USDA Regional Climate Hubs: Managing your risk in a changing climate.

Climate Risks in the Northern Plains

What type of agricultural production is in the Northern Plains?

The Northern Plains region (Mont., N.D., S.D., Wyo., Neb. and Colo.) has a high diversity of land uses including the largest remaining tracts of native rangeland in North America, substantial areas of both dryland and irrigated cropland and pasture, mosaics of cropland and grassland, and forested lands. Livestock production includes beef (cow-calf and yearling operations, feedlots), sheep, hogs, and dairy. Crop production is dominated by corn, soybeans, wheat, barley, alfalfa, and hay, but also includes a diversity of other crops such as potatoes, sugar beets, dry beans, sunflowers, millet, canola, and barley. Agroforestry includes windbreaks, riparian forest buffers, and alley cropping. Forest farms produce timber and other wood products.

How are climate change and weather variability affecting Northern Plains producers?

Land managers in the Northern Plains are experiencing changing climate and weather variability on the ground that is outside of the ranges they have dealt with in the past. These changes are impacting producers' day-to-day decisions, and some of these changes are expected to intensify. Examples include:

- ***Extreme weather events:*** Extreme events have dramatically influenced farmer and rancher livelihoods and enterprises in this region. The early October 2013 snowstorm (named "Atlas") resulted in tens of thousands of livestock deaths in western South Dakota and northwestern Nebraska with ripple economic effects to the businesses and local economies of these agricultural communities. Excessive rainfall in September 2013 in Colorado flooded crops and farmland, damaged houses and agricultural structures, and impaired water quality of rivers downstream in neighboring states.

- ***Drought:*** The extreme drought conditions of 2012 and 2013 had substantial negative economic results for land managers and local rural economies. Forage and hay production was less than half of average values resulting in low stocks of hay and much higher prices. Many livestock producers sold their herds, or markedly reduced their numbers, with the U.S. beef cow herd now at its lowest levels since 1952. Over 2,000 counties nationwide were designated as disaster areas due to drought.

- ***Longer, hotter growing seasons:*** Earlier arrival of spring is resulting in longer growing seasons and prolonged hot periods during the growing season, which affects the selection of crops and crop varieties. It is also enhancing the growth of non-native weeds (for example, cheatgrass, smooth brome, Kentucky bluegrass and Dalmatian toadflax) and increasing the risk of late-spring freeze damage to crops and forage production. Warmer and drier summers reduce forage production and crop yields, and are resulting in longer and more intense fire seasons that pose a risk by reducing forage available for livestock, altering critical wildlife habitat and impacting water quantity and quality from forest watersheds. The fire danger is especially acute for forested areas which had large diebacks of trees associated with the mountain pine beetle outbreak.

What is USDA doing about it?

USDA has established the USDA Northern Plains Regional Climate Hub (NPRCH), located in Fort Collins, Colo. This multi-agency effort (Agricultural Research Service, Forest Service, Natural Resources Conservation Service) is being led by Justin Derner, Supervisory Research Leader and Rangeland Management Specialist with the Agricultural Research Service. The Hub will deliver science-based knowledge and practical information to farmers, ranchers, and forest landowners that will help them to adapt to climate change and weather variability by coordinating with local and regional partners in Federal and state agencies, universities, NGO's, private companies, and Tribes.

The Hub will provide:

- Technical support for land managers to respond to drought, heat stress, floods, pests, and changes in growing season.
- Regional assessments and forecasts for hazard and adaptation planning.
- Outreach and education for land managers on ways to mitigate risks and thrive despite change.

Building on success stories

Water Supply Management: The Natural Resources Conservation Service responded to concerns resulting from the recent drought with an Initiative for the Ogallala Aquifer, which supports 30 percent of American irrigated agriculture. This Initiative helped land managers improve water management and save money on irrigation through adjusting cropping systems, replacing inefficient irrigation systems and planting non-irrigated vegetation.

Natural Resource Conservation Tools: The Forest Service has compiled information and tools for land managers related to wildfires, invasive plants, forest disease, resource stewardship, wildlife, aquatic ecosystems, grasslands, water resources, vegetation distribution, ecosystem services and biodiversity at their Climate Change Resource Center website.

Livestock and Weather Variability Research: The Agricultural Research Service used long-term (30-90 years) livestock weight gain data to determine effects of seasonal weather variability for ranchers. Wet winters and springs positively influence cattle production, whereas grazing season droughts can reduce cattle production by up to 60 percent. Cattle production is more sensitive to weather variability under heavy stocking rates. Land managers can use adaptive grazing management to reduce enterprise risk, and improve production capacity and production efficiency in the Northern Plains.

Need more information?

USDA Regional Hub Leader

Justin Derner
Supervisory Research Leader
Rangeland Management Specialist
USDA Agricultural Research Service
National Northern Plains Area
8408 Hildreth Road
Cheyenne, Wyo. 82009
2150 Centre Avenue, Building D
Fort Collins, Colo. 80526
(307) 772- 2433 x113
Justin.Derner@ars.usda.gov

USDA Regional Hub Partners

Linda Joyce
Quantitative Ecologist
Human Dimensions Research Program
USFS Rocky Mountain Research Station
240 West Prospect, Fort Collins, Colo. 80526
(970) 498-2560; ljoyce@fs.fed.us

Rafael Guerrero
Director, Central National Technology Support Center
USDA Natural Resources Conservation Service
501 W. Felix St., FWFC, Building 23, Fort Worth, Texas 76115
(817) 509-3570; rafael.guerrero@ftw.usda.gov