Gulf of Maine)
 - Expanded Dynamic Outlooks – web-based; river-basin focused
- Climate change assessment and adaptation
 - Products spanning historical, present, and future time scales (e.g., climate resiliency)

State Climate Offices

State Climate Offices - Affiliation

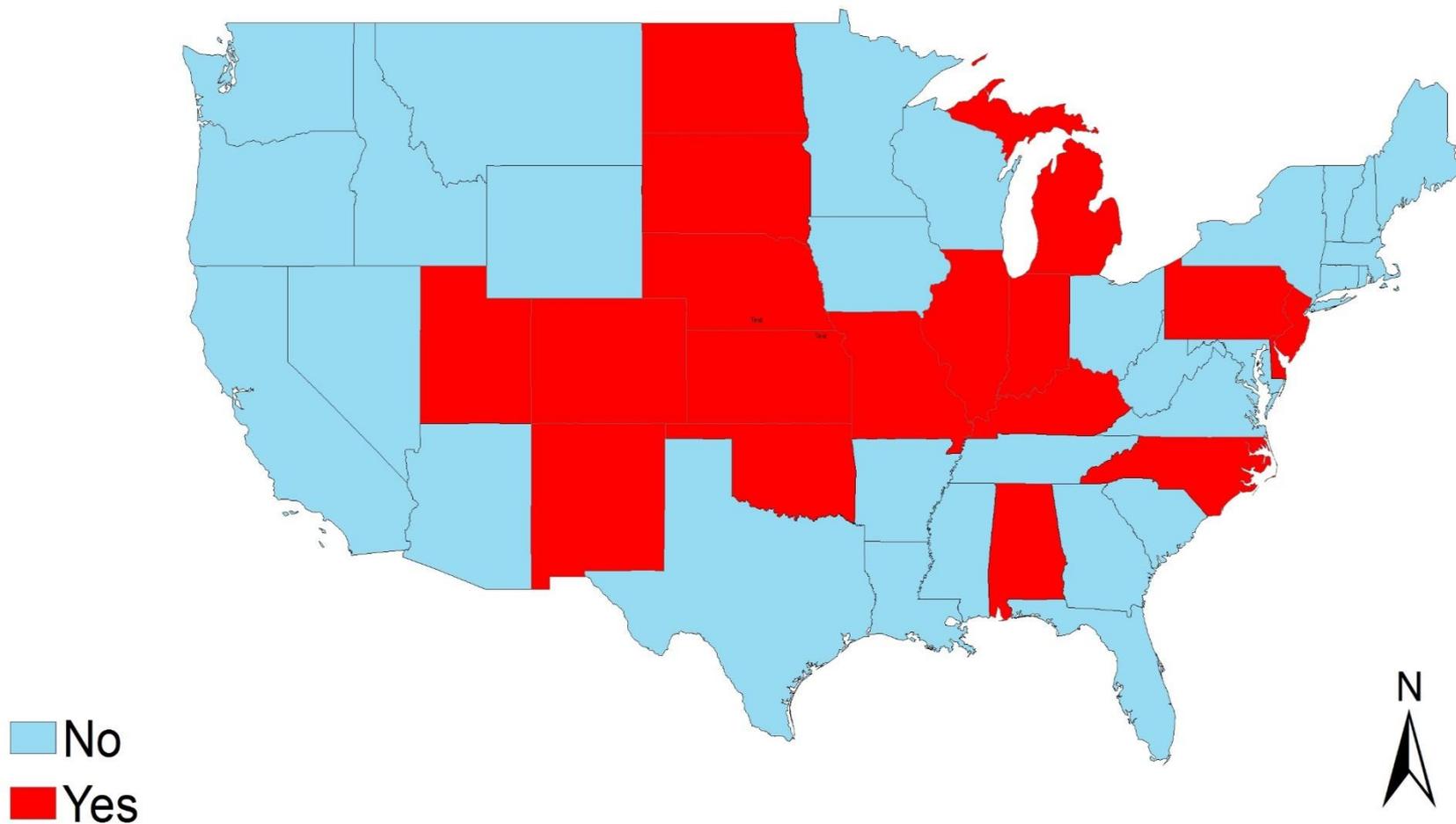


- None
- State Agency
- University



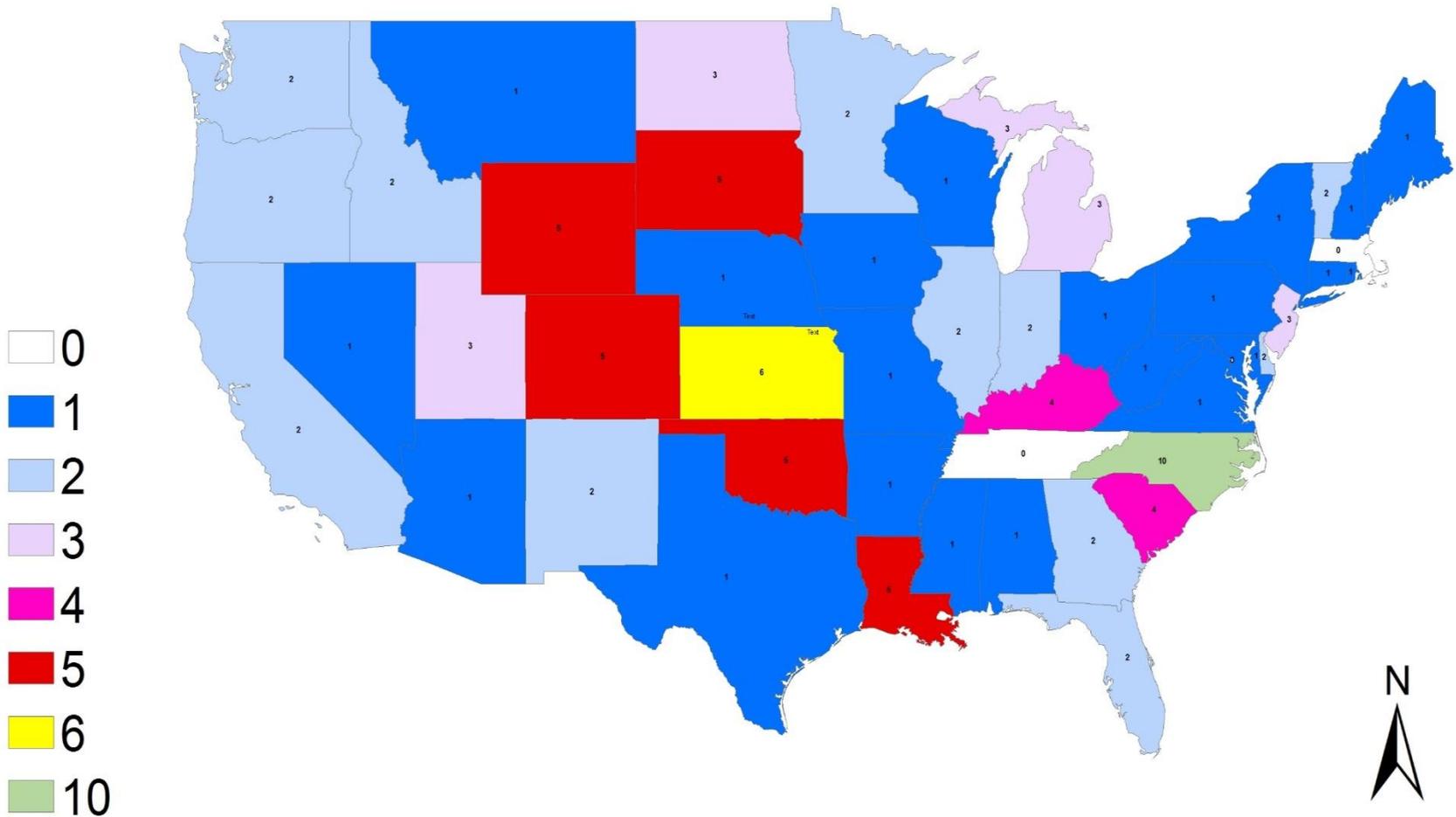
State Climate Offices

State Climate Offices - Mesonets 2016



State Climate Offices

State Climate Offices - Full Time Staff



Stakeholders/Clients

- Agriculture – Farming, Ranching Air Quality officials
- Water Resource Managers Health Departments
- Energy Producers Legal Community
- Insurance industry- all sectors Police & Sheriff's Office
- Hazard Mitigation Planners Public
- Emergency Managers Education - K-12
- University Researchers Forestry Department
- Transportation industry Media
- State, County, Municipal planners Manufacturing
- Outdoor Recreation Industry Flood Control Districts
- Sustainability Community Commodities Brokers

RUTGERS

THE STATE UNIVERSITY
OF NEW JERSEY

State Climate Offices Assisting Decision Makers

NOAA National Climate Services Meeting

Dr. David A. Robinson
Professor of Geography &
New Jersey State Climatologist

May 9, 2016

david.robinson@rutgers.edu

ONJSC
at Rutgers University

Office of the New Jersey State Climatologist · Rutgers University · 54 Joyce Kilmer Avenue · Lucy Stone Hall B224 · Piscataway, NJ 08854

RUTGERS
New Jersey Agricultural
Experiment Station

Home

Quick Links
NJWxNet
New Jersey Forecast
National Forecast
NOAA Climate Watch

NJ
Current Conditions
Current Forecasts
Climate Information

US
Current Conditions
Current Forecasts
Climate Information

Other
Coastal Observations
El Niño/La Niña
Hurricanes

ONJSC
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Research
Staff

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Latest from the NJWxNet

Latest temperatures across NJ appear in the above map. Click on the map or here, the [New Jersey Weather and Climate Network](#), for much more information.

Frequently Updated Climate Data

[Winter 2015-2016 Snow Event Totals](#)

[Monthly and Annual Statewide \(1895-Present\)](#)

[Monthly Station](#)

[Monthly Maps](#)

Latest News

Boaters enjoy the unseasonable warmth on March 9th at the Bordentown Beach water access leading to Crosswicks Creek and the Delaware River (photo by Michael Mancuso/NJ.com).

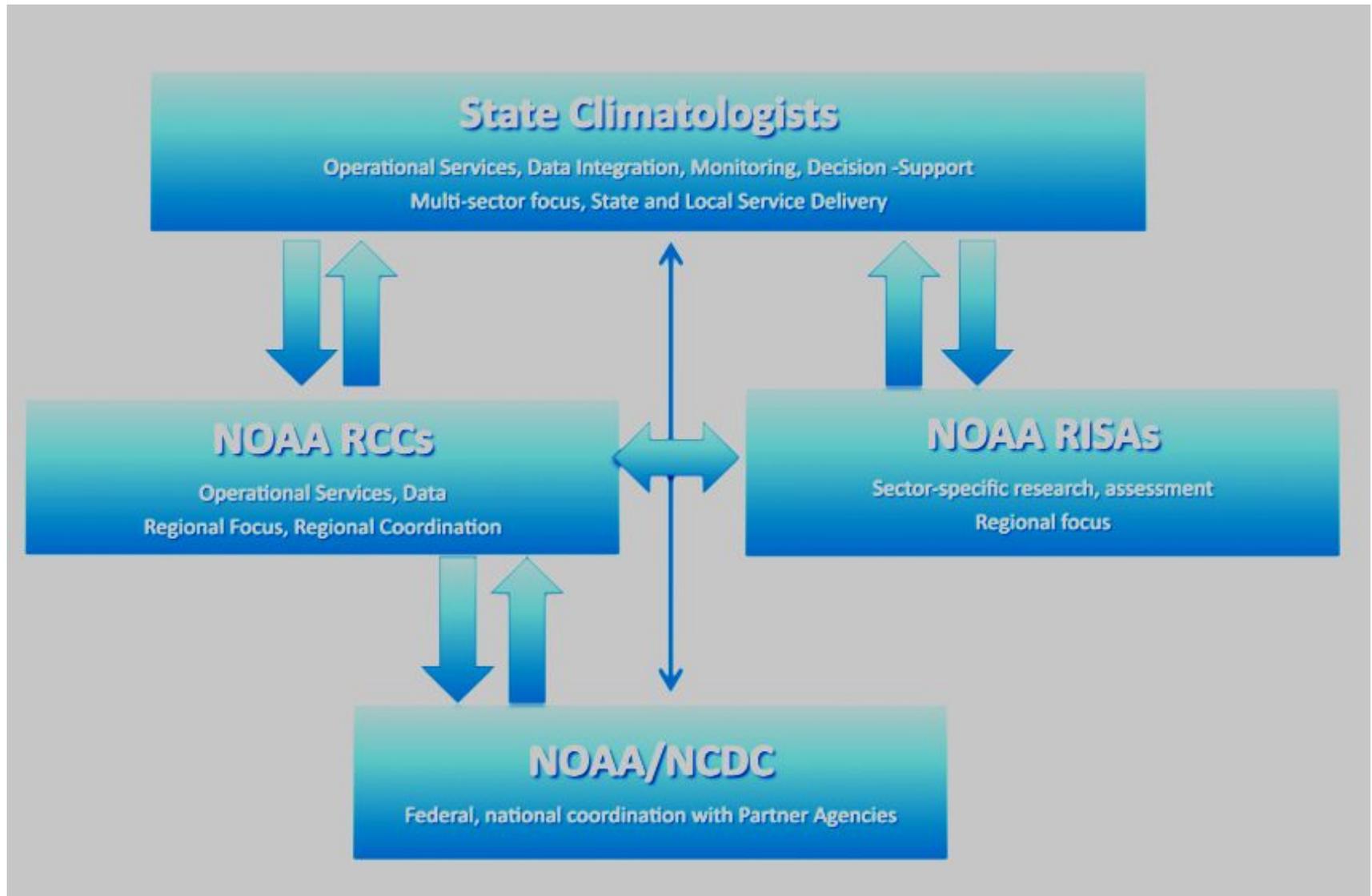
Spring Warmth Arrives Early: March 2016 Recap

Dr. David A. Robinson
New Jersey State Climatologist
April 4, 2016

Locals Trust Locals

- *Trusted relationships with state and local communities have developed over many years of service.*
- *Climate information must be put into context for each client.*
- *State Climate Offices are experts at doing this because they know the local climate, economy and geography.*

Partnering: Local to National



NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Formerly the National Climatic Data Center (NCDC)... [more about NCEI](#)

Home Climate Information Data Access Customer Support Contact About

NOAA's National Centers for Environmental Information (NCEI) is responsible for preserving, monitoring, assessing, and providing public access to the Nation's treasure of climate and historical weather data and information. [Learn more about NCEI](#)

How may we assist you?

- I want to search for data at a particular location.
- I want quick access to your products.
- I want to see your monthly climate reports.
- I want to find a specific dataset.
- I want to know about climate change and variability.

March 2015 Global Climate Report
 The globally averaged temperature over land and ocean surfaces for March was warmest on record for the month.

HIGHLIGHTS

Upcoming Events, Products, and Services
 View a complete listing of the upcoming products and services.

State of the Climate in 2013 Report Release
 We are announcing the release of the State of the Climate in 2013 report, an assessment of the world's climate system.

NEWSROOM

Addressing Scientific Data Stewardship Challenges
 We've developed a Stewardship Maturity Matrix to consistently score the quality of digital dataset stewardship.

Winter Severity and Frost Depth in a Warming Climate
 Scientists calculate and evaluate a new version of NOAA's air-freezing index that can be used to estimate maximum soil frost depth.

2015 Mountain Science Expo: Full STEAM Ahead
 We will be participating in the 2015 Mountain Science Expo on Saturday, April 11, 2015, at the North Carolina Arboretum.

NCEI PARTNERS

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by: *City, ST or ZIP code
 Enter location: Go

News Headlines

- NEW Skywarn Classes announced
- Weather Prediction Center Seeks Comments on New Web Page

NWS Forecast Office Philadelphia/Mt Holy
 Weather.gov > Mount Holy, NJ

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes Climate and Past Weather Local Programs

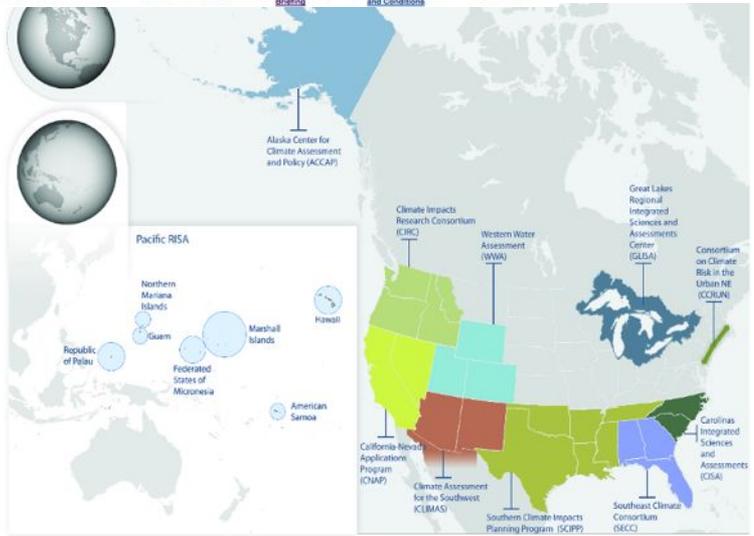
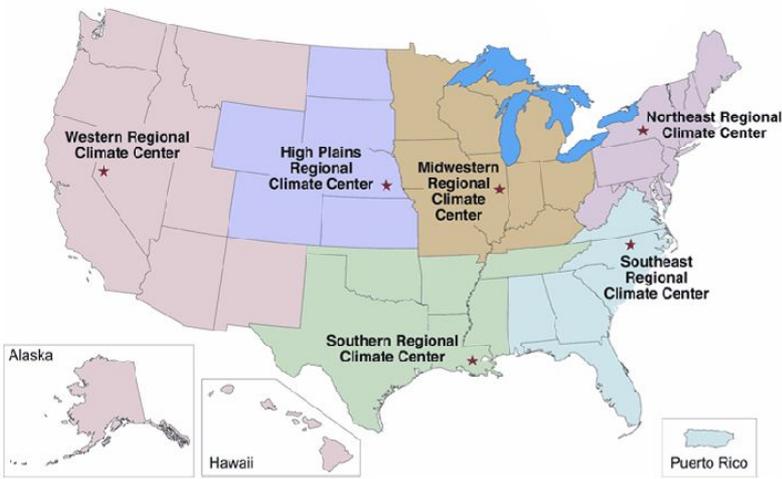
Click a location below for detailed forecast.

Matches, Warnings & Advisories

- Coastal Flood Warning
- State Storm
- Coastal Flood Advisory
- Small Craft Advisory
- Coastal Flood Statement
- Special Weather Statement
- Hazardous Weather Outlook
- Short-Term Forecast

Last Map Update: Fri, May 6, 2016 at 8:32:21 am EDT

- Radar
- Current Weather
- Rivers & Lakes
- Satellite
- Weather Information Display
- Forecast Maps
- Hour by Hour Forecast
- Text Products
- Marine Forecasts
- Climate Information
- Skywarn
- Submit Storm Report
- Weather Event Archives
- Forecast Discussion
- Emergency Managers
- Hazardous Weather Briefing
- Current Observations and Conditions
- Tropical



NEW JERSEY
Regional Hydrologic Indicators &
Declared Water-Supply Drought Status

March 9, 2014

**SCOs are
 communicators of
 climate
 information to the
 citizens of our states**

Region	Hydrologic Indicator	Status	Hydrologic Indicator					Water-Supply Status	
			90-day precipitation	90-day stream-flow	N.J. reservoirs	Del. R. reservoirs	Unconf. ground water		
North-west		Near or above normal	4	0	Not a significant region-wide water resource.	0	0	Normal	0
		Moderately dry	0	4	Not a significant region-wide water resource.	0	0	Watch	0
		Severely dry	0	0		0	0	Warning	0
		Extremely dry	0	0		0	0	Emergency	0
						↓	0		
Central		Near or above normal	4	4	0	0	0	Normal	0
		Moderately dry	0	0	0	0	0	Watch	0
		Severely dry	0	0	0	0	0	Warning	0
		Extremely dry	0	0	0	0	0	Emergency	0
					↓	0			
North-east		Near or above normal	4	0	0	Not a significant region-wide water resource.	0	Normal	0
		Moderately dry	0	0	0	0	0	Watch	0
		Severely dry	0	0	0	0	0	Warning	0
		Extremely dry	0	0	0	0	0	Emergency	0
					↓	0			
South-west		Near or above normal	8	2	Not a significant region-wide water resource.	0	5	Normal	0
		Moderately dry	0	0	0	0	0	Watch	0
		Severely dry	0	0	0	0	0	Warning	0
		Extremely dry	0	0	0	0	0	Emergency	0
					↓	0			
Coastal North		Near or above normal	4	0	0	Not a significant region-wide water resource.	0	Normal	0
		Moderately dry	0	0	0	0	0	Watch	0
		Severely dry	0	0	0	0	0	Warning	0
		Extremely dry	0	0	0	0	0	Emergency	0
					↓	0			
Coastal South		Near or above normal	10	4	Not a significant region-wide water resource.	0	43	Normal	0
		Moderately dry	0	0	0	0	0	Watch	0
		Severely dry	0	0	0	0	0	Warning	0
		Extremely dry	0	0	0	0	0	Emergency	0
					↓	0			

The number in each colored dot is the number of weeks the specific indicator in that region has been in that status. For indicators which changed status this evaluation cycle the arrow indicates the direction of change; it points from the previous status to the current. A water drop (☼) means the indicator has been green for more than a year.

Subject to revision and update. This summary shows regional drought indicators for New Jersey. Local water-supply conditions may vary. Drought status is based on DEP professional judgment of water-supply characteristics and indicators in each region. Indicators are shown only for those water resources significant for each region. The indicators are described at <http://trny.oc/xhsot>.

New Jersey Department of Environmental Protection
Bob Martin, Commissioner

For more information:
www.njdrought.org

Collecting local climate data helps improve climate science and services

- 15 State Climate Offices operate monitoring networks with over 800 superior stations providing data to the NWS via MADIS and SHEF feeds

- State Climatologists are also often leaders in establishing community volunteer networks; including CoCoRaHS

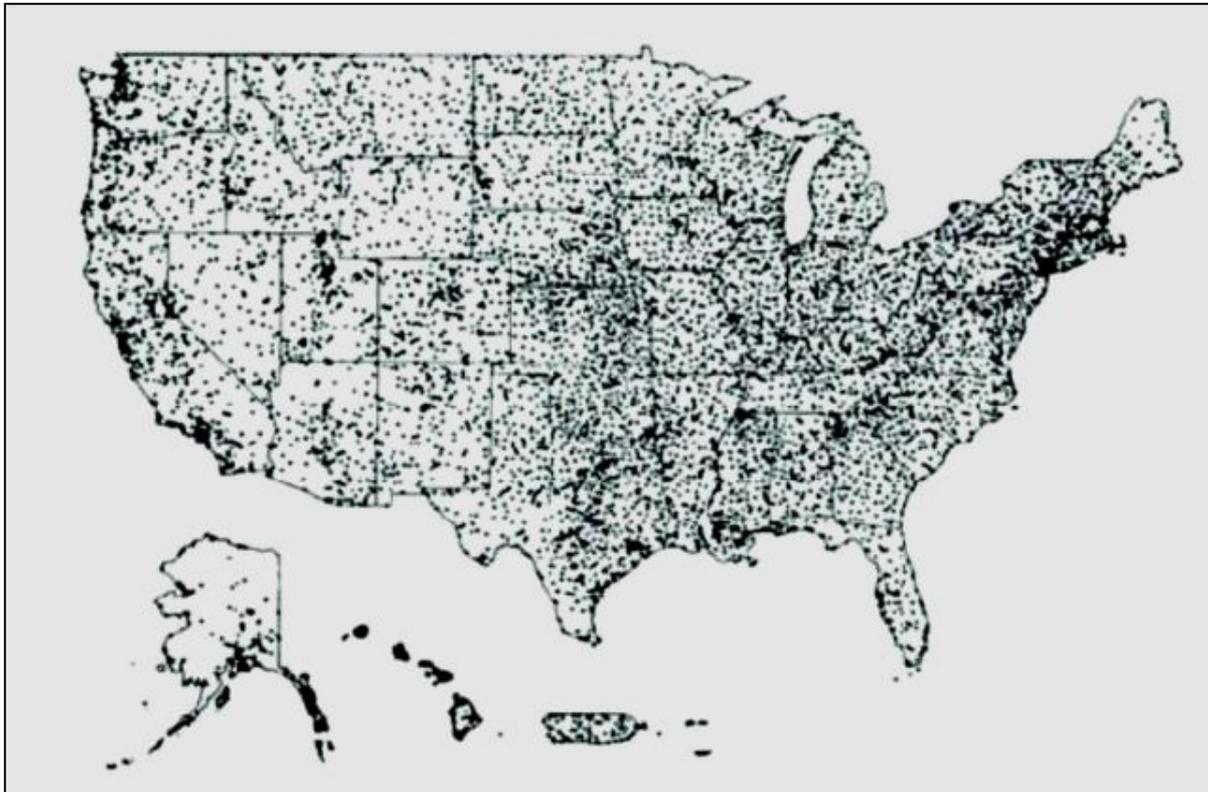
The screenshot shows the NJ Weather & Climate Network website. At the top, there is a navigation bar with links for Home, News, Blog, myWxNet, Tabular Data, Maps, Charts, Contact Us, and Login. The main content area features four weather maps: Latest Temperatures, Current Radar, Latest Wind Speeds, and Wind Gusts. Below the maps, there is a 'Top Story' section with the headline 'For Second Consecutive Year, Winter is Slow to Relinquish Its Grip: March 2015 Recap' and a sub-headline 'Monday, April 6, 2015 - 5:25pm'. To the right of the top story is a 'Latest Extremes' table. Below the top story is a photograph of a snowy landscape. To the right of the photograph is a 'Latest Conditions & Forecast' section for Hillsborough, NJ, showing a current temperature of 80°F and a forecast of 80°F. The forecast also includes Wind (N/A) and Wind Gust (N/A).

City, State	Temp	City, State	Temp
Pemberton, NJ	82	Harvey Cedars, NJ	56
Hamilton, NJ	82	Sea Girt, NJ	58
Hamilton Twp. (Mercer), NJ	82	Sea Bright, NJ	59
Wanaque, NJ	81	Seaside Heights, NJ	59
Carneys Point, NJ	81	Atlantic City (NJDOT), NJ	59

most current information as of May 3 4:50 PM

Latest Conditions & Forecast
Hillsborough, NJ
80°F
Wind N/A
Wind Gust N/A

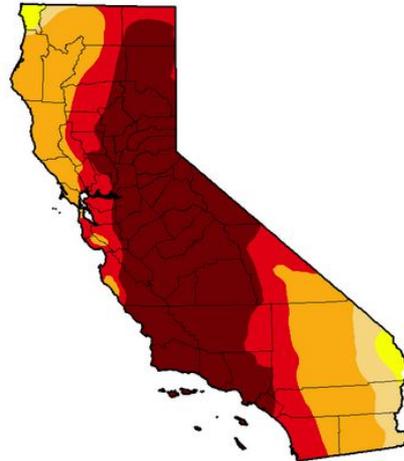
We Can't Forget the Cooperative Observer Program



Nearly every State Climatologist is the climate resource for **drought monitoring and planning** in their state. Many have developed decision support tools to specifically address state- and local-level needs.

Home > State Drought Monitor

U.S. Drought Monitor California



Download: [PNG](#) [PDF](#) [GPD](#)

April 28, 2015
(Released Thursday April 30, 2015)
Valid 8 a.m. EDT

Statistics type: Traditional (D0-D4, D1-D4, etc.) Categorical (D0, D1, etc.)

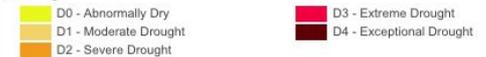
Drought Condition (Percent Area):

Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	2015-04-28	0.14	99.86	98.11	93.44	66.60	46.77
Last Week	2015-04-21	0.14	99.86	98.11	93.44	66.60	46.77
3 Months Ago	2015-01-27	0.00	100.00	98.13	94.34	77.52	39.99
Start of Calendar Year	2014-12-30	0.00	100.00	98.12	94.34	77.94	32.21
Start of Water Year	2014-09-30	0.00	100.00	100.00	95.04	81.92	58.41
One Year Ago	2014-04-29	0.00	100.00	100.00	96.01	76.68	24.77

Population Affected by Drought: **37,007,923**

[View More Statistics](#)

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying [text summary](#) for forecast statements.

Author(s):

Anthony Artusa, NOAA/NWS/NCEP/CPC

The National Drought Mitigation Center | 3310 Holdrege Street | P.O. Box 830988 | Lincoln, NE 68583-0988
phone: (402) 472-6707 | fax: (402) 472-2946 | [Contact Us](#)



Every State Climate Office performs outreach and education to agencies, community groups, and schools.



NEW JERSEY
Regional Hydrologic Indicators & Declared Water-Supply Drought Status
March 9, 2014

Region	Status	Hydrologic Indicator					Water-Supply Status
		90-day precipitation	90-day streamflow	N.J. reservoirs	Del. R. reservoirs	Unconf. ground water	
North-west	Near or above normal	4	0	Not a significant region-wide water resource.	0	0	Normal
	Moderately dry	4	4		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency
Central	Near or above normal	4	4	Not a significant region-wide water resource.	0	0	Normal
	Moderately dry	0	0		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency
North-east	Near or above normal	4	0	Not a significant region-wide water resource.	0	0	Normal
	Moderately dry	0	0		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency
South-west	Near or above normal	8	2	Not a significant region-wide water resource.	0	0	Normal
	Moderately dry	0	0		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency
Coastal North	Near or above normal	4	0	Not a significant region-wide water resource.	0	0	Normal
	Moderately dry	0	0		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency
Coastal South	Near or above normal	10	4	Not a significant region-wide water resource.	0	43	Normal
	Moderately dry	0	0		0	0	Watch
	Severely dry	0	0		0	0	Warning
	Extremely dry	0	0		0	0	Emergency

The number in each colored dot is the number of weeks the specific indicator in that region has been in that status. For indicators which changed status this evaluation cycle the arrow indicates the direction of change; it points from the previous status to the current. A water drop (☼) means the indicator has been green for more than a year.

Subject to revision and update. This summary shows regional drought indicators for New Jersey. Local water-supply conditions may vary. Drought status is based on DEP professional judgment of water-supply characteristics and indicators in each region. Indicators are shown only for those water resources significant for each region. The indicators are described at <http://tiny.cc/xhscot>.

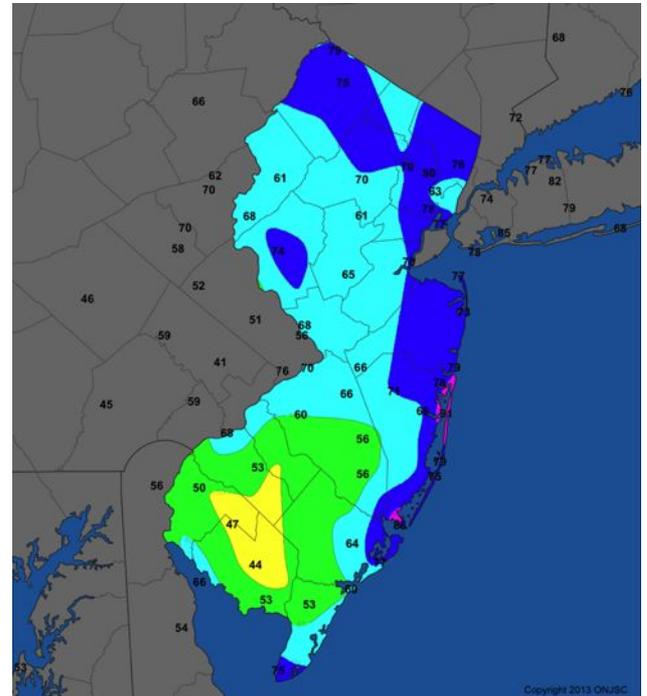
New Jersey Department of Environmental Protection
Bob Martin, Commissioner

For more information:
www.njdrought.org

Many state climate offices contribute their expertise on issues associated with **climate variability and change, including extremes**

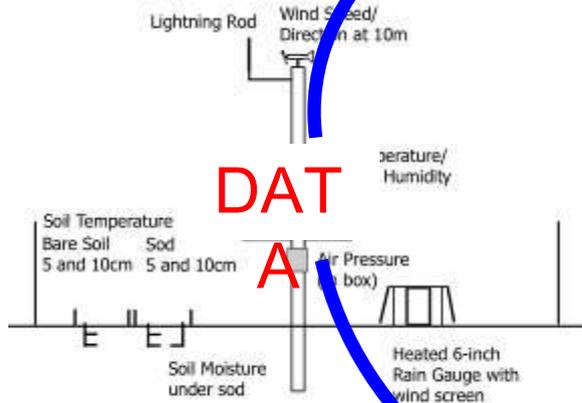


Sandy



State Climate Office Services Assisting Decision Makers

OUTREACH &
TRAINING



PRODUCTS



Knowledge through state climate services

- background knowledge
 - data/information
 - local expertise
 - collaboration
 - communication

Ever willing to cooperate
with NOAA colleagues



Southern Climate Impacts Planning Program (NOAA RISA)

Mark Shafer
University of Oklahoma
Norman, OK

Southern Climate Impacts Planning Program (SCIPP)

Increasing resiliency and preparedness for weather and climate extremes now and in the future across the South-Central United States

Partnership between OU and LSU

Work on a range of extremes: inland and coastal

Combination of physical and social science
- research and engagement



SouthernClimateImpactsPlanningProgram



@SCIPP_RISA

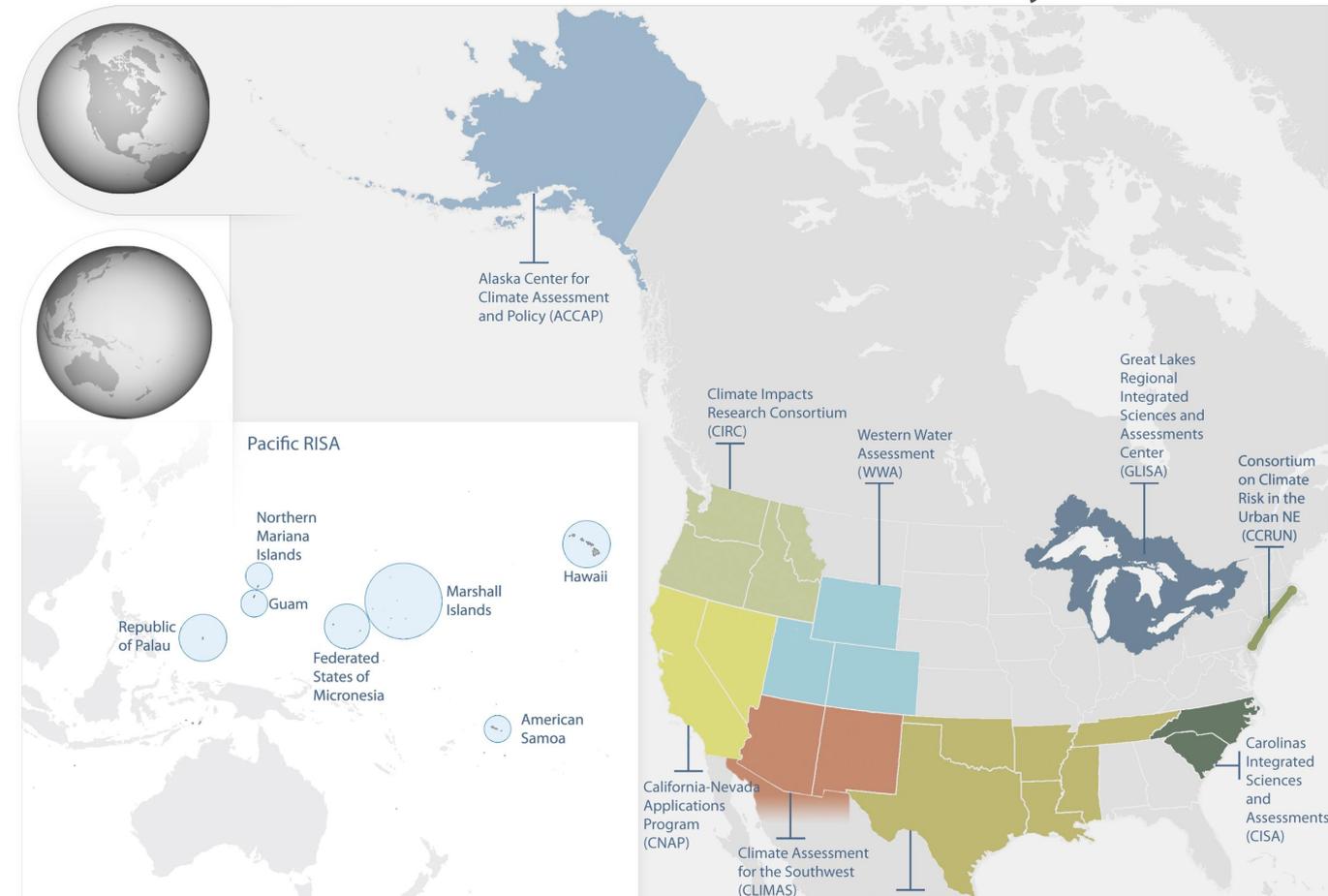


SCIPP01



NOAA's Regional Integrated Sciences and Assessments (RISA)

Currently Funded RISAs



NOAA's RISA program supports research teams that help expand and build the nation's capacity to prepare for and adapt to climate variability and change

They do this through partnerships with key stakeholders on a regional level

RISA aims to build knowledge *in and of* decision-making processes by:

- Advancing understanding of context and risk
- Supporting knowledge-to-action networks
- Innovating services, products and tools to enhance the use of science in decision-making
- Advancing science policy

Working With Communities

Assess Needs

- Local and regional workshops
- Surveys and interviews
- Creating a documents archive

Engage Selected Communities

- Test tools
- Learn metrics communities use to assess performance

Local and State Planning

- Groups such state hazard mitigation teams, city planners
- Identify requirements, critical thresholds

General Education and Outreach

- Presentations, webinars, newsletters, social media, ...

Southern Plains Drought Early Warning System

Partnership with NOAA/NWS, RISA, NDMC, NIDIS, AASC

Host forums, workshops, and webinars addressing current regional drought issues

21 webinars and 60 drought briefings, which are available on SCIPP's website and YouTube

<http://www.southernclimate.org>

Discuss impacts and management strategies

Promote planning and preparation



The Path Forward

Going back to the types of things SCIPP does...

Assess Needs

- NWS participation in regional workshops
- Include questions in surveys on issues important to NWS

Engage Selected Communities

- Test the usefulness of NWS products and communication methods
- Develop climate / extreme event histories to support other work with communities

Local and State Planning

- Involve NWS in discussions of critical thresholds and preparedness

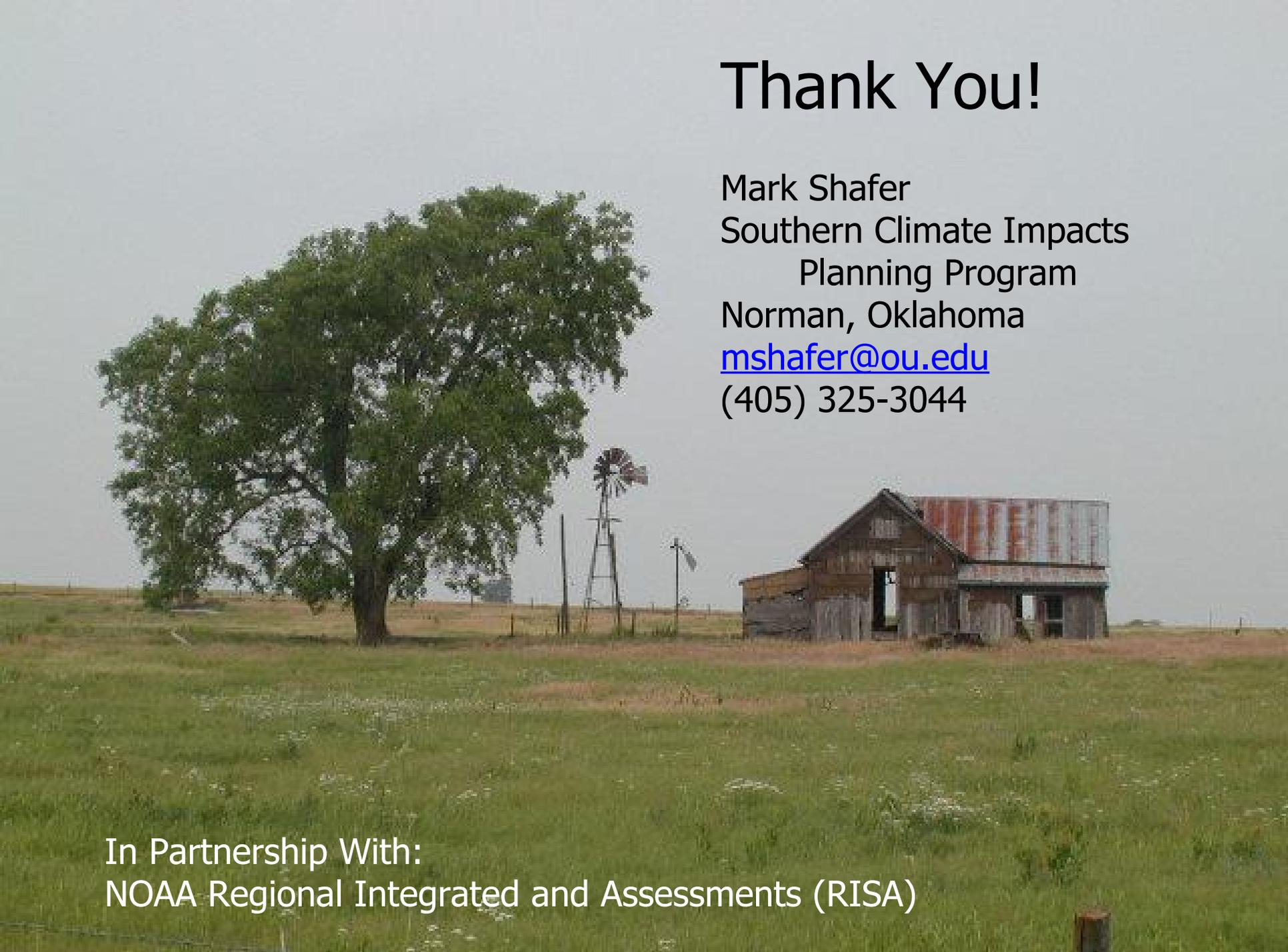
General Education and Outreach

- Share / re-tweet information from each other

Thank You!

Mark Shafer
Southern Climate Impacts
Planning Program
Norman, Oklahoma
mshafer@ou.edu
(405) 325-3044

In Partnership With:
NOAA Regional Integrated and Assessments (RISA)



DELIVERING CLIMATE SERVICES AT REGIONAL / LOCAL LEVELS: ENGAGING PARTNERS

Moderator: **Tami Houston**, National Partnership Liaison, NCEI

Wayne Higgins, Director NOAA Climate Program Office

Ellen Mecray, Regional Climate Services Director (ER), NCEI

Beth Hall, Director, Midwestern Regional Climate Center

Nancy Selover, Arizona State Climatologist, Arizona State University

David Robinson, NJ State Climatologist, Rutgers University

Mark Shafer, Southern Climate Impacts Planning Program (SCIPP RISA)