

SOUTHERN CLIMATE IMPACTS PLANNING PROGRAM (SCIPP) REGIONAL INTEGRATED SCIENCES AND ASSESSMENTS PROGRAM

4th Annual Report

May 1, 2011 - April 30, 2012

The original proposal (Climate Risk Mitigation Program) was submitted under a competitive RFP. After review, NOAA asked OU to revise the proposal with a new title and budget. The revision (Southern Climate Impacts Planning Program (SCIPP)) was the one ultimately funded on award NA08OAR4320886. This is the title that the annual report is submitted under. For the last two years, our annual performance report has been submitted under the title "Southern Climate Impacts Planning Program (SCIPP)" and has been accepted. Please accept the annual report entitled "Southern Climate Impacts Planning Program (SCIPP) for the period 5/1/2011-4/30/2012.



REPORT HIGHLIGHTS

Section	Page
1. SCIPP PROJECT TEAM	2
2. NEW AREAS OF FOCUS	3
3. RESEARCH FINDINGS	6
4. ACCOMPLISHMENTS	9
5. PUBLICATIONS AND REPORTS	13
6. LINKS WITH OTHER NOAA PROGRAMS	15
7. EXEMPLIFYING REGIONAL CLIMATE SERVICES	15
8. NCA ACTIVITIES	17
9. TABLE OF TEAM PROJECTS	18

April 30, 2012

1. SCIPP Project Team

The Southern Climate Impacts Planning Program team consists of the following investigators, core office staff, research & support staff, summer interns, and graduate students from the University of Oklahoma (OU) and Louisiana State University (LSU). SCIPP's Stakeholder Services Committee (Advisory Committee) is also detailed below. Team personnel are current as of April 30, 2012.

Principal Investigators

Mark Shafer (OU) and Barry Keim (LSU)

Co-Investigators

Renee Edwards (LSU), Yang Hong (OU), Peter Lamb (OU), Mark Meo (OU), Kevin Robbins (LSU), and May Yuan (OU)

Core Office Staff

Program Managers: Lynne Carter (LSU) and Margret Boone (September 2011 - present) (OU) and James Hocker (May 2011 - September 2011) (OU); Associate Program Manager: Rachel Riley (OU); Research Associate: Hal Needham (LSU); Undergraduate Student Assistants: Charlotte Lunday (OU), Emma Fagan (OU), and Brandon Westbury (OU)

Research & Support Staff

Stdrovia Blackburn (May 2011-November 2011) (OU), Jared Bostic (OU), Kyle Brehe (LSU), Billy McPherson (May 2011-March 2012) (OU), Luigi Romolo (LSU), David Sathiaraj (LSU), Ada Shih (OU), and Himanshu Shrivastava (May 2011-November 2011) (OU)

Graduate Students

Laura Becker (LSU), Amanda Billiot (LSU), Carly Kovacik (OU), Lu Liu (OU), and Anna Trevino (LSU)

Stakeholder Services Committee (SCIPP Advisory Committee)

Margaret Davidson (NOAA), Jeffrey Gaffney (University of Arkansas), Gregg Garfin (University of Arizona), Marilu Hastings (Energy Foundation), Michael Hayes (National Drought Mitigation Center), Bill Hooke (American Meteorological Society), Rebecca Jennings (Federal Emergency Management Agency), Putnam Reiter (Oklahoma Department of Emergency Management), Bob Rose (Lower Colorado River Authority), Tracie Sempier (Mississippi-Alabama Sea Grant Consortium), Melissa Stults (ICLEI), Russ Vose (National Climatic Data Center), Suzanne Van Cooten (National Severe Storms Lab), and Tom Wilbanks (Oak Ridge National Laboratory)

Former SCIPP Investigators

David Brown (Regional Climate Services Director, Southern Region), Ken Crawford (Vice Administrator, Korean Meteorological Administration), Dan O'Hair (Dean, College of Communications & Information Studies, University of Kentucky)

SCIPP Student Alumni

Heather Campbell (OU), Hal Needham (LSU), Amanda Schroeder (OU), Robert Gottlieb (OU)

SCIPP Affiliates

Renee McPherson (OU), Sascha Petersen (Adaptation International), Cindy Rosenthal (OU), and Kodi Monroe (OU, Sea Grant)

2. New Areas of Focus

Planning for extreme weather and climate events are central to the work of the Southern Climate Impacts Planning Program, though are not the only focus. The following represent the various thematic focuses of SCIPP with a brief description of the questions and issues the SCIPP team is working to address (Note: these are presented in order of priority).

DROUGHT MANAGEMENT AND MITIGATION

The issues and questions:

- *What causes a long-term drought and how long will the current drought in the Southern United States continue?*
- *Documenting and quantifying the long-term effects of drought on private and public entities?*
- *What policies are in place, or can be enacted, to minimize the effects of a long-term drought?*
- *What steps (if any) are communities, state agencies, tribal nations, and federal agencies in the South Central United States taking to be prepared for the impact of a continuing drought on sensitive components of their systems?*
- *How does drought planning relate to other types of hazards, water, and environmental management plans?*
- *What lessons have been learned from the current drought that can influence future drought decision-making?*
- *Providing relevant and current drought information and mitigation efforts through webinars and workshops*
- *Utilize relationships with other agencies (NOAA, CLIMAS, NDMC, NIDIS, AASC) to discuss and disseminate drought related materials [see Section 6. Exemplifying Regional Climate Services for more details]*

CLIMATE ADAPTATION PLANNING

The issues and questions:

- *What steps (if any) are communities, state agencies, tribal nations, and federal agencies in the South Central United States taking to be prepared for the impact of a changing climate on weather sensitive components of their systems?*
- *What impacts of a changing climate will have the most significant local impacts, and how do those vary across our diverse region?*
- *Is climate perceived to be an issue, or rather the individual weather events that comprise climate? This allows for opportunities to learn how to better communicate the issues to make them relevant to stakeholders.*
- *What information, research, tools, and others aspects are needed to support scientifically informed planning as related to future climate?*

PLANNING FOR EXTREME WEATHER AND CLIMATE EVENTS

The issues and questions:

- *How frequently have different historical hazardous weather events occurred across the South Central United States and where do they occur most commonly?*
- *How does our diverse region plan long-term for these hazards and how do hazard perceptions vary regionally?*
- *What information sources and tools are used to plan for these hazards, from where is this information obtained, and who provides it?*
- *What tools and information products are needed to more effectively plan for future hazards?*
- *How does the public perceive information it receives during hazardous weather events, and how is the information acted upon?*

Methods for Accomplishing Research in These Focus Areas

The Southern Climate Impacts Planning Program utilizes a mix of methods and strategies for accomplishing work in these three primary focus areas. The following are short descriptions detailing the different methods SCIPP employed during the past program year.

New Partnerships

SCIPP is a founding partner and consortium member for the South Central Climate Science Center (SC CSC). The existing relationship between the RISA team at OU and LSU was an important element in building the consortium, giving a coastal presence to the other consortium which primarily focus on land-based management issues. The strong ties between the RISA team and the SC CSC allows for better alignment of SCIPP's priorities with congruent efforts being undertaken by the CSC and strengthens relationships with the region's Landscape Conservation Cooperatives. Kevin Robbins (LSU) and Mark Shafer (OU) are among the Co-PIs on the CSC proposal.

SCIPP is the climate partner for the Southeast regional efforts of both Louisiana Sea Grant and the NERRS regional program. SCIPP participates in community meetings set-up by both groups and present the climate science and adaptation portions of workshops with local communities. So far, SCIPP has presented climate information to communities in Texas, Louisiana, and Mississippi communities, as well as participated in community discussions around climate information and its uses in planning. The following are specific workshops that have taken place this year where SCIPP has presented and participated in discussions with communities:

- *Planning to Protect: The Mississippi Gulf Coast*, at NERR workshop: Planning for the Future in Jackson County, Sea Level Rise and Changing Coastal Conditions, Grand Bay National Estuarine Research Reserve, Mississippi, March 6, 2012
- *Adapting to a Changing Climate*: Aransas Cty, TX. Aransas area communities and marine research station. Part 3 of below sessions: June 30, 2011
- *Planning to Protect: The Texas Gulf Coast*, workshop presentation for Aransas County communities on climate issues and preparing through the National Estuarine Research Reserve program May 3, 2011, part 1 of a 3-part process focused on building climate change and adaptation understanding with the local communities.
- Resilient Coastal Communities and Economies: NOAA Office of Education presentation will be *An Overview of Challenge and Opportunities for Resilient Coastal Communities*. March 26-27, 2012, Tallahassee, FL

SCIPP is also partnering with the National Drought Mitigation Center (NDMC), the National Integrated Drought Information System (NIDIS), the Climate Assessment for the Southwest (CLIMAS), NOAA, and the American Association of State Climatologists (AASC), to create a series of live webinars that discuss the ongoing drought, and how to manage and plan for drought situations. Along with the webinars, a series of workshops and forums were held across the drought stricken Southern United States. More information is available in *Section 6: Exemplifying Regional Climate Services*.

Operation of a Core Office

The core office plays a key role in the functioning of the Southern Climate Impacts Planning Program by providing a full time staff presence needed to guide the team, interact closely with stakeholders, travel and attend meetings, undertake research, interact with other RISA teams and the NOAA RISA program office, and facilitate connections between scientists as well as between scientists and stakeholders. As of April 30, 2012, SCIPP maintains a core office of two program managers (one for each academic campus), one associate program manager (OU), and one research associate (LSU), and several undergraduate student assistants.

During the past year the core office helped to facilitate SCIPP team interactions through a variety of routine conference calls. This included monthly SCIPP Investigator video conferences, monthly calls to discuss work on the National Climate Assessment, and weekly calls between the Program Managers. All meetings involved participants from both the OU and LSU campuses. In addition, numerous other individual campus meetings were held on an as

needed basis.

The core office also planned and hosted the annual meeting of the SCIPP Stakeholder Services Committee, which was held in Austin, Texas June 27-28, 2011. During this two-day meeting, the SCIPP team met both on its own (day 1) and with the committee (day 2) to review the team's activities from the past year and receive recommendations moving forward into the next program year.

Technology Development

Products and tools provide a tangible resource that decision-makers and others can utilize to help answer a question or make their jobs easier. SCIPP continues to place much of its focus on the development of products and tools that help to answer questions regarding past climate, and in particular, past extreme climate events.

Capitalizing on Recent or Current Extreme Weather/Climate Events

Given that extreme events and hazards represent the major program focus of SCIPP, significant focus was placed this past year on making use of recent or current extreme weather events for research and engagement purposes. The following represent the spectrum of on-going projects spanning a variety of different hazards:

- *Historical Hurricane Storm Surge Map and Experimental Blog*
- *Oklahoma Climate Adaptation Meeting May 10, 2011*
- *South Central U.S. State Drought Planning Workshop on May 11-12, 2011 in Memphis, TN*
- *February 2011 and 2012 Winter Storm Post Event Survey Project*
- *Post Flood Event Survey Project (being undertaken in partnership with NOAA's River Forecast Centers across the National Weather Service's Southern Region)*



For each of these projects, SCIPP is making use of extreme weather events for research purposes. While the projects vary in specific focus, the common goal is to better understand information needs for planning.

Figure 1: Photo taken at the Oklahoma Climate Adaptation Meeting on May 10, 2011 at the National Weather Center in Norman, OK.

Education & Outreach

Providing education and outreach on climate-related issues continues to be a critically important method of translating science. During the past year, SCIPP enhanced its educational outreach offerings by continuing to produce a monthly climate outreach publication entitled the "*Southern Climate Monitor*" which provides updates on climate conditions as well as articles focusing on a variety of topics including research, climatology, and current climate events. Also, the SCIPP team, in conjunction with NIDIS, NDMC, CLIMAS, AASC, and NOAA, produced a series of live webinars on drought management and mitigation. The webinars are currently ongoing. In other

activities, SCIPP team members gave presentations to a variety of audiences including decision-makers, non-scientists, and scientists. Finally, the SCIPP team continues to add valuable content to the program website including reports written by the team and additional resources provided from other sources. Climate-related news stories relevant to the region were also posted frequently to provide context.

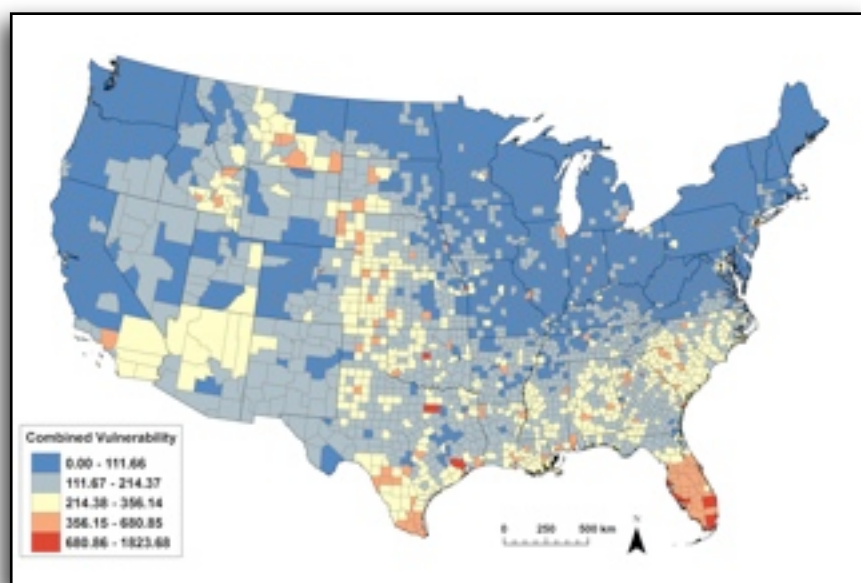
3. Research Findings

The following are summaries of several SCIPP research efforts and associated findings.

Occurrence of several physical hazards and socio-economic conditions identified four areas of high vulnerability (Gottlieb, Shafer)

This project focused on quantifying vulnerability to climatological hazards. This required looking both at the occurrence of hazards and the socio-economic factors that contribute to vulnerability, following the work of Cutter et al. (2003). The map shown in Figure 2 displays the total hazard vulnerability for each county across the United States. It identifies areas that are more susceptible to loss from meteorological hazards based on socioeconomic conditions and the actual occurrence of the hazards. The index is derived from data from the 2000 U.S. Census. Positive values of the index (marked in red) indicate higher social vulnerability and negative values (marked in blue) indicate lower social vulnerability. The end goal of this work is to help emergency managers and decision-makers

identify at-risk locations and populations to aid in hazard planning processes.



Cutter, S. L., B. J. Boruff, and W. L. Shirley, 2003: Social vulnerability to environmental hazards. *Soc. Sci. Quart.*, 84, 242-261.

Figure 2: Total Hazard Vulnerability. Red (blue) counties indicate areas with higher (lower) levels of social vulnerability.

Oklahoma climate needs assessment shows that most sector planning horizons focus on 15 years or less (Riley, Monroe, Hocker, Boone, Shafer)

The Oklahoma climate needs assessment, which began in late 2010, was completed in February 2012. The assessment was based on input from decision makers in 23 local, tribal, state, federal, non-profit, and for-profit agencies across Oklahoma in the following sectors: agricultural production, ecosystems, energy, health, society/public safety, transportation, and water resources. The data revealed the most significant climate-related issues that Oklahoma decision makers are currently facing and anticipate they will face in the future, the spatial and temporal scales in which they make decisions, and their need for climate information, education, and decision-support tools.

The findings demonstrate that climate had an enormous impact on the sectors in which the decision makers worked. The participants stated that flash floods and droughts, ice and snow storms, water resource issues, and tornadoes create the most significant climate-related issues. Many decision makers use weather and/or climate information on a daily or a weekly basis, and especially during extreme or high impact events. The decision makers said their most significant climate change-related issues will arise from more intense but less frequent rain events because an increased chance of floods and drought is problematic for many agencies.

The bulk of the participants in this study said their maximum planning timescale was less than 15 years. The exceptions were the transportation and water resources sectors, which generally plan out to 50 and 100 years respectively. Spatially, local weather data is used for the majority of short-term decisions. For longer planning horizons where climate model projections would be relevant, the participants generally agreed that grid spacing that breaks the state into 4 to 5 regions would be sufficient. Several research, data, and educational needs were identified during this study. Meeting these needs would provide decision makers with climate information that is relevant to their planning horizons and the multi-faceted nature of their work.

Figure 3: Cover page of the Oklahoma Climate Needs Assessment.



Past 25 years show weak teleconnections between summer drought and winter ENSO over the southern United States (Liu, Hong, Carter, Hocker, Shafer)

The objective of this research is to 1) assess climate change in the Southern U.S., 2) study the hydro-climate interaction (e.g. drought) in basins of interest within the Southern U.S., and 3) to examine the teleconnections between the El Niño Southern Oscillation (ENSO) and regional precipitation/drought patterns. The research utilizes the most recent years to study droughts in the Southern U.S. from a meteorological and hydrological perspective, and the teleconnection between regional droughts and tropical Pacific ENSO. The research analyzes the hydrological responses to past climate in order to provide useful information about future climate and droughts in the Southern U.S over the next several decades.

The results show that the winter Multivariate ENSO Index (MEI) and summer Standardized Precipitation Index (SPI) appear to correlate much better during the period of 1901-1924 than the other periods (correlation coefficient (CC)=0.74). The CCs show no appreciable values during other periods especially 1975-1999. This findings appears to agree with the conclusions drawn by Rajagopalan et al. (2000). Even though the indices vary, the most recent three decades show weak teleconnections between summer drought over Southern U.S. and winter ENSO.

Rajagopalan, B., E. Cook, U. Lall, and B. Ray, 2000: Spatiotemporal Variability of ENSO and SST Teleconnections to Summer Drought over the United States during the Twentieth Century. *Journal of Climate*, 13, 4244-4255.

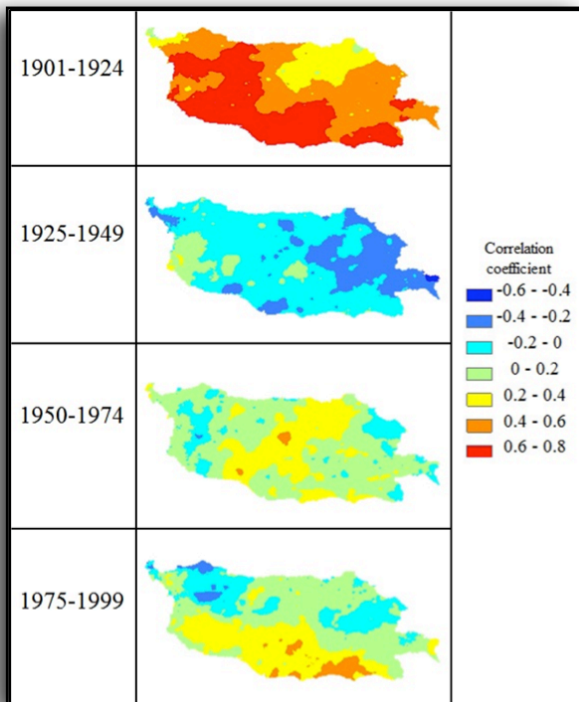


Figure 4: Spatial correlation coefficient between winter MEI and summer SPI of 12 month-scale for the time period of 1901-1924, 1925-1949, 1950-1974 and 1 and 1975-1999.

Climate Futures, Urban Floods, and Forecasting: Linking Severe Weather Impacts with Climate Variability (Meo, Hong)

The goal of this NOAA SARP-sponsored project is to simulate urban watershed flood events in five Oklahoma and Texas cities for present and projected future climate conditions, and present the simulated watersheds to urban planners and decision makers to determine the mix of possible modifications that might be made in urban flood planning and/or policy. To this end, the team is comprised of a climatologist, a hydro-meteorologist, an engineer/hydrologist, and an environmental policy analyst. The five cities and their watersheds selected for study include: Oklahoma City (Chisholm Creek), Tulsa (Fred Creek), Austin (Lake and Rattan Creeks), Dallas (Joe’s Creek), and Houston (Brays Bayou). City contacts have been established with each of the five cities and watershed data has been requested and received by the team. Geospatial data defining soils, topography, land use/cover, and imperviousness have been collected and assembled. Model parameters have been derived from the geospatial data to simulate infiltration and runoff processes. Model grids have been defined for each basin variously from 10 to 100 m resolution. For purposes of sensitivity testing, precipitation depths for 2, 5, 10, 25, 50, 100, and 500 yr return intervals have been assembled for each of the basins. For testing current and future climate scenarios, precipitation data at 3-hr intervals have been assembled for continuous simulation input. Initial model runs are being made to confirm model parameter choices and validity.

In the near term, completed watershed simulations will be visualized and be presented to each of the five city contact/liaison people to determine the most appropriate output parameters and presentations that can be used effectively to guide planning and decision making. The watershed visualizations and output packages will then serve as the basis for subsequent interactive dialogues with city flood planning and management units.

Gulf Coast Needs Assessments Reveals Hurricanes and Storm Surge Hazards have the biggest impact (Carter, Needham)

More than 60 in-person interviews have been conducted along the western Gulf of Mexico as part of the Gulf Coast Assessment, including much of the Texas coast (Houston/Galveston region in particular) as well as Louisiana. The goal of the Gulf Coast Assessment is very similar to the Oklahoma assessment and focuses on climate data needs for coastal stakeholders, perceptions of climate change, and use of climate projections and models. This assessment places a more significant emphasis on place-based analysis than the Oklahoma Assessment, due in large part to the multi-state region of study. Among survey participants thus far have been cities of varying sizes, government personnel, port authorities, and planning corporations. As part of the interviews, the SCIPP team provides a series of educational handouts focused on temperature, precipitation, and sea-level rise. Each handout is a two-sided publication that provides information about observed and projected changes for those three climate drivers.

Not surprisingly, the research has revealed that storm surge and hurricanes are the hazards with the biggest impact on the coast, while sea-level rise is an issue that stakeholders expect to become a bigger threat in the future. The engagement has also provided insight into the complex relationship between rainfall runoff and sea levels, as many stakeholders have indicated that heavy rainfall events do not drain well when sea levels are high because of onshore winds. This finding reveals that even a slight rise in sea level could have serious impacts (such as reduced drainage rates), which could negatively impact coastal communities long before actual sea levels inundate the coast directly.

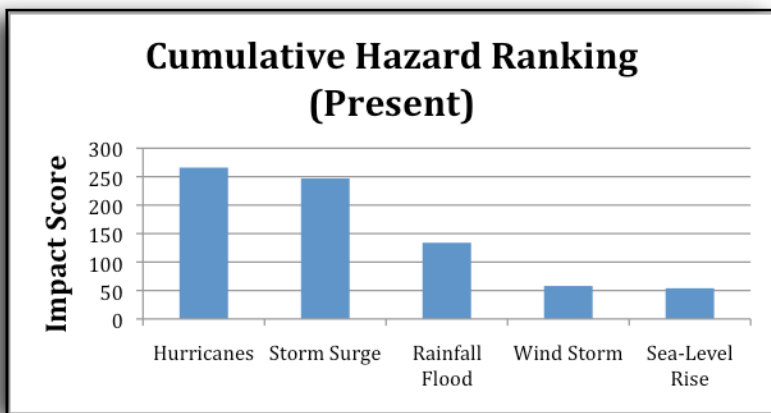


Figure 5: Cumulative Hazard Rankings by coastal stakeholders. Higher points mean the hazard is perceived as a greater threat.

4. Accomplishments

The following section details several major SCIPP team accomplishments from the past year.

Oklahoma Inter-Tribal Meeting (Riley)

SCIPP, in collaboration with Haskell Indian Nations University and the Oklahoma Climatological Survey, and supported in part by the U.S. Global Change Research Program and the National Aeronautics and Space Administration, hosted a meeting on climate variability and change with Oklahoma tribal representatives on December 12, 2011. The meeting took place at the National Weather Center in Norman, Oklahoma. Oklahoma is home to 39 tribal nations and this meeting provided them with the opportunity to offer input to be included in the 2013 National Climate Assessment (NCA). Of the seventy-three people that participated in the meeting, 42 represented Oklahoma tribes (21 tribal nations were represented). Two participants from a tribe in Texas also attended. Furthermore, three out of the four tribal colleges in Oklahoma were represented. The majority of the tribal participants were employed by their tribe's environmental department, although a few tribal leaders were also in attendance. The purpose of the meeting was to 1) enhance and foster dialogue between tribal representatives and climate scientists that was previously initiated through two statewide meetings in which tribal representatives were invited and some attended, 2) educate tribal representatives about climate science and climate change, and 3) develop recommendations for material to be included in the 2013 NCA document. A summary report is available on the SCIPP website: [http://www.southernclimate.org/publications/Oklahoma Intertribal Climate Change Meeting.pdf](http://www.southernclimate.org/publications/Oklahoma%20Intertribal%20Climate%20Change%20Meeting.pdf).

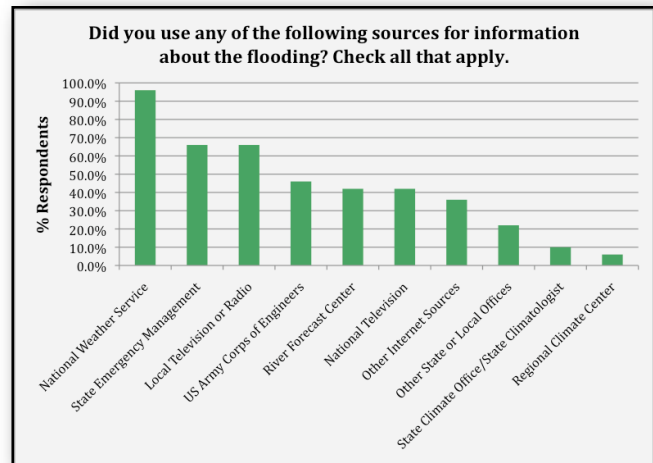


Figure 6: Oklahoma Inter-Tribal Meeting on Climate Variability and Change afternoon breakout session. Participants were divided into 10 diverse groups to discuss their views on climate change, climate policy, and the tribal and federal government environmental relationships. December 12, 2011.

River Forecast Center Survey (Riley, Edwards, Hocker)

A joint effort between SCIPP and three National Weather Service River Forecast Centers (RFCs) in the SCIPP region, the goal of this survey is to help the RFCs evaluate their products and services concerning flood information needs. Though the concept has been evolving for over a year, recent meetings during the fall of 2011 refined the focus of the project as well as the plan for moving forward. The agreed-upon concept was for the RFCs and SCIPP to co-produce a "Post Flood

Figure 7: Sources used by February-April 2012 pilot survey respondents to prepare for and/or monitor a flood event in their area.



Event” survey aimed at decision-makers involved with major flooding events. The short survey evaluates items such as information sources accessed, products used and the value of those products, and information gaps. The survey was piloted during the fall of 2011 and then again in the spring of 2012. Respondents included emergency managers, engineers, public safety officials, floodplain managers, and planners across the SCIPP region in addition to Georgia. The survey was distributed through emergency management and floodplain association list serves and linked on the three RFC websites. The first pilot was taken by 13 people; the second was taken by 70. The results from the pilot surveys will be used to create a final version that will be used by the RFCs once they obtain approval by NOAA headquarters. SCIPP is supplying critical expertise in survey design and testing; such expertise is often lacking in operational NWS offices.

Pre-Landfall Hurricane winds correlate best with storm surge heights (Needham, Keim)

The objective of this research was to estimate storm surge return periods along the U.S. Gulf Coast, in direct response to stakeholder requests. Results indicate the SCIPP Gulf Coast states, Texas, Louisiana and Mississippi, are most vulnerable to storm surge inundation. All of the Mississippi Coast, and portions of the Texas and Louisiana Coasts see 100-year storm surge levels greater than 20 feet. The relationship between hurricane winds and storm surge heights was also investigated. In particular, the research focused on the correlation between storm surge heights and pre-landfall wind strength. Wind speeds at 3-hour intervals were used from landfall to 36 hours before landfall for 126 separate hurricanes from 1880 through 2009.

One of the major results of this research was that pre-landfall hurricane winds, particularly winds 18 hours before landfall, correlate best with storm surge heights. Another interesting result is that the relationship between hurricane winds and storm surge is non-linear, meaning a moderate increase in hurricane winds can produce a large difference in surge heights.

As part of the storm surge research project, a storm surge internet blog was also maintained. The purpose of the blog was to provide historical context for active hurricane/storm surge events. To date, the blog has received 1,290 hits from 36 different countries. Visitors from Louisiana (739 hits), and Texas (85 hits) represent two of the six top locations that viewed the blog. The SURGEDAT dataset and “Hurricane Hal’s Storm Surge Blog” can be located at <http://surge.srcc.lsu.edu>.

The motivation for a global storm surge database was to provide a context to understand the physical processes that

generate storm surge, as well as maximum surge potential for every vulnerable region of the world. As the physics that drive storm surge are the same everywhere in the world, expanding the surge database to include over 400 observations will improve surge research, such as training of surge models, which will ultimately improve storm surge forecasts along the U.S. Gulf Coast. In addition, a global archive of historical storm surges provides opportunities for research collaboration.

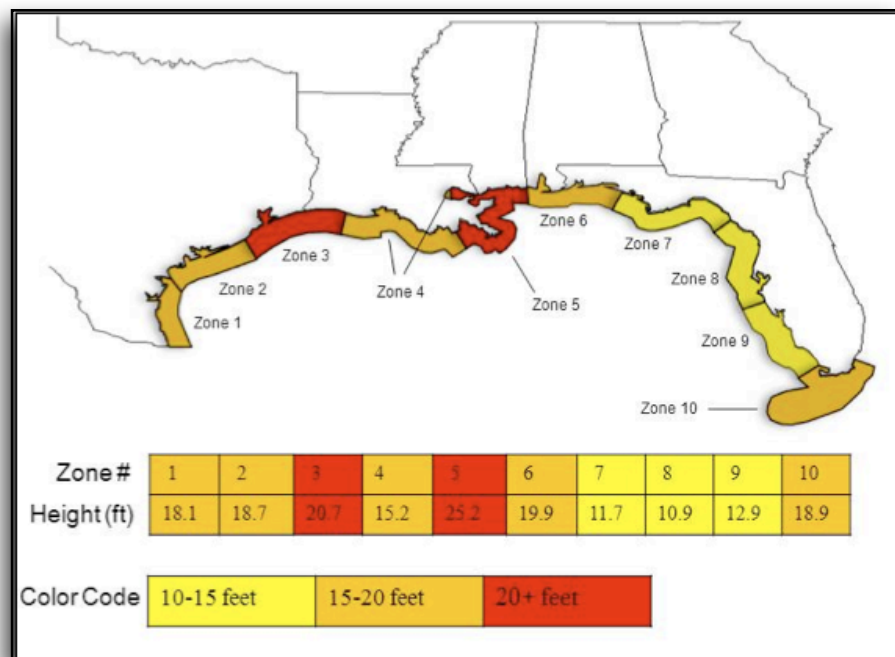


Figure 8: The graphic below depicts the height of the 100-year storm surge for 10 segments of coast.

Other Student Research Projects

Validation of IPCC Model Projections Using the Oklahoma Mesonet (Lunday, Fagan, McPherson)

This research focuses on comparing Oklahoma Mesonet precipitation and temperature observations with North American Regional Climate Assessment Program (NARCCAP) regional climate model (RCM) output. The goal of this study is to identify strengths and weaknesses in regional models so that future versions will have stronger predictions for local scales. This will help set a precedence for future evaluation of climate models.

The Impacts of Climate Change and Variability on the Surface Water Budget in the Southeast United States (Billiot, Keim)

The goal of this study is to determine the average surface water balance for various locations in the Southeast United States, and to investigate future water balance conditions based off the IPCC climate projections. Results from this research should assist decision makers who are in charge of water resources and management by providing information about future water conditions. The results may have important implications for water resources planning and management.

Mechanisms of urban influence on precipitation in the southeastern United States: Precipitation Enhancement, Storm Bifurcation, and Synoptic Characteristics (Trevino)

This research focuses on quantifying precipitation from urban areas in the southeastern United States in an effort to determine urban enhancement and to understand its role in regional precipitation climatology in the South. Precipitation from urban areas in the southeastern United States was analyzed to determine if urban enhancement occurred for the following study areas: Atlanta, Birmingham, Dallas/Fort Worth, Houston, Memphis, and Tulsa. Storm movement of heavy precipitation events were tested for storm bifurcation. Results were compared to synoptic-scale atmospheric patterns to test for a correlation between synoptic type and bifurcation occurrence. This research will enhance what is known about the urban influence on precipitation (enhancement and bifurcation), improve forecasting skills, and provide local stakeholders with a better understanding of urban-precipitation dynamics.

Tree Mortality After High Wind Events Based on Previous Weather Conditions (Becker)

The goal of this research project is to link tree mortality that results from a high wind event to the conditions before the event. Recent efforts have been focused on contacting stakeholders and gathering tree stand mortality data in Mississippi and Louisiana. Results could prepare landowners for an expected amount of tree mortality and possible types of damage given the conditions before the event. This can be useful in areas that high wind events occur regularly such as hurricane prone tree stands along the Gulf Coast.

Another major accomplishment of the SCIPP is presenting the relevant climate information and studies to our stakeholders and stakeholder communities. Below is a list of all SCIPP presentations conducted over the period May 2011 to April 2012.

Presentations

The following are a listing of presentations members of the SCIPP team gave at a variety of conferences, workshops, and meetings. They are provided in alphabetical order with the presenter indicated in parentheses.

- “A Historical Storm Surge Database for the East Coast of the U.S.” Poster presented at the Association of American Geographers Conference, New York, NY, February, 2012 (Keim).

- “A Spatiotemporal Assessment of Tornado Warnings within Storm Prediction Center Convective Outlooks using Geographic Information Systems.” Presented at the 92nd Annual American Meteorological Meeting, New Orleans, LA, January 24-27, 2012 (Yuan).
- “A System to Support Hazard Mitigation Planning in the South.” Presented at FEMA Region 6 Mitigation Conference, Denton, TX, May 3, 2011 (Hocker).
- “An analysis of historical storm surge activity along the U.S. Gulf Coast.” Presented at the Association of American Geographers Conference, Seattle, WA, April, 2011 (Needham, Keim).
- “An assessment of the climate-related needs of stakeholders in Oklahoma.” Presented at Practical Solutions for a Warming World: AMS Conference on Climate Adaptation, Asheville, NC, July 18-20, 2011 (Riley).
- “Analyzing Past Drought and Predicting Future Drought with Comprehensive Drought Indices for Arkansas-Red River Basin.” Poster presented at the Symposium on Data-Driven Approaches to Droughts (DDAD2011), West Lafayette, IN, June 21-22, 2011 (Liu, Hong, Hocker).
- “Climate Change Impacts on Water Availability and Hydrological Extremes: Case Studies from Southern USA and Emerging Regions.” Presented as part of the Department of Geography and Environmental Sustainability Colloquium Series Spring 2011 at the University of Oklahoma, April 1, 2011 (Hong).
- “Climatological Drought Analyses and Projection with SPI and PDSI: A Case Study for Arkansas-Red River Basin.” Presented at the International Symposium on Earth-Science Challenges, Norman, OK, September 15, 2011 (Liu, Hong, Hocker, Shafer).
- “Climatological Drought Analyses and Projection with SPI and PDSI: A Case Study for Arkansas-Red River Basin.” Poster presented at the 2nd International WaTER Conference, Norman, OK, October 24-25, 2011 (Liu, Hong, Hocker, Shafer).
- “Communicating with climate change visuals: Two exploratory exercises.” Presented at the 7th Symposium on Policy and Socio-Economic Research at the 92nd Annual American Meteorological Meeting, New Orleans, LA, January 24-27, 2012 (Riley).
- “Developing a System to Support Hazard Mitigation Planning in the South.” Presented at the 2011 FEMA Region VI Mitigation Conference, Denton, TX, May 2, 2011, Denton, TX (Shafer, Hocker).
- “Global and Regional Flood, Landslide and Drought Monitoring and Prediction.” Key Note Speaker at the International Water Conference, Nanjing, China, November 28-December 2, 2011 (Hong).
- “Gulf Coast Community of Practice.” Presenting on The US National Assessment Process, April 16, 2012 (Carter).
- “How and Where to Find Trustworthy Information.” Presented at the Oklahoma Inter-Tribal Meeting on Climate Variability and Change, Norman, OK, December 12, 2011 (Riley).
- “How Rare was the 1-3 May 2010 rainstorm in Nashville, TN and the surrounding region?” Poster presented at the Southeastern Coastal and Atmospheric Symposium, Mobile, AL, March 24, 2012 (Billiot).
- “Managing Climate Change in the Southern United States.” Presented at the Regional Climate Change Planning Meeting, June 28, 2011, College Station, TX (Shafer).
- “Managing Drought: A Southern Plains Webinar Series.” Presented for the National Integrated Drought Information System Early Preparedness Communities webinar, December 13, 2011 (Shafer).
- “Managing Drought in Oklahoma.” Presented to the Oklahoma Water Resources Board, Oklahoma City, OK, July 1, 2011 (Shafer).
- “Monitoring Drought.” Presented at the South Central U.S. State Drought Planning Workshop, Memphis, TN, May 9, 2011 (Shafer).
- “Musings Around Hazard Planning and Climate Adaptation: Parts of a continuum?” Presented at Hazard Mitigation and Climate Adaptation panel of the Annual Meeting of the American Meteorological Society, New Orleans, LA, January 24-27, 2012 (Carter).
- “Oklahoma Weather and Climate Needs Assessment: Preliminary Findings.” Presented at Adapting to Oklahoma’s Climate: Continuing Conversation, Norman, OK, May 10, 2011 (Riley).
- “Overview - Resilient Coastal Communities and Economies: Challenges and Opportunities.” Presented at the 6th Educational Partnership Program: Education and Science Forum, Developing STEM Talent: Increasing Innovation and National Competitiveness, Tallahassee, FL, March 26-28, 2012 (Carter).
- “Preliminary Results: Gulf Coast Climate Information Needs Assessment.” Presented at the Practical Solutions for a Warming World at the American Meteorological Society Conference on Climate Adaptation, Asheville, NC, July 18-20, 2011 (Carter).

- “Planning to Protect: How We Might Think About a Changing Climate and Be More Ready.” Presented as the first webinar in the series Adaptation in a Changing Climate and its Impact on National Security at The Security and Sustainability Forum, June 21, 2011 (Carter).
- “Preliminary Results: Gulf Coast Climate Information Needs Assessment.” Presented at the Louisiana Coastal Zone Programs’ Quarterly Meeting, Baton Rouge, LA, January 5, 2012 (Carter).
- “Preliminary Results Gulf Coast Climate Information Needs Assessment.” Presented at the Louisiana Sea Grant Quarterly Meeting, Baton Rouge, LA, March 9, 2012 (Carter).
- “Recap of July 2011 Austin Forum.” Presented at the Southern Plains Drought Assessment and Outlook Forum, November 29, 2011, Fort Worth, TX (Shafer).
- “Regional Understandings of Climate Variability and Change: A Cross-RISA Dialogue.” Session Chair for the Solutions for a Practical World: AMS Conference on Climate Adaptation, American Meteorological Society, Asheville, NC, July 19, 2011 (Shafer).
- “SCIPP Update & Lessons Learned.” Presented at the National Integrated Drought Information System Engaging Preparedness Workshop, Chicago, IL, June 9, 2011 (Shafer).
- “So you want to work in Climate or Sustainability or Hazards or ... What are you bringing to the table?” Presented at the Hot Topics and Local Weather Session at the 11th American Meteorological Survey Student Conference, New Orleans, LA, January 23, 2012 (Carter).
- “Storm Surge Research and Tools.” Presented at the Gulf of Mexico Alliance Annual Meeting, Lafayette, Louisiana, July, 2011 (Needham, Keim).
- “Storm Surge Return Periods for the U.S. Gulf Coast.” Poster presented at the Association of American Geographers Conference, Seattle, WA, April, 2011 (Keim, Needham).
- “Storm Surge Return Periods on the U.S. Gulf Coast.” Presented at the Association of American Geographers Conference, New York, NY, February, 2012 (Needham, Keim).
- “SURGEDAT Database.” Presented at the Severe Storm Prediction, Education, and Evacuation from Disasters Annual Conference, Rice University, Houston, Texas, 2011 (Needham, Keim).
- “The National Climate Assessment - Regions.” Presented at the 2012 Climate Leadership Conference, Association of Climate Change Officers, Weston, FL, February 29, 2012 (Carter).
- “The Urban Influence on Heavy Precipitation Events in the Southeastern United States.” Poster presented at the 26th Conference on Hydrology at the Annual Meeting of the American Meteorological Society, New Orleans, LA, January 24-27, 2012 (Trevino).
- “Urban enhancement of precipitation in the southeast United States.” Poster presented at the 36th Annual Climate Diagnostics and Prediction Workshop, Fort Worth, TX, October 2011 (Trevino).
- “Using GIS to assess vulnerability to meteorological and climatological hazards in the contiguous United States.” Presented at the 92nd Annual Meeting of the American Meteorological Society, New Orleans, LA, January 24-27, 2012 (Gottlieb).
- “Using GIS to assess vulnerability to meteorological and climatological hazards in the contiguous United States.” Presented at the Annual Meeting of the Association of American Geographers, New York, NY, February 24-28, 2012 (Gottlieb).
- “Using semi-structured interviews to assess the climate-related needs of Oklahoma decision makers.” Presented at the 7th Symposium on Policy and Socio-Economic Research at the 92nd Annual American Meteorological Meeting, New Orleans, LA, January 24-27, 2012 (Riley).

5. Publications and Reports

The following are various SCIPP-related publications and reports produced during the past year. An * indicates that the information was communicated to stakeholders.

Peer Reviewed

Bothwell, J., M. Yuan, 2011: A Kinematics-based GIS Methodology to Represent and Analyze Spatiotemporal Patterns of Precipitation Change. *Proceedings of the 19th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems* (ACM SIGSPATIAL GIS 2011).

Bothwell, J., and M. Yuan, 2012: Apply Concepts of Fluid Kinematics to Represent Continuous Space-Time Fields in Temporal GIS. *Transactions in GIS*.

- Carter, L., and K. Dow, 2012: Southeast Regional Technical Input Adaptation Chapter.
- Hoekstra, S., K. Klocklow, R. Riley, J. Brotzge, H. Brooks, and S. Erickson, 2011: A preliminary look at the social perspective of warn-on forecast: Preferred tornado warning lead time and the general public's perception of weather risks. *Weather, Climate and Society*, **3**(2), 128-140.
- Liu, L., Y. Hong, J. E. Hocker, M. A. Shafer, L. M. Carter, J. J. Gourley, C. N. Bednarczyk, and P. Adhikari, 2012: Analyzing Projected Changes and Trends of Temperature and Precipitation in the Southern U. S. from 16 Downscaled Global Climate Models under Different Emissions Scenarios. *Theoretical and Applied Climatology*, doi: 10.1007/s00704-011-0567-9.
- Liu, L., Y. Hong, J. E. Hocker, M. A. Shafer, and C. N. Bednarczyk, 2011: Hydro-climatological Drought Analyses and Projection using Meteorological and Hydrological Drought Indices: A Case Study in Blue River Basin, Oklahoma. *Water Resources Management*. In press.
- Liu, L., Y. Hong, J. Looper, R. Riley, B. Yong, Z. Zhang, J. Hocker, and M. Shafer, 2011: Climatological Drought Analyses and Projection using SPI and PDSI: A Case Study for Arkansas Red River Basin. *Journal of Hydrologic Engineering*. In press.
- Needham, H. E., and B. D. Keim, 2011: A Storm Surge Database for the U.S. Gulf Coast. *International Journal of Climatology*. doi: 10.1002/joc.2425
- Needham, H. E., L. Carter, D. P. Brown, 2012: Impacts and Adaptation in the Gulf Coast. *Pew Center for Global Climate Change*. In press.
- Needham, H., and B. D. Keim, 2011: Storm Surge: Physical Processes and an Impact Scale. Chapter 20, pp. 385-406, In: *Recent Hurricane Research – Climate, Dynamics, and Societal Impacts*, E. Lupo (Ed.). Intech Open Access Publisher: Croatia.
- Pecchioni, L. L., R. Edwards, and S. Grey, 2011: The effects of religiosity and religious affiliation on trauma and interpretations following Hurricanes Katrina and Rita. *Journal of Communications and Religion*, **34**, 37-58.
- Swan, L., and L. Carter, 2012: Southeast Regional Technical Input Education Chapter.
- Trepanier, J. C., H. F. Needham, J. B. Elsner, and T. H. Jagger, 2012: A Statistical Model of Return Periods for Combined Wind and Surge Hazards from Hurricanes. *The Professional Geographer*.

Non Peer-reviewed

- Bednarczyk, C., Y. Hong, L. Liu, P. Adhikari, J. Gourley, J. Hocker, and M. Shafer, 2011: Assessing Climate Change Impacts on the Blue River Basin of Oklahoma. Submitted to *Water Resources Management*.
- Carter, L., 2011: Higher Education's Role in Adapting to a Changing Climate. *A publication of the AMERICAN COLLEGE & UNIVERSITY Presidents' Climate Commitment*. Member of the American College and University Presidents' Adaptation Committee
- Liu, L., and Y. Hong, 2011: Analyzing Past and Predicting Future Droughts with Comprehensive Drought Indices for Arkansas-Red River Basin. 2011 Symposium on Data-Driven Approaches to Droughts. Paper 34.
- *Needham, H., L. Carter, and B. Keim, 2012: Gulf Coast Climate Information Needs Assessment Survey Results. Available shortly at <http://www.southernclimate.org/>. Communicated to the participants.
- *Riley, R., K. Monroe, J. Hocker, M. Boone, and M. Shafer, 2012: An Assessment of the Climate-Related Needs of Oklahoma Decision Makers. 47 pp. Available at: http://www.southernclimate.org/publications/OK_Climate_Needs_Assessment_Report_Final.pdf. Communicated to the participants and the Governor of Oklahoma.
- *Riley, R., P. Blanchard, R. Pepler, B. Bennett, and D. Wildcat, 2012: Oklahoma Inter-Tribal Meeting on Climate Variability and Change. 22 pp. Available at http://www.southernclimate.org/publications/Oklahoma_Intertribal_Climate_Change_Meeting.pdf. Communicated to all 39 Oklahoma tribal leaders and meeting participants.
- Riley, R., P. Blanchard, R. Pepler, B. Bennett, and D. Wildcat, 2012: Oklahoma Inter-Tribal Meeting on Climate Variability and Change. *Meeting Summary Report*. 22 pp. [Available online at http://www.southernclimate.org/publications/Oklahoma_Intertribal_Climate_Change_Meeting.pdf].
- Shafer, M., 2011-2012. Managing Drought in the Southern Plains webinar series summaries:
- Historical Context and Evolution of the 2011 Drought (Sep 29, 2011)
 - La Nina and Prospects for Extended Drought (Oct 13, 2011)

- Flash Drought (Oct 27, 2011)
- Water Resources (Dec 1, 2011)
- Cattle and Livestock (Dec 8, 2011)
- Seasonal Forecasting (Jan 12, 2012)
- Wildfire (Feb 9, 2012)
- U.S. Drought Monitor (Mar 8, 2012)
- Wildlife Impacts (Apr 12, 2012)

[Available online at <http://www.drought.gov> in the Southern Plains section]

6. Links with Other NOAA Programs

- Cooperative Institute for Mesoscale Meteorological Studies; National Severe Storms Laboratory
- National Climatic Data Center
- National Estuarine Research Reserve System
- National Integrated Drought Information System
- National Weather Service (NWS) Climate Prediction Center
- NOAA Coastal Services Center
- NOAA Regional Climate Services
- NOAA Regional Integrated Sciences and Assessment Programs
- NOAA Sea Grant: LA, MS/AL, and TX
- NWS Climate Services Division
- NWS River Forecast Center (Arkansas Red River Basin, West Gulf, and Lower Mississippi)
- NWS Southern Region Headquarters
- NWS Storm Prediction Center
- NWS Weather Forecast Office (Norman, OK)

7. Exemplifying Regional Climate Services

A drought of strong intensity and vast geographical extent gripped the South Central United States throughout 2011. As early as November 2010, the NOAA Climate Prediction Center predicted that eastern Pacific La Niña conditions would increase the potential for drought formation across the southern United States. In fact, the state of Texas set its driest water year (October 2010-September 2011) on record. To respond to these severe ongoing conditions, multiple efforts were launched to engage decision-makers from regional to state to local arenas in a conversation about drought.

Communication among agencies and affected sectors is a key to successful management. Towards this end, SCIPP, in collaboration with the National Integrated Drought Information System (NIDIS), NOAA Regional Climate Services Director, National Drought Mitigation Center (NDMC), Climate Assessment for the Southwest (CLIMAS), and the region's State Climatologists, launched a four-pronged approach to assure that all of these arenas were addressed: regional forums, state drought planning, a series of webinars and supporting local impact reporting. The net effect of these efforts is that interaction between these arenas and between the academic and practitioner communities increased substantially. Many decision-makers have participated in multiple activities, such as state drought planners attending the regional forums or local Farm Service Agency offices participating in the drought webinars and impact reporting.

While in many instances the response to the drought has remained reactive, these discussions have yielded a treasure trove of information that will form subsequent development of best practices guidelines, improve drought planning, and connect state and local monitoring more closely.

MANAGING DROUGHT IN THE SOUTHERN PLAINS

You are invited to join us in a bi-weekly webinar (web-based seminar) series to discuss drought conditions, impacts and resources available to help manage drought in the Southern Plains. Webinars will be held on the 2nd and 4th Thursdays of each month at 11:00 a.m. Central Time. The content is geared toward a general audience – anyone who has responsibility to manage or assist others in managing drought and its related impacts.

If you would like to join in these webinars, you need to register via the SCIPP website: <http://www.southernclimate.org> or e-mail scipp@mesonet.org. Registration is free but limited to 100 participants, so please register early. Each webinar will last about 20 minutes, plus additional time for questions. You will be provided with a link to the webinar and a toll-free phone line to call in.

Each webinar will include an overview of the current drought assessment and outlook, summary of impacts across the region, and a topic or resource, such as La Niña or wildfire conditions. You will have an opportunity to suggest topics for following webinars. The primary focus is in the states most heavily impacted from the current drought - Texas, Oklahoma and New Mexico – but participation from surrounding states is encouraged.


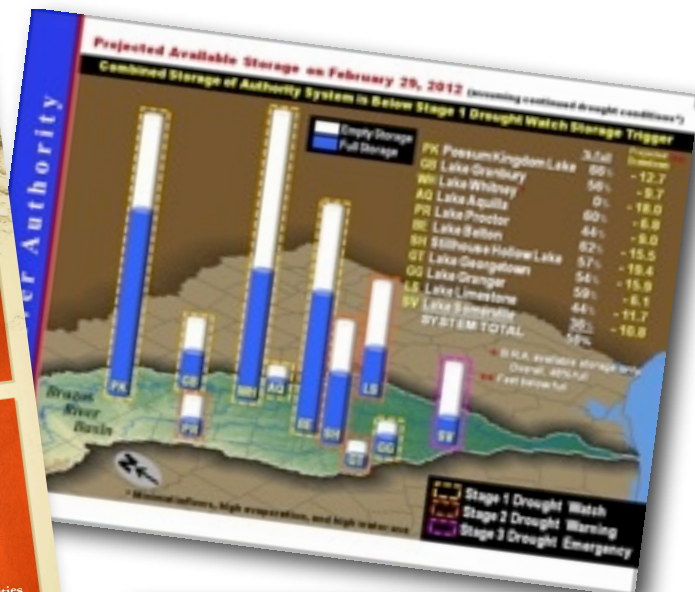
The webinar series is sponsored by a partnership of the National Integrated Drought Information System (NIDIS), National Oceanic and Atmospheric Administration (NOAA), National Drought Mitigation Center, Southern Climate Impacts Planning Program, Climate Assessment for the Southwest, and the region's State Climatologists.

Information from the webinars will be posted on a website linked through <http://www.southernclimate.org> and summarized in an online newsletter, Drought Tracker. Please pass on this announcement to relative organizations or groups that are involved in managing or monitoring drought and its related impacts.

To register or for more information, contact:
Southern Climate Impacts Planning Program
<http://www.southernclimate.org>
 405-325-2541 or scipp@mesonet.org

Webinar Topics:

- La Niña
- Cattle & Livestock
- U.S. Drought Monitor
- Ecological Impacts
- Assistance Programs
- Water Supply
- Ranch Drought Planning
- Wildfire
- Drought Ready Communities
- Agricultural Impacts

The series goals include:

- To improve communication among agencies and organizations in the Southern Plains who are being affected by the historic and exceptional drought;
- To provide information on available resources and assistance to help monitor and manage drought;
- To understand the impacts of drought in this region *from the perspective of those who are tasked with managing it*; and
- To document impacts that will help improve the weekly U.S. Drought Monitor assessment and our understanding of how drought impacts evolve and decay.

Webinars are held on the 2nd and 4th Thursdays of each month at 11:00 a.m. Central Time. The content is geared toward a general audience – anyone who has responsibility to manage or assist others in managing drought and its related impacts. Each webinar includes an overview of the current drought assessment and outlook, summary of impacts across the region, and a topic or resource, such as La Niña or wildfire conditions. During each webinar, attendees are able to vote on the next topic they would like to see as well as suggest new topics. Topics to date have focused on the following: the historical context and evolution of the 2011 drought; La Niña and prospects for extended drought; flash drought; water resources; the cattle industry; and seasonal forecasting. During the Spring 2012, the first webinar each month has focused on a drought impact, and the second monthly webinar presented an update of current drought conditions.

The Managing Drought in the Southern Plains Webinar Series include the following presentations:

- Historical Context and Evolution of the 2011 Drought (Sep 29, 2011)
- La Nina and Prospects for Extended Drought (Oct 13, 2011)
- Flash Drought (Oct 27, 2011)
- Water Resources (Dec 1, 2011)
- Cattle and Livestock (Dec 8, 2011)
- Seasonal Forecasting (Jan 12, 2012)
- Wildfire (Feb 9, 2012)
- U.S. Drought Monitor (Mar 8, 2012)
- Wildlife Impacts (Apr 12, 2012)

Summaries of these webinars are available online at <http://www.drought.gov> in the southern plains community.

More than 250 people have signed up for the webinars, with a typical draw of 60-80 registrants on any individual topic. Several have indicated that multiple people in their organization participate in the webinar via a single sign-in, so the number directly participating is likely higher. These webinars will continue, at least monthly, as long as extreme and exceptional drought remains mired in the region or as long as high interest levels are maintained. First and foremost, this webinar series is a useful way to convey information across a wide region, so that experts in one state can share their experiences with those in another. However, we also recognize that the region is beset by many different types of hazards beyond drought – severe storms, hurricanes, floods, winter storms and more. Just as we have learned from the experience with these drought webinars, there is likely an unmet need for conveying information surrounding these other hazards.

Along with the Managing Drought in the Southern Plains webinar series, several drought planning workshops and forums were held across the drought-stricken region.

South Central U.S. State Drought Planning Workshop, May 9, 2011, Memphis, TN

Southern Plains U.S. Drought Impacts & Assessment Workshop, July 7, 2011, Austin, TX

Southern Plains Drought Assessment and Outlook Forum, November 29, 2011, Fort Worth, TX

Southern Plains Drought Assessment and Outlook Forum, April 26, 2012, Lubbock, TX

8. NCA Activities

SCIPP has varied involvement in the National Climate Assessment (NCA) activities. SCIPP Team involvement includes having a member of the Federal Advisory Committee for the NCA, a Co-Chair of the Regions, a Coordinating Lead Author for the Southeast Assessment and Lead Author for the Adaptation Chapter, a Coordinating Lead Author for the Great Plains Assessment, and a member of the Education and Outreach committee of the NCADAC.

NCA activities will continue for SCIPP through the rest of 2012. After June 1, 2012, involvement will include reviews, revisions, and similar editing activities. This will include revisions of the Southeast and Great Plains assessment, as well as the Gulf Coast climate assessment document. The anticipated time commitment for these activities is no more than 25%.

9. Table of Team Projects

PI	Dr. Paul Risser	Rachel Riley	Lynne Carter, Hal Needham
Project Title	Cybercommons for Ecological Forecasting	Oklahoma Needs Assessment	Gulf Coast Assessment
End Date	August 2013 proposed	February 2012 Completed	2012
Deliverables/ Products	Online data and tools for carbon cycle modeling and biodiversity modeling.	The data revealed the most significant climate-related issues that Oklahoma decision makers are currently facing and anticipate they will face in the future, the spatial and temporal scales in which they make decisions, and their need for climate information, education, and decision-support tools. The information from this assessment was synthesized into a document: "Making Decisions: An Assessment of the Climate Related Needs of Oklahoma Decision Makers." The document was also provided to the participants of the assessment, and the Governor of Oklahoma.	The research has revealed that storm surge and hurricanes are the hazards with the biggest impact on the coast, while sea-level rise is an issue that stakeholders expect to become a bigger threat in the future. The information from this assessment was synthesized into a document, and will be available online shortly.
Abstract/ Description	NSF-funded Cybercommons project reaches out to stakeholders on water resource management, wildlife management, and state government agencies in Oklahoma and Kansas on climate, biodiversity, and ecological issues.	The assessment was based on input from decision makers in 23 local, tribal, state, federal, non-profit, and for-profit agencies across Oklahoma in the following sectors: agricultural production, ecosystems, energy, health, society/public safety, transportation, and water resources.	More than 60 in-person interviews have been conducted along the western Gulf of Mexico as part of the Gulf Coast Assessment. The goal of the Gulf Coast Assessment focuses on climate data needs for coastal stakeholders, perceptions of climate change, and use of climate projections and models
Partners	Oklahoma State University, University of Kansas, and Kansas State University	University of Oklahoma	Louisiana State University
If this is a RISA-led project, please mark A*. If RISA is a contributor, please mark B**.	B	A	A
If B, please indicate who is the primary lead	Dr. Paul Risser at the University of Oklahoma is the PI, but SCIPP investigator May Yuan is the Cyber Team Lead		

Dr. Mark Shafer	Dr. Brad Wilcox	Dr. Mark Meo, Dr. Yang Hong	Dr. Renee McPherson, Charlotte Lunday, Emma Fagan
Connecting Science to Landscape Managers in the Rio Grande Basin	Sustaining Rangeland Production Systems in the Southern Great Plains	Climate Futures, Urban Floods, and Forecasting: Linking Severe Weather Impacts with Climate Variability	Validation of IPCC Model Projections Using the Oklahoma Mesonet
Pending	June 2017 Proposed	August 2013 proposed	Ongoing
A report summarizing the science needs of stakeholders in the basin, ongoing research and activities in the region, and existing monitoring capabilities that are used by the stakeholders will be produced. The report will compare those sources mentioned by meeting participants to operational data sources to identify those existing resources that may be under-utilized.	Project outcomes include new forecasting and scenario-testing tools, baseline regional carbon and water budgets, experimental test of contrasting landscape-scale management strategies, decision-support tools, and better informed producers.	In the near term, completed watershed simulations will be visualized and be presented to each of the five city contact/ liaison people to determine the most appropriate output parameters and presentations that can be used effectively to guide planning and decision making. The watershed visualizations and output packages will then serve as the basis for subsequent interactive dialogues with city flood planning and management units.	The goal of this study is to identify strengths and weaknesses in regional models so that future versions will have stronger predictions for local scales. This will help set a precedence for future evaluation of climate models.
An assessment of regional adaptation capabilities and identification of the science needs to support adaptive management efforts in the Rio Grande Basin	A transformation of management practices that increases the sustainability and resilience of a complex social-economic-ecological system in the face of a changing climate and increased socio-economic risk. Includes life-cycle analysis, modeling, and extension & outreach.	The goal of this project is to simulate urban watershed flood events in five Oklahoma and Texas cities for present and projected future climate conditions, and present the simulated watersheds to urban planners and decision makers to determine the mix of possible modifications that might be made in urban flood planning and/ or policy.	This research focuses on comparing Oklahoma Mesonet precipitation and temperature observations with North American Regional Climate Assessment Program (NARCCAP) regional climate model (RCM) output.
CLIMAS/Gregg Garfin	Texas A&M University	University of Oklahoma	University of Oklahoma
A	B	A	A
	Dr. Brad Wilcox, Professor of Ecosystem Science and Management, Texas A&M University; Dr. Mark Shafer is the primary lead for RISA-related aspects of utilization, evaluation, and extension		

Robert Gottlieb	Lu Liu	Rachel Riley, Renee Edwards	Hal Needham, Barry Keim	Amanda Billiot, Barry Keim	Anna Trevino
Using GIS to Assess Vulnerability to Climate Hazards in the Southern United States	Assessments and projections of regional hydro-climatic variability over Southern U.S.: Potential teleconnections with El Nino/Southern Oscillation	River Forecast Survey	Storm Surge Heights	The Impacts of Climate Change and Variability on the Surface Water Budget in the Southeast United States	Mechanisms of urban influence on precipitation in the southeastern United States: Precipitation Enhancement, Storm Bifurcation, and Synoptic Characteristics
December 2011 Completed	2012	Ongoing	2012	Ongoing	Ongoing
The end goal of this work is to help emergency managers and decision-makers identify at-risk locations and populations to aid in hazard planning processes.	The objective of this research is to assess the climate change in the Southern U.S., to study the hydro-climate interaction in basins of interest, and to examine the teleconnections between the El Niño Southern Oscillation (ENSO) and regional precipitation/drought patterns in order to provide useful information about future climate and droughts in the Southern U.S over the next several decades.	The results from the pilot surveys will be used to create a final version that will be used by the RFCs. Once the survey has been approved by NOAA it will be available to all of the RFCs across the nation and will be ready for dissemination following a major hydrologic event.	The motivation for a global storm surge database was to provide a context to understand the physical processes that generate storm surge, as well as maximum surge potential for every vulnerable region of the world.	Results from this research should assist decision makers who are in charge of water resources and management by providing information about future water conditions.	This research will enhance what is known about the urban influence on precipitation (enhancement and bifurcation), improve forecasting skills, and provide local stakeholders with a better understanding of urban-precipitation dynamics.
This particular project focused on quantifying vulnerability to climatological hazards due to the presence of hazards and a community's response to hazards.	The research utilizes the most recent years to study droughts in the Southern U.S. from a meteorological and hydrological perspective, and the teleconnection between regional droughts and tropical Pacific ENSO.	A joint effort between SCIPP and three National Weather Service River Forecast Centers (RFCs) in the SCIPP region, the goal of this survey is to help the RFCs evaluate their products and services concerning flood information needs.	The objective of this research was to estimate storm surge return periods along the U.S. Gulf Coast, in direct response to stakeholder requests. The research focused on the correlation between storm surge heights and pre-landfall wind strength.	The goal of this study is to determine the average surface water balance for various locations in the Southeast United States, and to investigate future water balance conditions based off the IPCC climate projections.	This research focuses on quantifying precipitation from urban areas in the southeastern United States in an effort to determine urban enhancement and to understand its role in regional precipitation climatology in the South.
University of Oklahoma	University of Oklahoma	University of Oklahoma, Louisiana State University	Louisiana State University	Louisiana State University	Louisiana State University
A	A	A	A	A	A