



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

Northwest: Published a manuscript in the Journal *Ecohydrology* that was an assessment of streamflow benefits from wet meadow restoration in the Middle Fork John Day watershed in Oregon. While raising channel beds can increase total water storage in upland valley bottoms, the contributions of drainage from restored floodplains to late summer streamflow were found to be undetectably small, while losses in streamflow due to greater transpiration and lower hydraulic gradients were substantial. These approaches offer benefits for improving the quality and health of riparian and meadow vegetation that would warrant considering such measures, likely to be at the cost of increased water demand and reduced streamflow.

Southeast: Synthesized current research and understanding of drought trends in the southeastern U.S., and adaptation strategies to improve resilience of forests, riparian and aquatic ecosystems during drought conditions into a user-friendly resource for extension professionals and forestland managers. **Developed a factsheet that summarizes historic trends and projections of future drought in the Southeast, as well as adaptation strategies for maintaining resilience and productivity in forest, riparian, and aquatic ecosystems during drought conditions.**

California: Synthesized new data and scientific findings for an update of 14 Climate Effects on Specialty Crop Fact sheets for California. The crops include the states most economically important commodities that have current or potential climate vulnerabilities. The crops (or crop groups) include; almonds, avocados, broccoli, carrots, citrus, grapes, lettuce, melons, onions, pistachios, stone fruits, strawberries, tomatoes and walnuts. These factsheets summarize the vulnerability of each aforementioned crop or crop group according to its climate vulnerability through increased climate exposure, sensitivity and expected adaptive capacity.

Outreach & Education

Northern Plains: Reached 150 farmers, ranchers, irrigation/conservation district staff, and University Extension personnel through invited presentations at 3 different public events: WESTI Ag Days (Worland, WY; n=25), Four-States Irrigation Council (Ft. Collins, CO; n=50), Boulder County Ag Forum (Longmont, CO; n=75). Explained the US Drought Monitor and its relationship to USDA Farm Service Agency's Livestock Forage Disaster Program; how to participate in the US Drought Reporter and CoCoRaHS (Community Collaborative Rain, Hail, & Snow Network); how to access NOAA-RISA-Western Water Assessment High Plains Climate Dashboard and the University of Nebraska's AgriTools app for making climate-informed decisions in agriculture.

Northeast: Hosted a two day Partners Meeting attended by ~150 land grant extension specialists and researchers, farmers, and government employees. Building upon the foundational understanding of our regional climate trends and impacts, participants discussed climate adaptation solutions by sharing experiences to support agriculture in the region. The Northeast community exchanged information that will drive continued support, collaboration and advancement of climate adaptation in agriculture and forestry.

Outreach & Education

Northern Forests: Hosted **Advanced Course on Climate Change and Resource Management**, St. Paul, MN (Feb 27-March 1). NFCH regional USDA FS R9 National Forest climate change coordinators and land-management professionals met for an intensive **3-day course covering a variety of topics on climate change and carbon in land management**. This is the third time that NIACS has hosted a training in Advanced Climate Change Topics course, meant to provide a deep dive into current thinking on climate change vulnerability, adaptation, and carbon stewardship. The course featured talks, discussion and activities from multiple researchers and subject experts.

Southern Plains: Convened the first meeting of its new Joint Advisory Committee (JAC) with the United States Geological Survey (USGS) South Central Climate Science Center (CSC) in Norman OK on February 8th. The JAC will provide strategic and operational guidance and recommendations going forward for both the Hub and CSC, with an emphasis on **identifying regional priorities, synergies, and efficiencies for climate science and service delivery**.

Midwest: Delivered climate change and agriculture outlook information to producers in talks throughout the Midwest during winter ag meetings. These talks discussed current climate changes, delivered actionable information on this growing season and information about the hubs and outreach activities. Climate Smart Agriculture was also a focus. **This resulted in, in-person talks across four states to over 750 producers, and the development of new outreach materials and outlooks.**

Technical Support

California: In 2017, California had its worst fire season in history. This comes after record setting drought that resulted in 129 million dead trees. The combination of these events makes the need for better understanding of reforestation practices in the face of changed conditions even more acute. To address this need the USDA California Climate Hub **organized and hosted a reforestation and forest regeneration research summit with the leading scientists in the field from USFS PSW, UC Davis, and UC Berkeley** to assess the state of the knowledge as a first step toward providing guidance for landowners and public officials managing forests and reforestation programs.

Caribbean: Provided technical expertise to set up the Forest Health UPR urban field program in Survey123 for ArcGIS for data collection via offline digital tablets with GPS in 2018. **Helped establish a Forest Health partner program for insect and tree monitoring in urban forest plots in 7 communities and 33 plot locations in San Juan for data collection in March, June, and September 2018.** Includes online data management support.

Caribbean: Facilitated an initiative to **salvage hurricane-downed wood by coordinating with F.E.M.A., the Solid Waste Authority, University Extension, the Department of Natural and Environmental Resources of Puerto Rico, NGOs, and the U.S. Army Corps of Engineers (USACE)** and their contractors. The goals are to: 1) manage wood chips and salvaged logs to extract value from them and avoid that these organic materials end up in landfills or burned; and 2) that these resources can be used to develop value added wood products of compost, timber, furniture, or other wood products that can support economic development of forest and agricultural industries in Puerto Rico.

Northern Plains: Supported Tyler Williams (NPCH Extension & Outreach Team member and University of Nebraska Extension educator) in developing **two new online tools for farmers: (1) the "AgriTools" app for Android users, and (2) the "Hail Know!" website**. AgriTools accesses data from the High Plains Regional Climate Center, National Weather Service, and Nebraska Mesonet to provide weather and climate information relevant to farming decisions such as baling hay or spraying. The "Hail Know!" website provides an easy-to-navigate menu of hail-related topics (e.g., assessing damage, handling insurance, replanting options, cover crops) with resources to help farmers respond quickly to hail-damaged crops.

Northern Forests: Partnered with the Wisconsin Initiative for Climate Change Impacts (WICCI) Plants and Natural Communities Group, to convene wetland consultants, academics, tribes, NGO and WI DNR staff for a one-day adaptation workshop in Lake Geneva, WI (Feb 23). This workshop helped practitioners identify actions that enhance wetland ecosystems to adapt to changing conditions. This active, hands-on workshop used the Adaptation Workbook to consider climate change impacts and a new set of adaptation strategies and approaches created by NFCH and WICCI for non-forested wetlands to identify adaptation options in real-world management situations. **Developed 9 real-world wetland management projects that used the Adaptation Workbook** to specify climate change adaptation intentions and identify adaptation actions to implement.