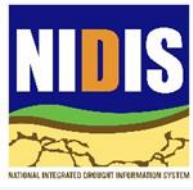
SOUTHERN PLAINS DROUGHT EARLY WARNING SYSTEM STRATEGIC PLAN

6/19/2017

2017-2018 Strategic Plan



Document prepared by the National Integrated Drought Information System (NIDIS) in partnership with key stakeholders including the Southern Climate Impacts Planning Program (SCIPP), a NOAA RISA Team.

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SOUTHERN PLAINS DROUGHT EARLY WARNING SYSTEM

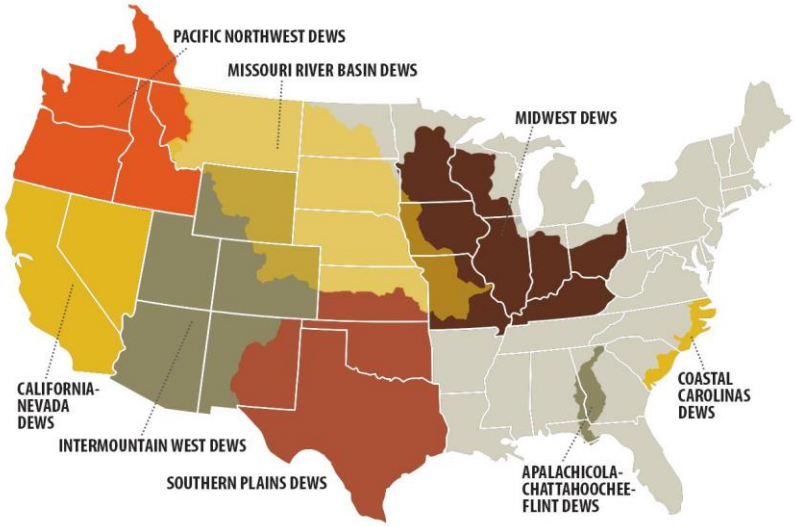
The National Integrated Drought Information System and Drought Early Warning Systems

In 2006, Congress authorized the National Integrated Drought Information System (NIDIS) with a mandate for interagency coordination and integrated drought research that builds upon existing federal, tribal, state, and local partnerships to create a national drought early warning system (DEWS). NIDIS is working toward this goal by developing a network of regional DEWS (see map, below). These regional DEWS utilize existing networks to make climate and drought science readily available, easily understandable, and usable; and to improve regional capacity to respond to and cope with drought.

WHAT IS NIDIS?
The National Oceanic and Atmospheric Administration's (NOAA) National Integrated Drought Information System (NIDIS) was authorized by Congress in 2006 (Public Law 109-430) with an interagency mandate to develop and provide a national drought early warning information system, by coordinating and integrating drought research, and building upon existing federal, tribal, state, and local partnerships.

WHAT IS A DEWS?
A Drought Early Warning System (DEWS) utilizes new and existing networks of federal, tribal, state, local and academic partners to make climate and drought science accessible and useful for decision makers; and to improve the capacity of stakeholders to monitor, forecast, plan for, and cope with the impacts of drought.

A regional DEWS is supported by stakeholders, comprised of relevant partners and community members across the region, including universities, the private sector, and federal, tribal, state, and local entities. Stakeholders participate in the NIDIS consultation process, and they support NIDIS priorities by leveraging existing resources, programs, and partnerships. This relationship ensures a robust, "ground-up" regional DEWS that is well-networked and responsive to the specific needs of each region. NOAA and the NIDIS program did not establish the DEWS and do not control or manage the DEWS functions or operations; rather, the DEWS constitute the continuation, and leveraging, of existing partnership networks.



Southern Plains DEWS

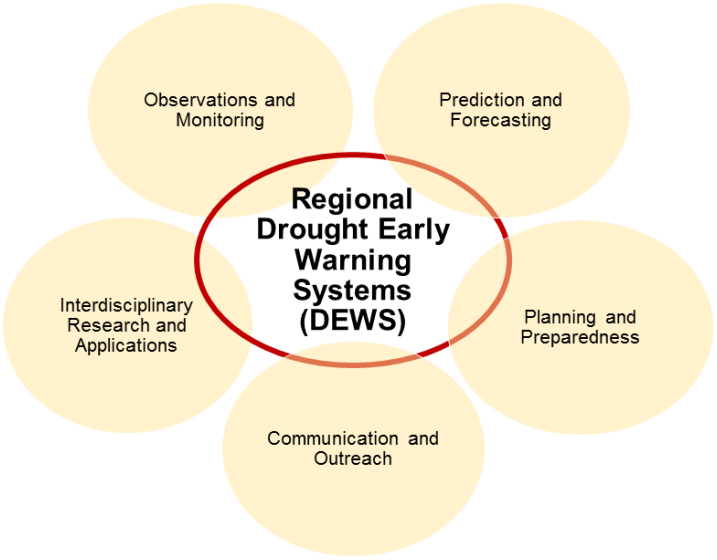
The development of a Southern Plains DEWS began in 2011 in the midst of a multi-year 2010-2015 drought in the region. A drought began in the fall of 2010 with the convergence of several large-scale oceanic and atmospheric circulation patterns. A strong La Niña event developed in the fall of 2010, leading to diminished rainfall totals in the late winter and spring of 2011, followed by the hottest and driest summer months since at least 1895. From 2012-2015, drought persisted throughout parts of the region, impacting western portions of Texas and Oklahoma and eastern New Mexico as well as many other areas in these states. Impacts were numerous across economic sectors. Failure of winter wheat and summer crops during 2011 resulted in shortages of food for cattle, which forced farmers to purchase large amounts of hay or sell their herds. Additionally, the drought caused critical municipal water shortages and led to wildfire danger and other ecological impacts. Many of these impacts lingered until 2015.

Southern Plains DEWS Region
Note: While the brown shading denotes the Southern Plains DEWS region, where the majority of DEWS actions focus, activities may extend beyond the shaded area when needed.

The Southern Plains DEWS launched to meet the diverse needs of stakeholders who needed information on drought conditions and the forecasted outlook, but often on different spatial and temporal scales. A range of decision support services were provided by local, regional, and national climate services organizations working together, including: NIDIS, NOAA's Regional Integrated Sciences and Assessments (RISA) teams, state climatologists, regional climate centers, NOAA's regional climate services programs, NOAA's Climate Prediction Center (CPC), and the National Drought Mitigation Center (NDMC). Decision support services included monitoring of drought conditions, data analysis, planning and preparedness assistance, and several stakeholder engagement activities. These efforts brought together decision-makers and resource managers from regional, state, and local entities, professional associations, independent farmers, and ranchers to discuss drought, and they resulted in a constructive dialogue and information-sharing between drought and climate information producers and users. Specific drought response activities included regional forums and webinars, state drought planning, and other efforts to improve drought impact reporting.

The cornerstone of these activities was a series of drought forums throughout 2011-2014, convened by NIDIS and the NOAA Regional Climate Services Director of the Southern Plains region. Six forums were held in Austin, TX (July 2011); Fort Worth, TX (November 2011); Lubbock, TX (April 2012); Abilene, TX (November 2012); Goodwell, OK (March 2013); and Wichita Falls, TX (June 2014). A virtual forum was also broadcast from Albuquerque, NM (June 2012). Drought conditions and impacts, comparisons with past drought events, and outlooks for the next season were discussed. Attendees included water resources, agriculture and livestock, forestry, and wildfire management professionals, along with state and federal agency representatives.

Key components of NIDIS Regional Drought Early Warning Systems



Purpose of the Southern Plains DEWS

The Southern Plains DEWS is a collaborative federal, tribal, state, and local interagency effort to improve drought early warning capacity and long-term drought resilience throughout the region. This is accomplished through local stakeholder-driven activities encompassing data collection and monitoring; research; planning for climate extremes; and communication, education, and outreach. Southern Plains DEWS activities occur throughout Texas, Oklahoma, eastern New Mexico and southern Kansas.

Specific goals of the Southern Plains DEWS include:

- Develop an active network of federal, tribal, state, and local stakeholders that promotes drought early warning capacity and long-term drought resilience.
- Provide a forum for a broad and diverse range of professionals across economic and environmental sectors to identify, synthesize, share, and disseminate relevant drought early warning and resiliency information.
- Enhance partnerships between researchers and decision-makers to better link emerging drought science and information to management challenges.

SOUTHERN PLAINS DEWS 2017-2018 STRATEGIC PLAN

Plan Purpose and Development

The Southern Plains DEWS Strategic Plan (Plan) outlines priority tasks and activities across the region to build drought early warning capacity and resilience. It includes a list of current partners (listed in Appendix A), outcomes, and key milestones. The Plan is a "living document" to which additional actions and partners may be added as needed.

Development of the Plan began in 2016 in stakeholder meetings to discuss existing drought-related activities and partnerships throughout the Southern Plains region, to prioritize needs for drought-related information identified during the DEWS 2011-2014 drought forums, and to outline a draft Plan to guide next steps. Stakeholders reviewed and commented on several working drafts, and two additional events also informed the Plan:

- **Communicating Seasonal Climate Information Workshop** – Held on September 27, 2012 with climate scientists, decision-makers, and communications experts to discuss the methods used to communicate drought information in the Southern Plains during 2010-2012 and to determine the areas in which scientists can improve their communication of seasonal climate information.

- **Climate Extremes Workshop** – Held on October 13 and 14, 2015 in Fort Worth, TX with Texas and Oklahoma state agency representatives to discuss the challenges, successes, lessons learned, interagency collaboration and climate information needs during the 2010-2015 drought and Spring 2015 flood events.

Southern Plains DEWS Priorities and Activities

The Southern Plains DEWS prioritizes the following aims necessary to building drought early warning capacity and long-term drought resilience throughout the Southern Plains region:

- **Priority 1 – Foster Stakeholder Collaboration, Coordination, and Relationship Building** - This priority calls for cultivating a culture of interagency collaboration and information-sharing throughout the Southern Plains DEWS region. Related actions include coordinated calls, as well as meetings and workshops to facilitate informed discussion on drought among federal, tribal, state, and local agencies.

- **Priority 2 – Improve Drought Early Warning Outreach and Communication -** This priority focuses on actions that can improve communications and outreach on drought and drought-related climate events. Related actions include improved communications on the U.S. Drought Portal's (www.drought.gov) Southern Plains DEWS webpage, targeted communication and outreach to key stakeholders on drought and climate outlook information, and a workshop on improving drought messaging to the public.

- **Priority 3 – Support Research on Key Water Resources and Land Management Topics –** This priority focuses on supporting research on water resource and land management issues related to drought and associated impacts that were identified during the DEWS 2011-2014 drought forums.

- **Priority 4 – Improve the Application of Climate Forecasts –** This priority focuses on developing sound and actionable information and climate forecast products. NIDIS and stakeholders will cultivate the relationship between climate service providers and decision makers, agencies, researchers, and managers to improve the usability, reliability, and timeliness of climate data for drought research and management needs. Related actions include an assessment on how climate forecasts are used in the Southern Plains and a workshop to foster open communication between

the climate forecast providers and end users.

- **Priority 5 – Improve Drought Planning -** This priority focuses on actions that can support and improve drought preparedness and planning across longer time horizons throughout the region. Activities include a study on the current state of long-term drought resilience in the region and drought simulations.

For each priority, some of the associated activities outlined in this plan have been started, while others will be initiated over the next two years. The corresponding schedule summarizes the expected timeframe for each activity's implementation. Milestone dates are based on the following quarters designated by seasons: Winter (Jan, Feb, Mar); Spring (Apr, May, Jun); Summer (Jul, Aug, Sep); and Fall (Oct, Nov, Dec).

Additionally, some of the activities are funded while other activities will require efforts to acquire funding. Funding sources may include NIDIS and DEWS partners. As the Southern Plains DEWS continues to develop, it will be important to identify and leverage resources and available funding among DEWS partners.

Coordination with NIDIS Working Groups

Vital to the mission of NIDIS are its six interagency Working Groups, each focused on a different component of NIDIS activities within and across agencies and throughout the country. These six areas of focus are: (1) education and public awareness, (2) monitoring and observations, (3) predictions and forecasting, (4) interdisciplinary research and applications for risk assessment, (v) planning and preparedness, and (5) the U.S. Drought Portal for improving accessibility to usable drought risk information. More information on these Working Groups is provided in the NIDIS Implementation Plan December 2016 Update.

Coordination, communication, and transferability of information and actions between the NIDIS Working Groups and the DEWS is essential the overall process of building an integrated drought information system. The NIDIS Program Office supports a network of regular communication and exchange of information between these entities to ensure meaningful engagement and effective collaboration on priorities and activities. Appendix B illustrates how each of the activities in this Plan correlates with the Working Group(s).

Priority 1 – Foster Stakeholder Collaboration, Coordination, and Relationship Building

The Southern Plains DEWS seeks to develop a robust network of federal, tribal, state, and local stakeholders dedicated to building drought early warning capacity and long-term drought resilience in a coordinated manner. Associated activities include routine communication and conference calls among stakeholders to provide individual input on Southern Plains DEWS objectives.

Activity 1.1 Host Partnership Conference Calls with Federal Agencies

NIDIS will host 2-3 conference calls with its federal partners in the Southern Plains to discuss opportunities for further developing and implementing the Southern Plains DEWS. Participants may include, NOAA line offices, such as the National Weather Service (NWS), U.S. Fish and Wildlife Service

(USFWS), U.S. Army Corps of Engineers (USACE), Federal Emergency Management Association (FEMA), U.S. Department of Agriculture (USDA), Environmental Protection Agency (EPA), U.S. Geological Survey (USGS), U.S. National Park Service (NPS), U.S. Forest Service (USFS), Centers for Disease Control (CDC), U.S. Bureau of Reclamation (USBR). Partnership opportunities may include a regularly updated matrix delineating federal agency contributions and interactions within the Southern Plains DEWS related to drought early warning and long-term drought resilience, to be shared with regional stakeholders.

Activity 1.1 Outcomes

- Summary of partnership opportunities presented to the group, next steps developed by federal agency participants. [Summer 2017 - Fall 2018]
- Proposed updates to DEWS priority actions and/or activities incorporated into the Plan because of increased federal coordination and resource leveraging. [Fall 2018]

Activity 1.2 Coordinate with Climate Services Providers in the Region

Multiple federal agencies provide routine climate services, conduct weather-related research, and communicate the state of knowledge around weather and climate with audiences across the Southern Plains. These climate services providers include the Department of Interior's (DOI) South Central Climate Science Center (CSC), the USDA Southern Plains Climate Hub, and NOAA's Southern Regional Climate Center (SRCC), as well as state climatologists. Each has separate but related priorities and activities related to drought monitoring, planning, and management. These climate providers have been and will continue to be important Southern Plains DEWS partners. For example, the USDA Southern Plains Climate Hub worked with NIDIS and other regional partners to host climate outlook workshops in Las Cruces, NM and in the Lower Rio Grande Valley, TX in the fall of 2016. NIDIS will convene regular calls and deliver routine correspondence to connect with these climate service providers and exchange information as well as identify opportunities for collaboration and leveraging of resources.

Activity 1.2 Outcomes

- Routine correspondence between NIDIS and the entities described above on collaboration, leveraging resources and coordinating Southern Plains DEWS relevant activities. [Spring 2017 - Fall 2018]

Activity 1.3 Host NWS Climate Outlook Calls

There are fifteen NWS Forecast Offices across the Southern Plains DEWS region, along with other climate services providers. NWS Weather Forecast Offices (WFOs) are a primary resource for the public to access weather-related information, including NOAA's CPC Monthly and Seasonal Drought Outlooks, the U.S. Drought Monitor, and other drought-related products. Each NWS WFO has a designated climate focal point, and consistency is vital across offices in the interpretation and dissemination of drought-related information.

To increase coordination and improve consistency in products and information, NIDIS's Southern Plains DEWS will host a monthly call among NWS Forecast Offices, the NWS Southern Region Headquarters, and regional climate services providers including the State Climate Offices and NOAA Regional Climate Centers, prior to the release of NOAA's CPC Monthly Drought Outlooks. Discussions will focus on

review of the products, corresponding implications for decision-making and decision support, and potential impacts.

Activity 1.3 Outcomes

- Host monthly coordination calls with local NWS WFOs offices and other partners indicated above [Spring 2017 - Fall 2018]

Activity 1.4 Improve Information Delivery on Drought and High Precipitation Events across Government

Stakeholders who attended the NIDIS-sponsored 2015 Climate Extremes Workshop identified the following principles essential to strong coordination among federal, state, and local government agencies prior to, during, and post drought and high precipitation events:

- Clearly defined responsibilities and transparency are critical elements of intergovernmental coordination during a drought event.
- Sustained interaction between state and federal agencies and across state borders is crucial for future preparedness and resiliency improvements.
- The transfer of information on best practices, success stories, and challenges can enhance the ability of each agency to connect with the public during drought and flood events.
- Different agencies within a state, or agencies of similar function across state lines, may use different terminology and metrics for estimating damages and external communication.
- Improving communication between state agencies and local communities raises awareness about local resources, needs, and capacities.
- Both OK and TX agreed that drought and floods require very different approaches to event management and interagency coordination, and need to be customized to specific needs and impacts.

Building upon these findings, NIDIS will coordinate the development of a best practices guide, including case studies of successes and challenges in drought information messaging, quantifying damage and impacts, and response coordination. NIDIS will work with partners including the NIDIS Planning and Preparedness Working Group, NWS, NDMC, SCIPP, Texas Water Development Board (TWDB), the Oklahoma Water Resources Board (OWRB), and other state and local agencies from TX, OK, NM, and KS.

Activity 1.4 Outcomes

- A Best Practices guide for improving coordination among federal, state, and local agencies delivered to DEWS stakeholders and posted in an interactive format on the U.S. Drought Portal. [Fall 2018]

Priority 2 – Improve Drought Early Warning Outreach and Communication Capacity

During drought and other drought-related climate events (e.g. high precipitation events that lesson the impacts of drought), increased drought and climate communication and outreach to stakeholders is paramount. The Southern Plains DEWS serves as a centralized communication hub that provides regional information on DEWS actions and climate tools and resources, through NIDIS's U.S. Drought

Portal and webinars. Those in need of drought and climate outlook information and resources should be able to access the U.S. Drought Portal and find tailored, locally relevant information to make better decisions in response to drought in the Southern Plains. NIDIS and stakeholders may also consider additional tools to improve drought early warning communication, like special webinars, presentations, and social media.

Activity 2.1 Update and Maintain the Southern Plains DEWS Information on the U.S. Drought Portal

NIDIS will work with its partners to update and maintain the Southern Plains DEWS pages on the U.S. Drought Portal. This site provides up-to-date information on DEWS activities (e.g. workshop dates and summaries, research, outreach activities, etc.). Additional information will be added to the U.S. Drought Portal as it becomes available, to include: innovative drought research; drought vulnerability research; and best management practices (BMPs), success stories, and lessons learned for drought mitigation and response.

NIDIS will work with Southern Plains DEWS stakeholders as well as subject matter experts of the NIDIS Drought Portal Working Group to provide recommendations for Southern Plains DEWS webpage improvements, using Google analytics data to inform discussion. Suggested improvements may include: the selection of specific climate tools to post on the site that are useful for stakeholders; the integration of Activity 1.4; and measures to enhance the user experience through diverse, interactive mediums.

Activity 2.1 Outcomes

- Regular enhancements to the Southern Plains DEWS webpage, to include timely updates, relevant content, and visual improvements in layout and formatting. [Winter 2017 – Fall 2018]

Activity 2.2 Host Climate Outlook Briefings and Climate Topic Webinars for the General Public

In 2011, SCIPP began conducting periodic webinars on current and forecasted drought conditions, drought research, and drought mitigation management strategies. Today, the climate outlook briefings are posted directly to YouTube and the SCIPP videos webpage and are also accessible on the Southern Plains DEWS webpage on the U.S. Drought Portal. When drought is present within the region, briefings may be updated weekly; otherwise, they are updated monthly when the new seasonal outlooks are issued from NOAA's CPC. SCIPP will consider increasing the frequency of briefings during dry conditions. Partners include: SCIPP, NOAA CPC, and NDMC.

In addition to the climate outlook briefings, SCIPP continues to host webinars on special climate and drought-related topics. Future topics may include a rollout of a drought app, as well as a discussion of drought planning tools and/or the impacts of La Niña/El Niño events. Experts from stakeholder organizations will be invited to discuss specific topics (ex., a state extension or USDA agency invited to discuss agricultural drought mitigation strategies). SCIPP plans to monitor attendance and participation in these monthly webinars and adjust the frequency accordingly. These climate topic webinars are also posted directly to YouTube and the SCIPP videos webpage and are accessible on the Southern Plains DEWS webpage. Partners include SCIPP, NDMC, and NWS.

Activity 2.2 Outcomes

- Weekly/monthly climate outlook briefings for the general public. [Spring 2017 – Fall 2018]
- Monthly climate topic webinars for the general public. [Spring 2017 – Fall 2018]

Activity 2.3 Host Monthly Climate Outlook Webinar for Resource Managers and Decision Makers

SCIPP's five-minute climate briefings (Activity 2.2) provide the public with a concise five-minute review of drought conditions and forecasted climate outlooks. However, many professionals and decision makers are interested in a longer briefing for the region. During periods of drought, NIDIS and its partners will provide detailed information on existing conditions and climate forecasts geared towards professional decision-makers and resource managers. The engagement will follow a webinar format to engage climate and water/land management experts throughout the region who can provide current and forecast information on precipitation levels, streamflows, reservoir storage, groundwater levels, climate extreme-related impacts currently being experienced, and climate outlook information, such as the seasonal drought outlook and the El Niño Southern Oscillation (ENSO). This extended webinar format also provides an opportunity for scientists and operational meteorologists to share their expertise and discuss developmental products (such as an evaporative stress index) with a diverse audience.

NIDIS will lead an effort to determine partners and develop these webinars for a focused audience Partners involved in the implementation may include: SCIPP, USDA, NWS, the TWDB, and other state agencies from TX, OK, NM and KS.

Activity 2.3 Outcomes

- Scoping calls with key stakeholders and partners. [Spring 2017 – Summer 2017]
- White paper summarizing key presenters and participants, webinar name, a process to develop and host the webinar, key features of the webinar including types of information presented and frequency of delivery. [Fall 2017].
- Interagency climate outlook webinars hosted during a drought event. [Winter 2018 – Fall 2018]

Activity 2.4 Develop a Communications Guide to Provide Consistent and Coordinated Drought Messaging to the General Public

Attendees at the 2012 Seasonal Climate Information Workshop and the 2015 Climate Extremes Workshop identified several challenges in the messaging of drought events to the public. In response to this feedback, NIDIS and stakeholders will enumerate strategies for improving drought messaging to the public, to be shared with relevant federal and state agencies. The guide will help users to:

- Establish consistent drought messaging across agencies and determining what communications approaches and vehicles would be most beneficial.
- Translate technical information for the public in a user-friendly manner.
- Coordinate the timing of public messaging as a drought progresses in the Southern Plains and identify where timing can influence public perception and response.
- Optimize available communications resources.
- Improve the public's climate and drought literacy through educational resources.

Contributors to the guide will include: NWS, SCIPP, NDMC, Texas Sea Grant College Program, TWDB, OWRB, and other organizations from TX, OK, NM, and KS.

Activity 2.4 Outcomes

- Communications Guide to provide recommendations for improving drought messaging to the public in the Southern Plains region. [Fall 2018]

Priority 3 – Support Research on Key Water Resources and Land Management Topics

Stakeholders have expressed a need for further research on key water resources and land management topics to improve their ability to address potential impacts of drought. This priority focuses on support for research on specific water resource and land management topics identified during the DEWS 2011-2014 drought forums.

Activity 3.1 Research Drought's Influence on Water Resource and Land Resource Management

During and after the DEWS 2011-2014 drought forums, several water resource and land management topics in need of additional research were identified and prioritized. These topics were reviewed by Southern Plains DEWS stakeholders during the development of this Plan. A Southern Plains DEWS stakeholder group responded to a survey that asked each participant to prioritize each topic. High priority topics, as selected by DEWS stakeholders, are summarized in Appendix C.

The Southern Plains DEWS stakeholders will review the research topics provided in Appendix C and will engage subject matter experts to identify opportunities to build upon existing research, including 2-3 areas for further investigation and project scoping. Partners may include: SCIPP, NDMC, Texas Sea Grant, and other organizations from TX, OK, NM, and KS.

Activity 3.1 Outcomes

- 2-3 topics identified for research, to determine the most appropriate and effective drought mitigation strategies in the Southern Plains for water resource and land managers. [Summer 2017 – Fall 2018]

Priority 4 – Improve the Application of Climate Forecasts

The Southern Plains DEWS 2011-2014 drought forums revealed that, while there is a wealth of hydrological and meteorological information available on the Internet, opportunities exist to facilitate and enhance usability of climate forecasts and outlooks. Key forum themes focused in the following areas of climate information delivery:

(1) climate science literacy and climate product interpretation;

(2) the challenge of decision making with uncertain forecasts and risk-based decision making;

(3) identification of "critical windows" when climate data is crucial for decision making, by sector; and

(4) the delivery of spatially and temporally appropriate climate information to support meaningful and actionable decision-making.

Additional information on these themes is provided in Appendix D. This priority focuses on developing

sound and actionable information and climate forecast products. NIDIS and stakeholders will cultivate the relationship between climate service providers and decision makers, agencies, researchers, and managers to improve the usability, reliability, and timeliness of climate data for drought research and management needs. Related actions include an assessment on how climate forecasts are used in the Southern Plains and a workshop to foster open communication between the climate forecast providers and end users.

Activity 4.1 Evaluate Use of Climate Forecasting Data

A comprehensive assessment will be conducted among key stakeholders from federal, state, and local agencies and organizations to obtain additional information specific to the themes highlighted above. This assessment will be implemented through surveys, interviews, and focus groups. The assessment will target five to six key groups of stakeholders (e.g. ranchers, municipal water providers, wildlife managers, public communication specialists) to learn more about what specific sources of climate data, forecasts, products and information they currently use; benefits and challenges they may have in using these specific resources, how climate data resources inform their drought indicators and triggers, and additional climate informational needs. Results of the assessment will serve as a primary resource for designing the workshop in activity 4.2. Partners will include: SCIPP, NDMC, Texas Sea Grant, TWDB, and other organizations from TX, OK, NM and KS.

Activity 4.1 Outcomes

- Assessment report summarizing results of the evaluation. This report will inform the workshop format and agenda detailed in Activity 4.2 below. [Spring 2018]

Activity 4.2 Host Workshop Focusing on Connecting Climate Forecasting to Decision Maker Needs

A “Train the Trainer” workshop was recommended during the 2015 Climate Extremes Workshop, where staff from federal, state, and local agencies that use climate information would have the opportunity to learn from climate experts on how to best access and interpret climate information and forecasts for decision-making purposes.

NIDIS will host this “Train the Trainer” workshop to train agency staff on the use of these climate information tools, who will then be empowered to train others within their organizations. The workshop will build upon the assessment results of Activity 4.1 to help translate existing climate forecasting products into useful information. During this workshop, climate forecast providers will demonstrate their climate products and explain the science underlying the product, while also receiving feedback from attendees on how the products can be improved. Discussion will include interpretation of graphics and opportunities to improve their usability; as well as uncertainties associated with the forecasts that users should be aware of when making management decisions. Partners may include SCIPP, NDMC, NWS, Texas Sea Grant, TWDB, and other organizations from TX, OK, NM, and KS.

Activity 4.2 Outcomes

- Train-the-trainer workshop including materials to host and facilitate the workshop (agenda, invite list, handouts, presentations, etc.). [Spring 2018]
- Report on workshop findings, outcomes, and recommendations for next steps to continue to improve use of climate forecasting information. [Fall 2018]

Priority 5 – Support Drought Planning Efforts in the DEWS Region

Drought planning, preparedness, and mitigation are important components of enhancing drought early warning capacity and ultimately increasing drought resilience in the Southern Plains. This priority encompasses activities that will support and improve drought planning efforts at state and local levels.

Activity 5.1 Investigate the Current Status of Drought Planning in the Southern Plains Region

SCIPP will consult with stakeholders including academia, the private sector, and government agencies in the DEWS to review historical drought regimes, drought impacts to economies, current adaptation strategies, gaps in information and research, and recommended solutions for improved long-term drought planning. SCIPP and partners will develop a ten-year vision document that will utilize our knowledge of the current status of drought planning to inform regional long-term planning. This information will be incorporated back into the DEWS. Examples of questions to be considered in a ten-year planning context include:

- What are impacts from drought, sector-by-sector (including agriculture, public water supply, transportation, tourism and recreation, ecology, health, and public safety)?
- At what length of time or severity of drought do problems emerge in each sector? When do the problems become critical?
- What monitoring networks and indices are currently available and will need to be online in the future? Are these universally available or location or sector-specific?
- What communication practices will need to exist over the next ten years to relay drought information across the region?
- What resources and practices are available to lessen the impacts of drought over the next ten years?

Activity 5.1 Outcomes

- A ten-year vision document that will utilize our knowledge of the current status of drought planning to inform regional long-term planning [Winter 2017 – Fall 2017]
- Locally-driven coordination among stakeholders, as well as leveraged private sector contributions and innovations, to engage in a deliberate long-term planning effort. Such a proactive approach will strengthen drought early warning capacity in the region.

Activity 5.2 Support Drought Simulations

Drought simulations (scenario exercises) have proven to be an effective planning tool to improve regional stakeholders' understanding of drought events, impacts, and available response and mitigation strategies, and to improve drought response, preparedness, and resilience within the region. During simulations, teams representing multiple economic sectors and levels of government are presented with drought scenarios and encouraged to develop the most effective and suitable mitigation and response strategies to address anticipated impacts in the region. These exercises also provide stakeholders the opportunity to experiment with different weather and climate information resources, products, and data sets. They can be used as a stakeholder engagement tool, inform drought planning processes, and test and socialize existing drought indicators, triggers, and plans.

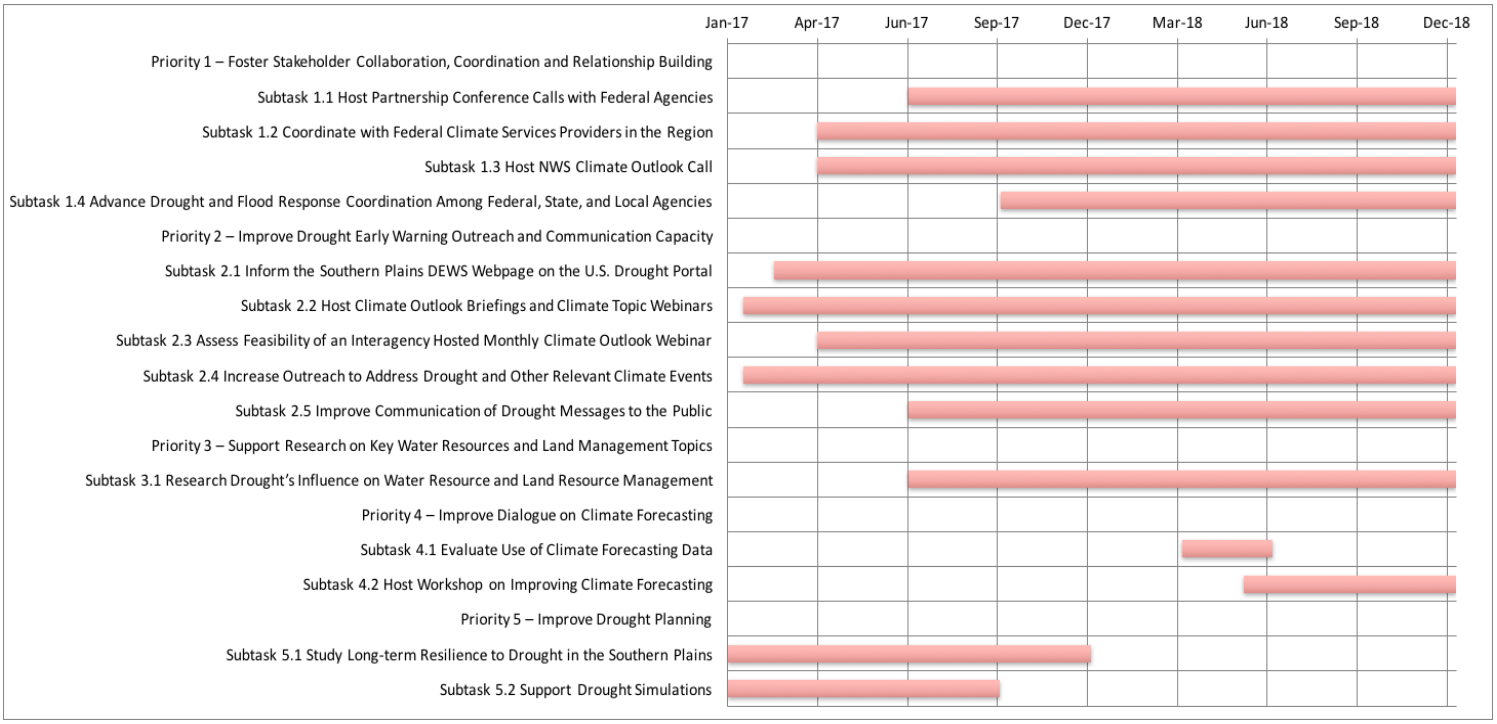
A drought simulation was conducted in OK in 2014 and a multi-hazard simulation (addressing drought and flood) was conducted near San Antonio, TX in 2015. Follow up simulations to the San Antonio event are scheduled for 2017 in the upper portion of the San Antonio River Basin in Bexar County, TX and also in the lower portion of the Basin. Partners include USACE Institute for Water Resources (IWR) (lead), USACE Fort Worth District, San Antonio River Authority (SARA), and relevant counties.

Activity 5.2 Outcomes

- Two multi-hazard simulations (drought and flood) held in the San Antonio River Basin [Winter 2016 - Spring 2017]

SCHEDULE

Figure 1 Southern Plains DEWS Strategic Plan Milestones



APPENDIX A – SOUTHERN PLAINS DEWS PARTNERS IN DEVELOPMENT OF THE STRATEGIC PLAN

The development of this Southern Plains DEWS Strategic Plan reflects the knowledge and experience of dedicated individuals, organizations, and partners. Collaboration is the key to improving drought early warning capacity and building upon existing programs and partnerships. This list is not exhaustive and will evolve as new regional partnerships are formed.

Table A – Southern Plains DEWS Strategic Plan Partnerships

Partner Agencies and Organizations
Federal Emergency Management Agency
National Drought Mitigation Center
National Oceanic and Atmospheric Administration
National Weather Service
Climate Prediction Center
National Center for Environmental Information
Texas Sea Grant
New Mexico Office of State Engineer
New Mexico State University - New Mexico Climate Center
Oklahoma Conservation Commission
University of Oklahoma - Oklahoma Climatological Survey
Oklahoma Water Resources Board
Southern Climate Impacts Planning Program
Texas A&M University - Office of the State Climatologist
Texas A&M Forest Service
Texas Division of Emergency Management / State Drought Task Force
Texas Parks & Wildlife Department
Texas Water Development Board
U.S. Army Corps of Engineers
U.S. Department of Agriculture
Southern Plains Climate Hub
ARS Grazinglands Research Laboratory
U.S. Department of Interior
Gulf Coast Prairie Landscape Conservation Cooperative
South Central Climate Science Center
U.S. Fish and Wildlife Service
U.S. Geological Survey

APPENDIX B – NIDIS WORKING GROUPS

Coordination, communication, and transferability of information and actions between the NIDIS Working Groups and the Southern Plains DEWS is essential the process of building a collaborative information system. The table below highlights how each of the priority Activities in the Plan correspond with the individual Working Groups. As the Southern Plains DEWS and Working Groups continue to develop, activities among each of these groups will be leveraged and coordinated.

Table B - Southern Plains DEWS and NIDIS Working Groups

Activity	NIDIS Working Groups					
	Education and Public Awareness	**Monitoring and Observations**	**Predictions and Forecasting**	**Interdisciplinary Research Applications for Risk Assessment**	**Planning and Preparedness**	**U.S. Drought Portal**
Priority 1 – Foster Stakeholder Collaboration, Coordination, and Relationship Building						
Activity 1.1 Host Partnership Conference Calls with Federal Agencies					**X**	
Activity 1.2 Coordinate with Climate Services Providers in the Region					**X**	
Activity 1.3 Host NWS Climate Outlook Calls			**X**		**X**	
Activity 1.4 Improve Information Delivery on Drought and High Precipitation Events across Government					**X**	
Priority 2 – Improve Drought Early Warning Outreach and Communication Capacity						
Activity 2.1 Update and Maintain the Southern Plains DEWS Information on the US Drought Portal	**X**				**X**	**X**
Activity 2.2 Host Climate Outlook Briefings and Climate Topic Webinars	**X**	**X**	**X**			
Activity 2.3 Host Monthly Climate Outlook Webinar for Resource Managers and Decision Makers	**X**	**X**	**X**			

Activity 2.4 Develop a Communications Guide to Provide Consistent and Coordinated Drought Messaging to the General Public	X				X	
Priority 3 – Support Research on Key Water Resources and Land Management Topics						
Activity 3.1 Research of Drought's Influence on Water Resource and Land Resource Management				X	X	
Priority 4 – Improve the Application of Climate Forecasts						
Activity 4.1 Evaluate Use of Climate Forecasting Data		X	X	X	X	
Activity 4.2 Host Workshop on Connecting Climate Forecasting to Decision Maker Needs		X	X		X	
Priority 5 – Support Drought Planning Efforts in the DEWS Region						
Activity 5.1 Investigate the Current Status of Drought Planning in the Southern Plains Region		X	X		X	
Activity 5.2 Support Drought Simulations	X				X	

APPENDIX C - PRIORITY 3, RESEARCH

Feedback from the DEWS 2011-2014 drought forums identified a series of water resource and land management topics in need of additional research to improve drought management and decision-making. Southern Plains DEWS stakeholders reviewed and prioritized each of these topics during the development of the Strategic Plan.

Topic	Description	Specific Research Needs Identified during 2011-2014 Drought Forums
Water Resources		
Improve understanding and messaging of the relationship between groundwater and surface water.	The interaction of surface water and groundwater is complex and can vary significantly due a variety of factors, such as the geologic components, depth, size, and recharge rate of the aquifer. Drought can add additional complexity.	Where streams are gaining or losing on reaches of a river due to aquifer infiltration rates
		Ways that prolonged severe drought can hasten aquifer depletion
		Local impacts of declining groundwater levels on nearby well fields
		Impacts of declining groundwater on nearby seeps and Springs
		Activities to help incorporate new research information into local water resource management practices
		Improved coordination and sharing of groundwater information among state agencies, researchers and other data users
Improve understanding of relationship between soil moisture and surface water	The interaction of soil moisture and surface water is complex and can significantly vary depending on location, soil properties, etc. Drought adds additional complexity and can significantly affect drought impacts and recovery following a drought.	Better understand recovery of deep soil moisture after drought
		Better understand impact of recovery following a drought on water supplies
Improve capabilities to support reservoir management	Drought management and response capacity can be improved through effective reservoir management.	Prediction of runoff and reservoir inflows
		Assessing and predicting evaporation rates from reservoirs
		Identifying outreach methods and tools to communicate with reservoir operators
Improve understanding and management of drought impacts on	Drought can significantly impact water quality which impacts ecosystems and water supplies.	Increased salinity in coastal areas. A coastal salinity index would be useful for management purposes. The USGS has developed a Coastal Salinity Index.

water quality		Proliferation of algal blooms that occur from higher concentration of nutrients and increased temperatures in water bodies, including lakes and estuaries.
		Concentration of minerals and pollutants in diminished water supplies. As the amount of water declines, the relative concentration increases, which may make the water toxic.
Improve understanding of evapotranspiration-driven drought	The Southern Plains region has been impacted by evapotranspiration-driven drought. A better understanding of this climatic phenomenon can improve drought early warning capacity.	Flash droughts following times of near-normal to abundant rainfall
Land Management		
Improve management of prescribed wildfire	Prescribed fire can be an effective means to mitigate drought impacts.	Effectiveness in controlling invasive species
		Different fire management techniques that may be required during times of drought
		Re-growth of vegetation during periods in which sufficient soil moisture may not be available
Improve understanding of changes in frequency and intensity of fire	As ecology changes across the region, such as an ongoing transition of brushland to buffalo grass in West Texas, the benefits and risks of fire may change compared to historical practice and experience, with resultant implications for fire frequency, intensity, and management practices.	Evaluate implications for fire management in response to ongoing ecological landscape transitions
Improve decision-making capabilities for livestock management	Drought can impact cattle management, reducing cattle feed availability, increasing management costs, reducing stock water and resulting in cattle mortality.	Critical stocking decisions that are generally made in September that require an informed prediction of Fall pasture wheat grass availability and cost of hay for the Winter
		Predicting long-term recovery of pastures and rangeland after a drought and determining when bring back livestock
		Overall forage quality and needs for supplemental high-energy feed during drought
Evaluate relationship between heavy Spring rainfall and Summertime heat and dryness	Abundant soil moisture in Spring may limit root growth making plants more susceptible to short-term dryness.	Evaluate how Spring soil moisture may limit root growth and make certain landscapes for vulnerable to drought

APPENDIX D – PRIORITY 4, IMPROVE THE APPLICATION OF CLIMATE FORECASTS

The Southern Plains DEWS 2011-2014 drought forums revealed that while there is a wealth of hydrological and meteorological information available on the Internet, much improvement can still be made to increase the usability of climate forecasts and outlooks. These forums touched on the following key themes for consideration when assessing the delivery of climate information: (1) explanation of climate data and processes; (2) how uncertainty can play into forecasts and ultimately decisions; (3) stakeholder climate literacy; (4) timely data dissemination; (5) and the geographic scale of data. Details on each of these themes is provided below.

- **Education on climate science and climate product interpretation –** Stakeholders have expressed interest in the following topics: in-depth discussions of seasonal outlooks, including the reasoning and uncertainties associated with those predictions; how Pacific Ocean sea surface temperatures can influence the Southern Plains climate; and how the U.S. Drought Monitor maps are created each week. There is also a need for improved guidance on product interpretation, which can be improved through an increased understanding of the physical basis for climate and drought forecasts and what these forecasts might indicate from an on-the-ground impact perspective.

- **How uncertainty can play into forecasts and ultimately decision making** – Many would like to gain confidence in climate forecasts by learning about the limitations of predictability, and examining ways of applying those forecasts to their operations. Of particular interest is addressing forecast uncertainty in relation to the prediction of ENSO phase and other oceanic circulations (e.g. Pacific Decadal Oscillation, Atlantic Multidecadal Oscillation) and their relation to potential impacts.

- **Level of scientific detail and terminology used among different stakeholders –** Stakeholders have a broad spectrum of preferences concerning the level of scientific detail and terminology used when climate information is conveyed. Many stakeholders have expressed a desire for clearly relating current conditions to historical conditions; creating simple graphics summarizing the current situation; and providing products and narratives understandable to the layperson.

- **Identifying "critical windows" when climate data is crucial for decision-making** – The critical window for stakeholders to have climate data for decision-making purposes varies significantly depending on the type of stakeholder.

- **Diversity of stakeholder needs related to geographic scale of climate data –** Stakeholders need to be able to apply climate data for decision-making purposes on a variety of geographic scales. For instance, local agencies often need assistance in obtaining data at the local or basin scale whereas certain federal agencies may need information on a more regional scale.

APPENDIX E – CURRENT DROUGHT-RELATED ACTIVITIES IN THE SOUTHERN PLAINS

Activities	Submitted By	Agencies / Entities Involved	Funding Source	Activity Dates	Contact
Current-Ongoing Activities					
Management					
Field Photos - engaging citizen scientists to take pictures of landscape for comparison to drought indicators	SCIPP	CoCoRaHS, SCIPP, Earth Observation & Modeling Facility, iSeeChange	NOAA SARP	9/2012-ongoing	Mark Shafer, 405-325-3044, mshafer@ou.edu
Drought app for mobile phones - provides drought indices and allows condition reports	SCIPP	Weather Decisions Technologies, SCIPP, NDMC	NIDIS	8/2014-12/2016	Mark Shafer, 405-325-3044, mshafer@ou.edu
Regional survey of local offices on drought management practices	SCIPP	SCIPP	NOAA RISA, DOI SC CSC	10/2014-9/2016	Mark Shafer, 405-325-3044, mshafer@ou.edu
Comparison of planning documents in 3 cities to analyze if / how drought is included	SCIPP	SCIPP	NOAA RISA	01/2016-09/2016	Mark Shafer, 405-325-3044, mshafer@ou.edu
Webinars and Briefings	SCIPP	SCIPP, NOAA RCSD, NDMC	NOAA RISA	08/2011-ongoing	Margret Boone, 405-325-7809, mboone@mesonet.org
Climate communication and curriculum development	USDA	USDA SP Climate Hub, Kansas State University, Oklahoma NRCS	USDA SP Climate Hub	2015-2017	Peter Tomlinson ptomlin@ksu.edu Lauri Baker lmbaker@ksu.edu
Grazing Management Schools	USDA	Texas AgriLife and West Texas A&M	USDA SP Climate Hub	2015-2018	Richard Teague r-teague@tamu.edu Tim Steffens tsteffens@mail.wtamu.edu
Integrating soil health and climate into FFA curriculum in Oklahoma	USDA	USDA SP Climate Hub	USDA SP Climate Hub	2016-2017	Clay Pope claygpope@gmail.com
Sea Grant Climate Literacy & Capacity-Building program	TX Sea Grant	TX Sea Grant	NOAA	Ongoing	Stuart Carlton, stuartcarlton@tamu.edu

TexMesonet	TWDB	TWDB	State	Ongoing	Rima Petrossian Rima.Petrossian@twdb.texas.gov
Drought Preparedness Council	TWDB	TWDB, TDEM, TCEQ, TPWD, TDA, Texas Agrilife Extension Service, TSSWCB, TDHCA, Texas Forest Service, TXDOT, Texas Department of Economic Development, groundwater representative, governor appointees	None - representatives are employed and funded by their respective agencies	Ongoing	Sam Hermitte, TWDB, sam.hermitte@twdb.texas.gov, 512/463-5617; Joshua Bryant, TDEM, Joshua.Bryant@dps.texas.gov, 512/424-5989
Emergency Drinking Water Task Force	TWDB	TCEQ, TWDB, TDA, TDEM	None - representatives are employed and funded by their respective agencies	Ongoing	Alex Hinz, TCEQ, Alexander.Hinz@tceq.texas.gov, 512/239-4720; Sam Hermitte, TWDB, sam.hermitte@twdb.texas.gov, 512/463-5617
Quarterly climate outlook that covers drought and fire weather (in addition to flooding, severe, Winter, and tropical weather) potential relative to "normal"	NWS	NWS-Austin/San Antonio	no funding	Ongoing	Mark Lenz, mark.lenz@noaa.gov
Drought-related talks	NWS	NWS-Austin/San Antonio	no funding	Ongoing	Mark Lenz, mark.lenz@noaa.gov
Computer Models on Climate Change and Downscale Climate Change Assessments	CSC	NOAA (GFDL) DOI (SC CSC)	SC CSC	10/1/2016 to 9/30/2018	Keith Dixon
Online Climate Change Impacts Course	CSC	DOI (SC CSC), OU	SC CSC	8/15/2015 to 1/30/2018	Aparna Bamzai
Training for Native Tribes of Louisiana and New Mexico l) Understanding Climate in a Changing World	CSC	DOI (SC CSC), LSU	SC CSC	8/15/2015 to 8/14/2017	Kristine DeLong

Improving Resilience for the Rio Grande Coupled Human-Natural System	CSC	DOI (SC CSC), OU	SC CSC	10/1/15 to 9/30/17	Jack Friedman
Translational Science: Communications and outreach to the SC CSC stakeholders of the SC CSC	CSC	DOI (SC CSC), OU, GCP LCC	SC CSC	9/1/2016 to 8/313/2017	Renee McPherson
Tribal Capacity building through outreach on climate change impacts to tribal lands and jurisdictions in the South Central region	CSC	DOI (SC CSC), OU, Chickasaw & Chochtaw Nations of OK	SC CSC	7/25/2016 to 7/24/2017	Renee McPherson
Climate Research					
Spatial and temporal correlations in temperature between months	SCIPP	Texas A&M, SCIPP	NOAA RISA	9/2015-8/2016	Steven Quiring, squiring@geos.tamu.edu
Effects of teleconnections on precipitation patterns in Texas	SCIPP	Texas Water Development Board, SCIPP	NOAA RISA	05/2016-08/2016	Nelun Fernando 512-475-0454 nelun.fernando@twdb.texas.gov
Comparing performance of drought indicators	SCIPP	Texas A&M, SCIPP	DOI SC CSC	09/2014-08/2016	Steven Quiring, squiring@geos.tamu.edu
Great Plains Grazing Collaborative Agricultural Project (CAP)	USDA	USDA ARS, state universities, extension agencies, Noble Foundation, USDA SP Climate Hub	USDA NIFA	2013-present	Amber Campbell (ambercampbell@ksu.edu)
Demonstration agricultural sites for adaptation and resilient systems	USDA	USDA SP Climate Hub, Oklahoma NRCS	USDA SP Climate Hub	2015-present	Clay Pope (claygpope@gmail.com)
Hosting SCIPP Summer intern- Project on 'Assessing how rainfall is needed to overcome a drought-induced soil moisture deficit'.	TWDB	SCIPP/TWDB	NOAA RISA / SCIPP	Summer 2016	Nelun Fernando 512-475-0454 nelun.fernando@twdb.texas.gov

Improve and downscale drought early warning over US Great Plains: - provide an improved and downscaled early warning of summer drought and flood risk with 3 to 6 months lead time, - Develop an early warning indicator of drought impact on ecosystem including crops	TWDB	UT Austin, NASA JPL, AMES, with informal collaboration with TWDB	NASA	8/2016 to 7/2019	Rong Fu rongfu@jsg.utexas.edu, 404/680-1607 rfu@atmos.ucla.edu
SMAP Early adaptor Team: - Provide a downscaled early warning of Summer soil moisture anomalies (32 km)	TWDB	UT Austin, NASA JPL, UT Austin, TWDB, NASA JPL	no funding	8/2015-	Rong Fu/Nelun Fernando, rongfu@jsg.utexas.edu, rfu@atmos.ucla.edu nelun.fernando@twdb.texas.gov
Quantifying Future Precipitation in the South Central Region for Stakeholder Planning	CSC	DOI (SC CSC), TX Climate Sciene Center, TTU	SC CSC	8/18/2015 to 8/17/2017	Katherine Hayhoe
Uncertainty analysis of new statistically downscaled climate projections for the South Central U.S.	CSC	DOI (SC CSC), NOAA (GFDL)	SC CSC	10/1/2016 to 9/30/2017	Keith Dixon
Regional Graduate Student, Post-Doc, and Early-Career Researcher Training II	CSC	DOI (SC CSC), OU	SC CSC	10/1/2015 to 9/30/2016	Derek Rosendahl
Initiating the Development of Regional Demonstration Fields for Implementing of Soil Practices that Maximize Soil Health and Drought Resilience	CSC	DOI (SC CSC), OU, GCP LCC, TTU, USDA (SPRCH)	SC CSC	8/1/2016 to 7/31/2016	John Zak
Wildfire					
Developing a regional fire climatology	SCIPP	SCIPP, Texas A&M, Oklahoma State University	DOI SC CSC	09/2015-08/2017	Mark Shafer, 405-325-3044, mshafer@ou.edu
Environment					
Ecological impacts of drought on regional wildlife refuges and managed lands	SCIPP	SCIPP, SC CSC	NOAA RISA	05/2014-08/2016	Mark Shafer, 405-325-3044, mshafer@ou.edu

Water smart landscaping	TX Sea Grant	TX Sea Grant, Texas Coastal Watershed Program	various	Ongoing	Stuart Carlton, stuartcarlton@tamu.edu
Guadalupe Bass flow-ecology relationships; with emphasis on the impact of flow on recruitment	Gulf Coast Prairie LCC	GCP LCC, Texas Tech University	GCP LCC	05/2015-08/2018	Dr. Robin Verble, 501-400-6693, robin.verble@ttu.edu
Quantification of Alligator Gar Recruitment Dynamics Using a River-Stage Specific Floodplain Inundation Model		GCP LCC, U of North Texas,	GCP LCC	06/2015-05/2018	Dr. David Hoeinghaus, David.Hoeinghaus@unt.edu 940-565-2228
Use of River-Reservoir Interface Habitats by Larval and Juvenile Fishes: Influence of Lateral Connectivity and Multi-Scale Environmental Conditions		GCP LCC, Texas Tech University	GCP LCC	12/2013-06/2016	Allison A. Pease, allison.pease@ttu.edu, (806) 742-2841
Water Resources					
Water Reservoir Data Visualization Tool	SCIPP	Southern Regional Climate Center, SCIPP	NOAA RISA, NCDC	8/2013-ongoing	Margret Boone, 405-325-7809, mboone@mesonet.org
Homeowner water management BMP study	TX Sea Grant	TX Sea Grant, Galveston Bay Foundation	none	Ongoing	Stuart Carlton, stuartcarlton@tamu.edu
Drought early warning tool - provisions of May–July rainfall forecasts over Texas, generated using an empirical tool with April observed fields, via the Water Data for Texas website - provision of 6- to 4-month lead time forecasts of May–July rainfall, using a hybrid dynamical-statistical tool, via the Water Data for major reservoirs in Texas - provision of experimental reservoir storage forecasts for May–July for three reservoirs in the	TWDB	TWDB, Brazos River Authority, Univ. of Texas at Austin, Texas Department of Emergency Management (Drought Preparedness Council)	USBR	10/2015 to 09/2017	Nelun Fernando 512-475-0454 nelun.fernando@twdb.texas.gov

Brazos River Basin - provision of May–July evaporation forecasts for Texas					
Drought Chapter in the Texas State Water Plan	TWDB	TWDB	State	Ongoing	Temple McKinnon/Sarah BackhouseTemple.McKinnon@twdb.texas.gov or sarah.backhouse@twdb.texas.gov
Drought Chapter in the 16 Regional Water Plans of Texas	TWDB	TWBD, 16 regional planning groups, river authorities, consulting firms	State	Ongoing	
Very-High-Resolution Dynamic Downscaling of Regional Climate for Use in Long-term Hydrologic Planning along the Red River Valley System	CSC	DOI (SC CSC), OU	SC CSC	9/26/2015 to 9/25/2017	Ming Xue
Climate Variability, Snowpack and Streamflow in the Rio Grande Headwaters	CSC	DOI (SC CSC), UNM	SC CSC	4/1/2016 to 3/31/2017	David Gutzler
Development and application of a climate and drought-responsive land-use model to support stakeholders in the Rio Grande and Red River Basins	CSC	DOI (SC CSC), USGS (EROS)	SC CSC, GP LCC	4/27/2016 to 4/26/2017	Terry Sohl
Agriculture					
Regional workshops to support the USDA Climate Change Mitigation Strategy	USDA	USDA SP Climate Hub	USDA OCE	2015-2016	Clay Pope claygpope@gmail.com
Soil Moisture-Based Drought Monitoring for the South Central Region	CSC	DOI (SC CSC), OSU, TAMU	SC CSC	9/22/2015 to 9/22/2018	Tyson Ochsner
Planned Future Activities					
Management					
Convene a study group to look at long-term resilience to drought in the Southern Plains	SCIPP	SCIPP	NOAA RISA, NIDIS	10/2016-09/2017	Mark Shafer, 405-325-3044, mshafer@ou.edu
Developing and updating State Drought Plans	SCIPP	SCIPP	NOAA RISA	04/2016-10/2017	Mark Shafer, 405-325-3044, mshafer@ou.edu

2016-2017 La Niña early warning and preparedness in the Rio Grande basin	USDA	USDA SP Climate Hub, SCIPP, NDMC, TWDB	USDA SP Climate Hub, USDA CCPO	2016-2017	David Brown david.brown@ars.usda.gov
La Niña early warning and impacts in the Rio Grande Valley	TWDB	USDA, NOAA, potentially TWDB	USDA	2016-2017	David Brown (USDA)/Sam Hermitte (TWDB)
Climate Research					
Summer Internship (specific project TBD)	SCIPP	SCIPP	NOAA RISA	05/2017-08/2017	Margret Boone, 405-325-7809, mboone@mesonet.org
Climate smart soil health demonstration pilot	USDA	USDA SP Climate Hub, Redlands Community College	USDA SP Climate Hub	2016-2017	Clay Pope (claygpope@gmail.com)
Agriculture					
Regional strategic planning conference on agriculture and climate change	USDA	USDA SP Climate Hub, Texas A&M, Kansas State	USDA SP Climate Hub	2016-2017	Jean Steiner (jean.steiner@ars.usda.gov) Ron Lacewell (r-lacewell@tamu.edu)

APPENDIX F - ACRONYMS

BMPs	Best Management Practices
CDC	Centers for Disease Control and Prevention
CPC	Climate Prediction Center
CSC	Climate Science Center
DEWS	Drought Early Warning System
DOI	Department of Interior
EDEN	Extension Disaster Education Network
ENSO	El Niño Southern Oscillation
FEMA	Federal Emergency Management Association
NCEI	National Centers for Environmental Information
NDMC	National Drought Mitigation Center
NGOs	Non-governmental organization
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic Atmospheric Administration
NPS	National Park Service
NWS	National Weather Service
OWRB	Oklahoma Water Resources Board
RISA	Regional Integrated Sciences and Assessments
SARA	San Antonio River Authority
SCIPP	Southern Climate Impact Planning Program
SRCC	Southern Regional Climate Center
TWDB	Texas Water Development Board
USACE	United States Army Corps of Engineers
USACE IWR	United States Army Corps of Engineers Institute for Water Resources
USBR	United States Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Appendix G: Disclaimer

The Southern Plains Drought Early Warning System (DEWS) Strategic Plan is a collaborative Federal, state, tribal and local interagency effort to improve early warning capacity and resilience to drought in America's Southern Plains region. The contents of this plan should not be used as evidence against any Southern Plains DEWS state; any federally recognized tribe; or the Federal government in any administrative, judicial, or other proceeding. The assumptions, conclusions, and other information contained in the Plan do not represent a legal interpretation or legal position related to any issue raised in, or otherwise relevant to, litigation, nor do they represent a consensus view of federal agencies or other stakeholders involved in the Plan's development. Nothing in the Plan is intended to, nor shall the Plan be construed so as to, interpret, diminish, or modify the rights of any Southern Plains state, any federally recognized tribe, or the Federal government under Federal or state law or administrative rule, regulation, or guideline.

Finally, all parties recognize that stakeholders participating in this process may disagree over the appropriate scope, methods, results, or interpretation of technical analyses performed in developing or implementing this DEWS. As such, neither the Plan, nor any work performed pursuant to it, shall be attributed to any organizations or individuals by virtue of their participation as a stakeholder in this process. Nor shall any party be deemed to accept or agree with any particular assumption, conclusion, and other information contained in the Plan or its resulting studies, unless explicitly stated by those parties.