Regional Engagement Workshop Summary Report: Northern 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 employed 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 Northern Great Plains Regional Engagement Workshop

On February 22, 2017, the NCA4 Northern Great Plains chapter team held its Regional Engagement Workshop. The objectives of the workshop were to gather input from a diverse array of stakeholders throughout the Northern Great Plains to help inform the writing and development of NCA4, and to raise awareness of the process and timeline for NCA4.

The South Dakota School of Mines and Technology, in Rapid City, South Dakota, served as the hub location. Three satellite locations were distributed throughout the region (Figure 1), and several stakeholders also participated virtually.

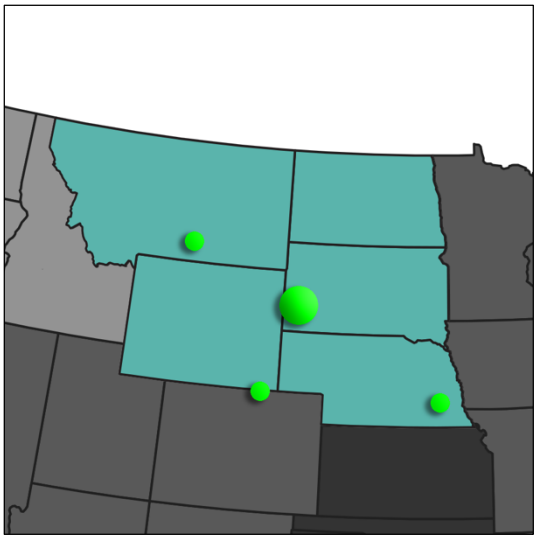

Figure 1. Map of the REW hub & satellite locations: Rapid City, SD; Billings, MT; Fort Collins, CO; Lincoln, NE.

Authors, Locations, and Staff

Authors

- Doug Kluck, NOAA (Coordinating Lead Author)
- Richard Conant, Colorado State University (Chapter Lead)
- Mark Anderson, USGS
- Barb Mayes Boustead, NOAA
- Justin Derner, USDA
- Laura Farris, EPA
- Mike Hayes, University of Nebraska
- Ben Livneh, University of Colorado
- Shannon McNeeley, Colorado State University
- Danelle Peck, USDA
- Martha Shulski, University of Nebraska

Satellite & Hub Hosts

- South Dakota School of Mines and Technology (Rapid City, SD)
- Rocky Mountain Regional Office, Bureau of Indian Affairs (Billings, MT)
- Fort Collins Science Center, USGS (Fort Collins, CO)
- University of Nebraska, Lincoln (Lincoln, NE)

USGCRP Staff

- Kristin Lewis
- Matt Dzaugis
- Apurva Dave

Overview and Topics of Discussion

Kristin Lewis, Senior Climate Change Scientist with the National Climate Assessment, opened the workshop with a welcome to all participants and an introduction of all chapter authors and USGCRP staff who were present. Lewis gave an overview of the NCA, providing context and explaining the goals of the workshop. She also provided additional information from the Great Plains chapter of NCA3 (2014).

Doug Kluck and Rich Conant, the Coordinating Lead Author (CLA) and Chapter Lead (CL) for the Northern Great Plains Chapter, respectively, then introduced a series of short talks from chapter authors on proposed Focal Areas for the chapter:

- Water Resources – Ben Livneh
- Agriculture & Livestock – Justin Derner
- Land Use – Kluck and Conant
- Wildlife and Fisheries – Danelle Peck
- Tribes and Indigenous Peoples – Shannon McNeeley
- Adaptation Efforts – Kluck and Conant

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

During the afternoon, participants shared specific questions, issues, ideas, resources, and case studies for each of the aforementioned focal areas. While most focal areas were discussed in independent breakout groups at each workshop location, the participants interested in issues relating to tribal and indigenous communities instead connected across locations for an extended teleconference during this time.

For each focal area, stakeholders were asked a specific 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.

Water Resources

- Consider variability in the water cycle; the region sees extremes on both the wet and dry side (e.g., drought in 2012 and floods in 2011)
- Also consider the timing of changing precipitation; wetter springs have implications for other sectors such as agriculture and livestock
- The region has many competing demands for quality water, and water rights are important in the region
- The US Army Corps of Engineers is a stakeholder for water resources
- Incorporate changing practices regarding water management and storage
- Explore how changes in snow and rain affect groundwater recharge
- Water is highly connected to energy
- Tile drainage practices (see land use and adaptation discussions) could be a case study

Agriculture and Livestock

- There is a need for better forecasting on the seasonal level
- Longer growing seasons may not always be of use due to variability and a risk of freezing
- Agriculture has connections to other sectors too:
    - Water: making more efficient use of irrigation
    - Ecosystems: pollinators
    - Land Use: landscape heterogeneity
- Explore collaborative adaptive management practices
- Potential adaptation efforts to discuss:
    - Tile drains

    - No-till farming
- Consider impacts to soil health
- Impacts to agriculture may also affect food security and transportation
- Explore the genetic differences of different cultivars
- There are different impacts to livestock as well:
    - Heat stresses
    - Forage availability
    - Changes to calving season weather

Land Use

- Consider changing rainfall events and their impact on soil erosion
- Separate climate drivers of land use change from changing management practices
- Land use is highly connected to other sectors: wildlife, agriculture, water, etc.

Wildlife, Fisheries, and Ecosystems

- It's important to have species vulnerability assessments to understand where protected areas should exist
- Landscape heterogeneity is valuable for ecosystems under climate variability
- Consider ecosystem services, including pollinators and grassland birds
- Explore invasive species and diseases (e.g. deer tick range expansion)
- Drivers of climate change vs. management practices can be difficult to disentangle (see also Land Use)
- Changing stream temperatures may affect cold-water species of fish; see the assisted migration of bull trout as an example
- Consider impacts to migratory birds and potential connections to wind energy
- Consider case studies on cottonwoods and whitebark pine

Adaptation Efforts

- There are significant differences between adapting to extreme events vs. "slow-build' stressors
- Consider tiered risk levels
- Consider the concept of "graceful failure;" how can we help systems fail in a controlled/protected way to avoid cascading failures and larger impacts?
- There's a difference between proactive and reactive management (e.g., adaptation vs. recovery)
- Consider social and behavioral change; how do you spur communities and managers to adapt?

Tribes and Indigenous Communities

Given the high level of participation in this focal area and to better represent the extent of this more in-depth discussion, this section contains additional takeaways:

- There were strong technical inputs for NCA3 that should be consulted for NCA4, as well
- Extreme events such as floods, drought, and fires are challenging tribes' disaster management capabilities
- Observed changes are impacting human health, livelihoods, as well as cultural and spiritual practices (e.g., fisheries and riparian plants for subsistence; ceremonial activities, cottonwood die-off, reduced forage productivity in rangelands, bison management, water borne pathogens)

- Climate impacts on rangelands available for livestock forage are an important issue for tribes, with economic impacts for tribes with grazing permits
- Blackfeet, whitebark pine are shifting to higher elevations and have limited range in which to expand
- Cold-water fisheries and impacts to them are important for tribes within the region
- Consider the compounding effects of climate change within the marginalized socio-economic and political systems in which some indigenous peoples and communities are embedded (e.g., high poverty, poor health, poor infrastructure, issues with water quality/quantity, and complex, ill-defined water rights)
- Water and energy issues have galvanized the community and fostered a shared feeling of risk, particularly regarding potential vulnerabilities of pipeline infrastructure to climate change and subsequent impacts to the water resources of local communities
- Many indigenous communities are developing ways to mitigate the effects of climate change and adapt to extreme weather events and climate change, including:
    - water and drought vulnerability assessment projects with Rosebud, Standing Rock, Pine Ridge, Santee Sioux (BIA climate change program), and Wind River Reservation (NCCSC)
    - vulnerability assessment of water resources and impacts to bison with SD State School of Mines and Intertribal Buffalo Council
    - climate change adaptation plans, and disaster/emergency management plans for flood, drought, and fire (Confederated Salish and Kootenai Tribes, Fort Belknap, Northern Cheyenne)
    - attitudinal changes toward reducing fossil fuel use and the protection of sacred sites
- Northern Cheyenne Tribe is working on a drought mitigation project with Intertribal Buffalo Council (who is doing nationwide drought and climate adaptation w/ their member tribes) as well as Integrated Resource Management Planning that will include water and climate change
- Confederated Salish and Kootenai Tribes have done adaptation planning and are now working on drought and flood planning
- Fort Belknap is working on collecting data and developing adaptation plans for their reservation, including disaster management, fire management, and forestry programs to help them with some of the climate-sensitive issues they are facing:
    - catastrophic flooding events
    - noxious weeds
    - damage to infrastructure
    - drier springs and impacts to waterfowl migration patterns
    - mosquito habitat expanding in new areas
    - dying cottonwoods
- Tribes have authority over their built environment within reservation boundaries, allowing them to make decisions about climate-resilient housing construction, for example
- Some communities are building more resilient/sustainable housing and investing in renewable energy enterprises (e.g., Oyate Omniciye' Oglala Lakota Plan, Lakota Solar Enterprises)
- Funding is often a challenge for projects at the tribal level, and sustaining efforts and implementation of strategies is a challenge after initial project funding ends
- There's a desire to continue and expand upon conversations such as this and to have regular face-to-face meetings of tribes throughout the region to share knowledges and provide networking opportunities
- Future meetings should send questions ahead of time and try to get tribal leaders there to discuss climate-sensitive decisions they have to make; they have valuable input

- Consider talking to the Great Plains Tribal Water Alliance for outreach and engagement
- Tribes and indigenous communities prefer to be framed not as vulnerable victims, but as part of the solution with knowledge and practices built over thousands of years
    - Tribes are doing some proactive things to adapt to climate change, and have been adapting for thousands of years
    - Many tribes, like the Northern Cheyenne, are working to prepare their students to be scientists who can operate in both indigenous and western sciences
- When mapping indigenous lands, it would be good to include land bases that are off-reservation

Other Takeaways

- Explore the interactions between sectors, particularly in the connections between water, agriculture, land use, and ecosystems
- Some topics that were potentially missing from the key focal areas:
    - Human health
    - Forests
    - Invasive species/pests/pathogens
    - Grassland (and forest) fires
    - Snowpack trends
    - Management practices
- Suggested expanding the "fish and wildlife" focal area to a broader "ecosystems" or "ecosystems and biodiversity"
- There's a desire to better understand the economic implications of climate impacts

Results

The feedback provided during this workshop serves as valuable input to the development of not only the Northern 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. It will also be made publicly available on the NCA4 website (http://www.globalchange.gov/nca4). Over 75 stakeholders throughout the Northern 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 Northern 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
Northern Great Plains Regional Engagement Workshop

Wednesday, February 22

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

**Note, times listed are Mountain Time; the Lincoln, NE satellite is in the Central Time Zone.*

8:00	**Registration opens**
8:30	**Introduction to workshop goals and brief introductions**
9:00	**What is the National Climate Assessment?** • Mandate, timeline, structure, etc. of NCA4 • Ways to get involved (ex. author, technical contributor, reviewer, etc.) • Areas of desired emphasis from public comments • Main findings from Great Plains chapter of NCA3 • Q&A
9:45	**Preliminary Author Thoughts on Northern Great Plains Chapter** • Introduce chapter team of authors • Present notional chapter focal areas
10:30	**Open Discussion and Input** • Open discussion for questions on process or content; suggestions on additional areas to address (or avoid); suggestions of resources to use or case studies to highlight; etc.
11:00	**Charge for Break-out Groups** Groups will rotate to 4 groups in 20 minute intervals. There are 6 breakout groups and you may choose any four groups (the six focal areas and one for additional topics) to contribute discussion points. Topical areas for breakout discussions: • Water Resources • Agriculture and Livestock • Land Use • Fish and Wildlife • Tribal and Indigenous Communities • Adaptation Efforts • Other Topics/Vulnerable Populations

<table>
<tr><td></td><td colspan="2">Stakeholder Perspectives in Breakout Groups

Potential guiding questions:
How is or has climate change affected this topic (i.e., observed change)?
What climate-sensitive decisions are you making or do you foresee making in the future?
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 (i.e., projected change)?
What challenges, opportunities and success stories for addressing risk can be highlighted?
Are there case studies or specific resources to highlight?
What are the emerging issues and/or research gaps on this topic?</td></tr>
<tr><td>11:15</td><td colspan="2">Participants Break and Move into Groups</td></tr>
<tr><td>11:20</td><td>Breakout Group 1</td><td rowspan="6">Please note, lunch will NOT be provided at satellite locations, but beverages and snacks will be available throughout the day. Participants should plan accordingly.

Satellite locations may wish to approach the lunch / Break-out session in a manner best suited to the number of participants and their interests.

For example, if there are 20 participants at a given satellite location, it does not make sense to divide them into Break-out Groups. Rather, you may all wish to stay in “Plenary” together and spend 15-30min on a few topical areas that are of most interest to the participants in the room.</td></tr>
<tr><td>11:40</td><td>Breakout Group 2</td></tr>
<tr><td>12:00</td><td>Break
Pick-up Lunch (Hub location only)</td></tr>
<tr><td>12:15</td><td>Breakout Group 3</td></tr>
<tr><td>12:55</td><td>Breakout Group 4</td></tr>
<tr><td>1:00</td><td colspan="2">Report Out from Breakout Groups in Rapid City (~5 min/topic area)</td></tr>
<tr><td>1:45</td><td colspan="2">Report Out from Satellite Locations</td></tr>
<tr><td>2:30</td><td colspan="2">Wrap-up Discussion
How would you like NCA4 to serve you?
Sustained engagement: Is your organization or community interested in being engaged? How can USGCRP and your regional partners help facilitate this?
Are there lingering topics/areas you felt haven’t yet been addressed?
Where do you currently look for and find climate information?
Sharing of resources (State/local/tribal assessments, state climate summaries, etc</td></tr>
<tr><td>3:00</td><td colspan="2">Concluding Remarks
Thanks
Reminder of timeline/ways to continue engaging</td></tr>
<tr><td>3:15</td><td colspan="2">End of Meeting</td></tr>
</table>

Appendix B: List of Northern Great Plains Regional Chapter Authors

Coordinating Lead Author: Doug Kluck, National Oceanic and Atmospheric Administration (NOAA)

Chapter Lead: Richard Conant, Colorado State University

Authors:

- Mark Anderson (USGS)
    - Expertise: water resources
- Barb Mayes Boustead (NOAA)
    - Expertise: meteorology, extreme weather, climate-weather connections
- Justin Derner (USDA)
    - Expertise: adaptive grazing management
- Laura Farris (EPA)
    - Expertise: mitigation and adaptation planning and implementation
- Mike Hayes (University of Nebraska)
    - Expertise: drought risk management, extreme events
- Ben Livneh (University of Colorado)
    - Expertise: hydroclimatology, land cover/land use change
- Shannon McNeeley (Colorado State University)
    - Expertise: social-ecological climate vulnerability and adaptation in natural resource management
- Danelle Peck (USDA)
    - Expertise: agriculture economics, uncertainty, animal disease
- Martha Shulski (University of Nebraska)
    - Expertise: applied climate science, climate variability

USGCRP staff:

- Kristin Lewis, Senior Climate Change Scientist
- Matt Dzaugis, Knauss Fellow
- Apurva Dave, International Coordinator and Senior Analyst