Regional Engagement Workshop Summary Report: Southern Great Plains Region

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Introduction

The Fourth National Climate Assessment (NCA4), currently in development, will assess the science of climate change and its impacts across the United States. It will document climate change-related impacts and responses for various sectors and regions, with the goal of better informing public and private decision-making at all levels.

To ensure that the assessment is informed by and useful to stakeholders, engagement workshops were planned for each of the 10 NCA4 regions. These workshops provided stakeholders an opportunity to provide input to and exchange ideas with the chapter author team on key message formulation, share relevant resources, and give feedback on issues of importance to their region.

Workshop Structure

In an effort to maximize participation while easing travel burden, organizers are employing a 'Hub and Satellite' model for NCA4 Regional Engagement Workshops. A hub—or primary location—hosted stakeholders, the chapter author team, and NCA4 staff from the U.S. Global Change Research Program (USGCRP). Satellite locations throughout the region established remote connections to the hub for plenary presentations and discussion. Satellites were encouraged to hold break-out sessions on regional concerns and proposed topics for NCA4, reporting their discussions to the hub at a pre-determined time.

The Southern Great Plains Regional Engagement Workshop

On March 2, 2017, the NCA4 Southern Great Plains chapter team held its Regional Engagement Workshop. The objective of the workshop was to gather input from a diverse array of stakeholders throughout the Southern Great Plains to help inform the writing and development of NCA4, and to raise awareness of the process and timeline for NCA4.

The National Weather Center, in Norman, Oklahoma, served as the hub location. Austin, Texas served as a satellite, and a number of stakeholders participated virtually (Figure 1).

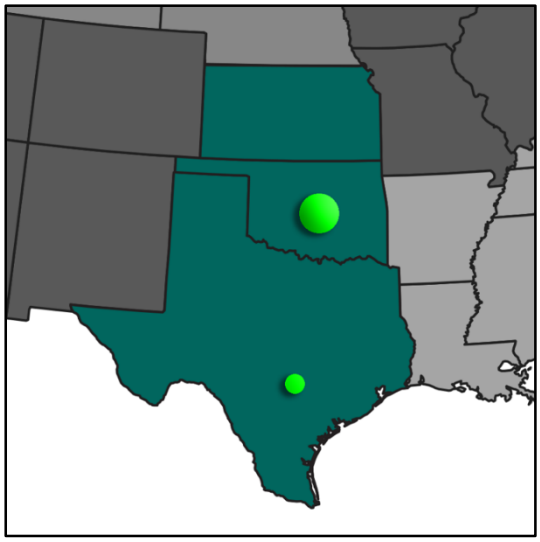

Figure 1. Map of the REW hub & satellite locations: Norman, OK and Austin, TX.

Authors, Locations, and Staff

Authors

- Bill Bartush, US Fish and Wildlife Service (Coordinating Lead Author)
- Kevin Kloesel, University of Oklahoma (Chapter Lead)
- Jay Banner (University of Texas)
- Dave Brown (USDA Southern Plains Climate Hub)
- Xiaomao Lin (Kansas State University)
- Gary McManus (University of Oklahoma)
- Esther Mullens (DOI SC Climate Science Center)
- John Nielsen-Gammon (Texas A&M)
- Mark Shafer (University of Oklahoma/SCIPP)
- Sid Sperry (Oklahoma Association of Electric Cooperatives)
- Daniel Wildcat (Haskell Indian Nations University)

Satellite & Hub Hosts

- Texas Water Science Center (Austin, TX)
- National Weather Center (Norman, OK)

USGCRP Staff

- Tess Carter
- Susan Aragon-Long
- Mark Shimamoto

Overview and Topics of Discussion

Kevin Kloesel, the Southern Great Plains Chapter Lead, opened the workshop with a welcome to all participants, and an introduction of all chapter authors and USGCRP staff who were present. Tess Carter, the NCA Program Coordinator, went on give an overview of the NCA, providing context and explaining the goals of the workshop.

Kloesel then went into detail on the Southern Great Plains chapter itself. Additional information on the Great Plains Chapter from NCA3 (2014) was presented, with specific detail provided on each of the key messages from that report. From there, Kloesel and Bill Bartush, the Coordinating Lead Author for this chapter led a discussion on the proposed Focal Areas for the Southern Great Plains chapter of NCA4.

Kloesel and Bartush presented the chapter's proposed initial focus areas. They were:

- Water
- Agriculture
- Energy
- Transportation
- Extremes (Forecasting and Mitigating Hazards)
- Focus on People – urban, rural, tribal, etc.

- Focus on Places – coastal zone, border zone, and Ogallala Aquifer and Arid High Plains

In an open question-and-answer session, stakeholders were invited to provide comment to the author team and USGCRP staff on the report development process, as well as the substance of the Southern Great Plains chapter.

Participants shared specific questions, issues, ideas, resources, and case studies for each of the aforementioned focal areas. For each focal area, stakeholders were asked a series of questions around which to structure their responses:

1. How is or how has climate change affected this topic (i.e. observed change)?
    a. Are there specific case studies you would suggest to illustrate that observed change?
2. How is climate change projected to affect this topic in the next 20-30 years and at the end of the century (i.e. projected change)?
    a. Are there specific case studies you would suggest to illustrate that projected change?
3. What challenges, opportunities, and success stories for addressing risk can be highlighted?
    a. Are there specific case studies you would suggest to illustrate those challenges, opportunities, and success stories?
4. What are the emerging issues and/or research gaps on this topic?
    a. Are there specific case studies you would suggest to illustrate those emerging challenges or research gaps?

Stakeholders were also given the opportunity to share thoughts on areas that were not covered by the previously-identified focal areas.

Key Takeaways

Stakeholders identified areas of opportunity and concern, case studies, and relevant regional information associated with each of the focal areas. This feedback was later distilled into key thematic takeaways for the chapter author team. These takeaways are summarized below.

New additions to consider - Crosscuts:

- Infrastructure
    - Deterioration, sustainable development, including low impact development, water conservation, renewable energy, and land treatment
- Economics
    - Monetarily quantify the cost of impacts across the different focal areas
    - Impacts to Southern Great Plains industries
    - How you value it from both a biological concern and municipal and industrial use; how do you provide public dollars to subsidize environmental flows for example?
- Health
    - Emerging and reemerging infectious disease: invasive vectors (mosquitoes, pests, etc.)
    - Social equity
    - Urban heat island
    - Respiratory: air pollution, dust
    - Access to safe and nutritious foods
- Gulf Coast
    - Cuts across impact areas as well as across chapters
- Urban vs. Rural
    - A common theme that seemed relevant when considering the impacts to the different focal areas

        - Use terms in which people can relate

Water: The delivery mechanism of climate change in the west

- Aquifers:
    - Ogallala - large in scope, so may need to work with other regional chapters and perhaps only cover Kansas or Oklahoma - also work with Agriculture chapter
    - Edwards Plateau - Case study: Implementation Recovery Program and how they assess competition for resources. Due to essential water downstream being "over-allocated" irrigation was eliminated for rice, and minimum requirements for estuary health and stability of bays and estuaries were reduced.
- Gulf coast
    - Sea-level rise on the Texas Coast – Marsh migration scenarios and enhancing coastal resiliency through modeling sea level rise impacts to communities and rural landscape
    - The system integrity of commercial oyster fisheries has been greatly reduced due to significant freshwater flow reductions
- Differentiate between surface and groundwater
- Desalination, grey water, green water
    - What are their individual impacts and their interdependencies
    - El Paso and Corpus Christi examples
- Water availability
    - Stack region used for energy and other competing uses, especially during drought
    - Rural versus urban uses
- Infrastructure
    - Land treatment: green infrastructure and water quality as examples of smart mitigation and adaptation. Also applicable for coastal zones and adaptive measures from storm surge.
    - Oklahoma and Texas: over 60% of all the flood control structures were built in the 1950s and 60s (50 year building lifespan), but there is potential to repurpose those buildings while still managing flood control.
- Aquatic invasive species and aquatic habitats stressors (such as harmful algal blooms)

Agriculture

- Scope: Agriculture, livestock, forestry, and wildlife (fishing, hunting, etc.)
- Tribal food sovereignty
- Wildlife, in particular hunting and fishing on private lands, is a critical piece of the rural economy. Many cases exceed ag production by 2x (quail hunting for example)
- Positives: are there any shifts from the monoculture (or traditional crops). Reduce threat of cold weather, but then see hard freezes.
- Considerations for influxes of hard freezes and warmer nighttime temperatures on crops.
- The impact to the nutrition value of key Southern Great Plains crops and the subsequent impacts to health.
- Impacts from shorter winter seasons on agricultural pest, disease vectors and other invasive plant and animal "pests" (eastern red cedar, Cattle Fever Tick).
- Pollinators – if things blooming earlier, and if it doesn't synch up with pollinators this may create problems
- What can we do now that we couldn't do before or can do better now:
    - Don't have to break ice for cattle as much
    - Diversification of crops beyond corn and soybeans – shifting away from monoculture

- Shift from cropland ag to more permanent grass cover with different farm bill programs that can shift toward grazing for a more sustainable land use
- Crops for biofuels – plants that have higher water-use efficiency can be grown in more arid environments
- Earlier planting of cotton
- Risk of harder freezes is decreasing – but Austin had the warmest winter on record (2016/2017) along with some hard freezes in the middle of warmer weather
- Development of drought resistant seeds

Energy

- The impacts on the oil and gas industry
  - Water cooling ponds
- Impacts to renewable energy industry
- Impacts to the food, water, energy, wildlife nexus
- Human health impacts
  - Blackouts to critical infrastructure
  - Pollution (from energy sources) of water and air, and their subsequent downwind impacts
- Impact of climate change on the efficiency of the distribution of power

Transportation

- Aging infrastructure that is critical for agricultural and energy transportation
- In addition to impacts on land and air travel, the disruption of shipping lanes in the Gulf
- Adaptation action: clean energies initiative looking at alternative fuels in Oklahoma.
- There are several resources on climate and transportation
  - Southern Great Plains Transportation Institute, looks at climate adaptive resilience transportation. They have research projects either completed or nearly completed to share.
- Transportation for evacuation and relocation of peoples before and after a disaster

Extremes

- Impacts of drought across sectors in the Southern Great Plains
  - 2011 Texas Drought – did lead to greater conservation measures (a positive)
  - Tribal farmers face unique challenges
- Fire risks
- Urban heat
- Risk to local ecosystems
- Human health and well-being impacts from extreme weather
  - Dust bowl events and air quality impacts
- Water cycle: evapotranspiration measurements. Highlight its impacts/vulnerabilities in SPG in a way to streamline the importance of this measurement. Bring an economic twist to these measurements, for example policies that monetizing environmental flow.
- Marsh restoration - Rebuilding marshes with dredging in inter-coastal canals (Beaumont/Port Arthur)

Science, studies, and other relevant activities:

- Citizen Potawatomi, 5 assessments completed by the tribes that have good examples, all completed in the last 12 months.

- Future resource: Rio Grande and Red River watershed assessments. Expected to be released by end of 2017 into 2018.
- New air quality information from EPA
- Sam Brodie's work (Texas A&M) on coastal sustainability institute and disaster risk reduction
- National phenology network, citizen tracking of peak bloom seasons. Nature's notebook
- Chickasaw National is developing drought contingency plan, Arbuckle-Simpson aquifer
- Coffeyville Oklahoma water contamination
- Michael Webber at University of Texas has done some work "Thirst for Power"
- Case Studies along Texas/Mexico border:
    - Desert & Gulf Coast Prairie Landscape Conservation Cooperatives (LCCs) work on Rio Grande collaboration
    - Sul Ross is developing a cross-border partnership, reach out to them
    - Rio Bravo work
- Texas State Water Plan that includes demographics, and where we plan to get water, where there will be water shortages (2017 Texas State Water Plan – info down to the county level – Texas Water Development Board)
- Texas has been setting up a Texas soil moisture network (David Allen's work)
- Farmer citizen science, where farms can communicate with each other via online platform, and monitor soil health
- National Phenology Network (track peak bloom): https://www.usanpn.org/
- Breeding Bird Survey: https://www.pwrc.usgs.gov/bbs/
- Climate assessments were done looking at resiliency in Austin and North Texas

Needs and gaps:

- Soil carbon sequestration
- Soil health relative to ag
- Fracking and climate change, particularly for leakage.
- Social equity: socioeconomic implications of supply and demand for food, water, energy.
- Prescribed burning in Kansas
- Wetlands and water detention
- Language and communication barriers to help reduce risk in real time
- Success stories on risk communication (Katharine Hayhoe)

Case studies:

- Impact of the 2011-2012 drought on the beef industry. Resulted in migration of the actual industry to Northern Great Plains (National Academies of Science reports/statistics for evidence).
- Cities of San Antonio and Austin passed bond measure to purchase open space for water recharge, with potential space of recreational and wildlife values as well.
- Critical hospital infrastructure resilience from Choctaw Nation and Houston
- BP Oil Spill as an example of the need for proactive rather than reactive conservation funding
- Tribal emergency preparedness for emergency managers - leading on this
- The success of Mesonet and opportunities for expansion into Texas and Kansas
- Flint Hills as an example of sustainability and a large landscape, Tallgrass prairie
- Edwards Aquifer Recovery Implementation Program and how they assess competition for resources
- Connecting URBAN and RURAL people – best way is through water and watersheds. Good ways to connect people and tell a story. (Case Study on manmade wetlands – Trinity Study)

- Key CASE STUDY: 2011 Texas Drought caused Lower Colorado River Authority to deny water (2011-14) to lower river rice farmers for the ONLY time ever in 80-year history. Rice farmers dependent on irrigation were denied permits for multiple years – some have gone out of business and or transitioned to dry land farming. Lower Colorado River Authority (LCRA) having to relook at their water management plan, changing a coastal culture of rice to dry land farming.
- Multiple climate information pathways - Regional Integrated Sciences & Assessments (RISA) program, Climate Science Centers, USDA Climate Hubs, Landscape Conservation Corps, etc. - coordination among them is a positive/case study - can use the 2011 drought as an example (e.g., creation of Southern Plains Drought Early Warning System (DEWS), Chapter 9 of recent RISA book)
    - Early warning drought system didn't exist before

Results

The feedback provided during this workshop serves as valuable input to the development of not only the Southern Great Plains chapter of NCA4, but of all chapters. This summary report is being shared with all NCA4 authors to inform the development of their chapters, as well. It will also be made publicly available on the NCA4 website (www.globalchange.gov/nca4). Over 45 stakeholders throughout the Southern Great Plains region participated in the day-long meeting, providing authors with a great deal of useful feedback – from concerns they face, to resources they use and specific case studies where communities are working to address the risks they face as a result of climate change. Responses from both authors and participants indicated that the workshop was not only positively received in and of itself, but it served to cultivate new relationships, research ideas and, hopefully, future collaborations across the Southern Great Plains.

About the NCA

The National Climate Assessment is the U.S. Government's premier resource for articulating the risks posed to the Nation by climate change, as well as what is being and can be done to minimize those risks. It is an inter-agency effort, bringing together experts from the 13 Federal agencies of USGCRP, the broader Federal government, as well as hundreds of experts in the academic, non-profit, and private sectors.

Appendix A: Workshop Agenda

4th National Climate Assessment
Southern Great Plains Regional Engagement Workshop

Thursday, February 9

Objective: To gather input from a diverse array of stakeholders throughout the Southern Great Plains to inform the Southern Great Plains (and related) chapters of NCA4, and to make the stakeholder community aware of the process and timeline for the development of NCA4.

8:30am **Arrival and Registration/Sign In**

9:00 – 9:15am **Welcome, Introduction to workshop goals**

9:15 – 10:00am What is the Fourth National Climate Assessment?

Ways to get involved; Mandate, timeline, structure, etc. of NCA4; NCA3 and splitting the Great Plains into 2 chapters; Areas of emphasis from NCA3; Q&A (questions on process or content or other related issues) from local audience and from satellite locations

10:00 – 10:45am **Preliminary Author Thoughts on Southern Great Plains Chapter of the Fourth National Climate Assessment**

Chapter co-author introductions; each author presents their thoughts regarding NCA4 and their goals for the chapter (5-7 minutes each).

10:45 – 11:00 **Break**

11:00 – 11:30am **Describe the current chapter Focus Areas:**

These are currently identified as Water, Agriculture, Energy, Transportation, Extreme Weather and Forecasting and Mitigating Hazards.

11:30 – 12:00pm **Focus on People, Focus on Places**

The People focus areas are currently identified as urban areas, rural areas, and tribes;

The Places that are currently focus areas are The Coastal Zone (Gulf of Mexico), The Ogallala Aquifer, The Border Zone (The Rio Grande River), and the Arid High Plains.

12:00 – 1:00pm Working Lunch

1:00 – 2:30 **Stakeholder Perspectives (From Both Locations)**

Chapter Authors in "Listen Mode"

Potential guiding questions:

a) What items, focus areas, etc. have we NOT captured? Do you have suggestions on additional topics that need to be addressed in this assessment? (What are we missing?)

b) Around each of these issues (captured prior or not) - what are the key attributes, assets and things of greatest value to the Southern Great Plains?

c) How are those things vulnerable to or at risk from climate change?

d) Are there resources (reports, studies, etc.) or case studies we should be aware of to highlight for each topic?

For each given topic:

a) How is or has climate change affected this topic (e.g., observed change)?

b) What concerns you about projected climate changes and how they may affect this topic in the next 20-30 years and at the end of the century (e.g., projected change)?

c) What challenges, opportunities and success stories for addressing risk can be highlighted?

d) Are there case studies or specific resources to highlight?

e) What are the emerging issues and/or research gaps on this topic?

3:00-3:30pm	**Traceable Accounts, Wrap-up & Next Steps**
3:30pm	**CLOSE OF PUBLIC LISTENING ENGAGEMENT WORKSHOP**
3:30-3:45pm	**Break**
4:00 -4:30pm	**Authors meet to discuss plans for Friday Author Team Meeting**

Appendix B: List of Southern Great Plains Regional Chapter Authors

Coordinating Lead Author: Bill Bartush, US Fish and Wildlife Service

Chapter Lead: Kevin Kloesel, University of Oklahoma

Authors:

- **Jay Banner** (University of Texas)
  Water, earth surface processes, sustainability
- **Dave Brown** (USDA Climate Hub)
  Regional climate service, agriculture
- ***Xiaomao Lin** (Kansas State University)
  Agricultural climatology, bio-atmospheric interactions
- ***Gary McManus** (Univ of Oklahoma)
  Drought, climate services, education and outreach
- **Esther Mullens** (DOI SC Climate Science Center)
  Climatology, winter weather, modeling, atmospheric dynamics
- ***John Nielsen-Gammon** (Texas A&M)
  Large-scale and local-scale meteorology, basic and applied climatology, and air pollution
- **Mark Shafer** (OU/SCIPP)
  Climate information, drought, and climate services
- **Sid Sperry** (Oklahoma Association of Electric Cooperatives)
  Communications, emergency management
- **Daniel Wildcat** (Haskell Indian Nations University)
  Indigenous knowledge, technology, environment, and education

* Denotes State Climatologists

USGCRP staff:

- Tess Carter, NCA Program Coordinator
- Susan Aragon-Long, USGS Liaison to USGCRP