

PURPOSE

The Climate Hubs reduce climate related risks to agriculture, forestry, and rural communities by working with and through USDA agencies and partners. The hubs develop and deliver science-driven strategies and tools so that USDA programs, advisors, and land managers can make informed decisions to manage risk.

Assessments & Syntheses

California: Developed the **Climate Vulnerability Assessment of California Rangelands for the state's ranchers, rural residents, and resource managers who depend on/support the livestock industry.** Declines in rangeland health affects the ability of California's ranchers to maintain viability. Revenues have declined across this sector, a trend exacerbated by recent severe drought. This assessment highlights vulnerabilities specific to California rangelands, further engages stakeholders in the livestock industry, and provides a foundation for developing practices that increase rancher and rangeland resilience.

Southern Plains: Hosted the **2018 annual meeting of the Long-Term Agroecosystem Research (LTAR) Network alongside ARS Grazinglands Research Laboratory** in El Reno, OK. Over 150 participants, including representatives from eight Climate Hubs, worked to prioritize LTAR's aspirational research activities for the upcoming year and identify mechanisms to better deliver/translate LTAR science outcomes to agricultural audiences.

Southwest: Published a **Special Issue in *Climatic Change* containing seven articles highlights crop, rangeland, forest and community vulnerabilities** (based upon the Southwest Vulnerability Assessment). Assessing systemic vulnerability to climate change provides the foundational information to target future adaptation and mitigation efforts and prioritize imperiled resources and communities. This synthesis represents the best current knowledge of agricultural and forest vulnerability in the arid southwest.

Outreach & Education

Midwest: Partnered with the NDMC to host a meeting on the **US Drought Monitor for USDA staff and state and regional partners** to help educate how the USDM is created, how the USDM triggers FSA programs and to develop better collaboration around drought. 30 people attended in person with another 10 remotely.

Northeast: Co-hosted/Facilitated a **workshop on Monitoring Forest Soil Moisture for a Changing World** in Ann Arbor, MI. Specific objectives were to discuss priority questions about soil moisture thresholds in forested lands that may indicate timely management actions, outline and discuss available and emerging soil moisture data, and outline opportunities to integrate/synthesize data sets from a suite of existing agro-forestry research sites with contemporary digital environmental sensor data.

Northern Plains: Designed, hosted, and facilitated a **one-day interactive workshop on SoilMERGE (SMERGE), a new historical soil moisture database on behalf of a research team from ARS, NASA, and Texas A&M International University.** SMERGE is a new root-zone soil moisture (RZSM) product in development that covers the continental United States. RZSM is a limiting factor that constrains agricultural productivity. The workshop brought 24 participants together from 9 states, 6 universities, 4 USDA-ARS locations, 2 Climate Hubs, NOAA, NDMC, USGS, NC-CSC, and the Desert Research Institute. Users provided feedback on SMERGE's accessibility, opportunities for improvement, and potential applications and much more.

Outreach & Education

Southeast: Reached over 400 farmers, wine grape producers, beef cattle producers, loggers, extension, conservation & resource management professionals, and state climatologists through invited and sponsored presentations at 10 events throughout the southeast. Topics included climate change and variability, impacts on agriculture, forest and grazing lands, and tools to increase water quality, productivity, and resiliency to climate variability.

Southern Plains: Developed the "Southern Plains Podcast", now available on iTunes, featuring interviews with USDA scientists and professionals as well as officials from key partner organizations. The Podcast will enhance the Hub's ability to deliver information to regional agriculturalists regarding weather and climate-related issues, such as wildfire resilience, land treatment options, and soil health. A dozen Podcast episodes have been recorded/published. The series will continue to highlight issues of regional importance as determined by analytics information and stakeholder feedback.

Southwest: Collaborated in hosting the Western Snow Conference in Albuquerque, NM. Understanding how climate change is likely to affect snowpack, snowmelt runoff and water resources is vital to plan for future water needs. New this year was an effort to increase communication capacity and document current research. The Western Snow Conference is a forum for ARS and University researchers to interface with practitioners that focus on water supply.

Technical Support

Caribbean: Supported the USDA Hurricane Recovery Team by providing information to over 300 farmers in Puerto Rico through an initiative entitled "USDA Federal Aid Guidance and Registration Cycle". This consisted of meetings with farmers held in four different municipalities on the island where landowners received information on many USDA program available in the US Caribbean.

Midwest: Co-hosted a first-time meeting of Wisconsin's State, Federal, University, & Tribal weather and climate information providers and users. Meeting objectives were to identify climate services needs or gaps in the state, build awareness of existing climate tools, data, and expertise, identify opportunities to seek out additional resources, and enable climate service providers to better coordinate and collaborate. Midwest and Northern Forest Hubs displayed their climate services for forestry and agriculture within the region.

Northern Forests: Taught a climate change effects and adaptation module as a component of environmental officer training for several branches of the Department of Defense, sponsored by the Navy at Whidbey Island, Washington. The Hub also led an adaptation workshop co-hosted by Army National Guard as part of the National Military Fish and Wildlife Association annual meeting at Norfolk, VA. 50 participants from these engagements represented military installations from across the country and addressed a variety of natural resource challenges affected by changing climate.

Northern Forests: Collaborated on applied research that will further understanding of management options for climate change adaptation at Second College Grant owned and managed by Dartmouth College, NH. This research is part of the Adaptive Silviculture for Climate Change project that collaborates with scientists and land managers to develop experimental silvicultural trials across the country. Initiated last fall, the project began data collection and is planning summer timber harvests to implement forest management treatments demonstrating the three adaptation options of resistance, resilience, and transition.

Northern Plains: Led the public rollout of Grass-Cast, a new experimental Grassland Productivity Forecast for the Northern Plains. Crucial to the rollout was the new [Grass-Cast website](#). Content, co-developed and managed by the Hub, includes: Grass-Cast maps, introductory video, 2-page handout, historical productivity estimate table, and much more. The Hub co-authored a USDA Press Release, USDA Blog post, USDA Radio story, and @ClimateHubs tweets (9850 impressions, 286 engagements, 30 retweets) which inspired nearly a dozen newspaper and radio stories about Grass-Cast throughout the region and country.

Northwest: Presented and participated in discussions on climate, climate change vulnerability, and adaptation practices at the Intermountain Region Climate Assessment Workshop for the National Forest Service Region 4 in Ogden, UT. Hub members facilitated discussion and worked through the Adaptation Workbook with National Forest System's resource managers. About 40 natural resources managers and partners attended the workshop and another 30 participated virtually from their local district offices.