



USDA Climate Hubs: Managing risks in a changing climate



Climate Risks in the Northern Plains

What types of agricultural production are in the Northern Plains?

The Northern Plains region (MT, WY, CO, NE, SD, and ND) contains highly diverse land uses, including the largest remaining tracts of native rangeland in North America, mosaics of grasslands and croplands, significant areas of dryland and irrigated crops, as well as forested lands. Livestock production includes beef cattle ranches and feedlots, sheep ranches and feedlots, dairy farms, and hog farms. Crop production is dominated by corn, soybeans, wheat, alfalfa, and hay, as well as a diversity of other crops such as potatoes, sugar beets, dry beans, sunflowers, millet, canola, and barley. In suitable microclimates, specialty crops such as melons, sweet corn and other vegetables are grown in the region, as well as fruit orchards (e.g., peaches, apples) and vineyards. Agroforestry includes windbreaks and riparian forest buffers.

How is climate change affecting producers and land managers?

Producers and land managers in the Northern Plains are already experiencing climate conditions and weather variability that exceed historical ranges. Many of these extreme conditions are expected to intensify in the future. Yet they are already impacting day-to-day decisions. Examples include:

- **Extreme Weather:** In 2019, one of the costliest inland floods in U.S. recorded history swept through the Missouri River Basin, affecting portions of Nebraska, South Dakota, and North Dakota. The flooding resulted in an estimated \$10 billion in damages, including the loss of roads, bridges, railways, levees and dams; degradation of agricultural lands, buildings, and equipment; and the stranding of thousands of cattle. This historic flood was caused by a sequence of extreme weather events, beginning in the fall of 2018, when above-normal precipitation filled the soil profile. Soils then froze deeply in late winter, due to heavy snowfall and below-normal winter temperatures, which caused thick ice to form on rivers and streams. In March of 2019, a record-breaking spring storm caused an extreme rain-on-snow event, which generated excessive runoff that quickly overwhelmed ice-jammed waterways. As climate in the Northern Plains continues to change, the weather is expected to become more variable, with back-to-back extreme events becoming more common, resulting in cascading or compounding effects, as seen in 2019.
- **Drought & Wildfire:** In 2017 and 2020, large portions of the Northern Plains felt the effects of severe drought, with substantial economic losses for agricultural producers, land managers, and rural economies. Forage and hay production were below average, resulting in low feed stocks and high prices. Many livestock producers reduced their numbers or sold their herds. Drought conditions also resulted in historically large wildfires, which reduced forage availability for livestock, altered critical wildlife habitat, closed recreational areas, reduced air quality for downwind communities, and impacted water quality from forested watersheds. Fire danger is especially high in forested areas with large diebacks from mountain pine beetle. With changing climate in the Northern Plains, spring green-up is arriving earlier, dry spells are lasting longer, hot days and nights are becoming hotter, and warm conditions are occurring later into the year. This results in longer, more intense wildfire seasons in our forests and rangelands.

What is USDA doing about it?

The USDA Climate Hub network was established in 2014 as a multi-agency effort led by the Agricultural Research Service, Forest Service, and the Natural Resources Conservation Service. The Northern Plains Climate Hub (NPCH) is directed by Dannele Peck with the Agricultural Research Service in Fort Collins, CO. The NPCH team delivers science-based knowledge and practical information to farmers, ranchers, and forest managers with the goal of empowering them to adapt to a changing climate, and increasingly variable and extreme weather. To accomplish this goal, the Hub works closely with local and regional partners in Federal and state agencies, universities, non-governmental organizations, private companies, and Tribes.

The Hub provides:

- Technical support for land managers to respond to drought, floods, heat stress, pests, and other weather-related events that are becoming more extreme in a changing climate.
- Regional assessments to inform adaptation planning and forecasts for weather-related agricultural risks.
- Outreach to service providers and land managers about mitigating risks and thriving despite changes.

Building on success stories

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

Resource Management Tools: The Forest Service has compiled information and tools for land managers related to wildfires, forest pests and diseases, invasive plants, aquatic ecosystems, grasslands, water resources, ecosystem services, wildlife, and biodiversity at their Climate Change Resource Center website.

Livestock Research: The Agricultural Research Service uses long-term (30-90 years) weather and livestock weight-gain data to understand the implications of seasonal weather variability for ranchers. Drought during the grazing season can reduce cattle production substantially, with greater sensitivity to variable weather under heavy stocking rates. Land managers can use flexible stocking and adaptive grazing management to reduce their operation's production risks and improve resiliency in the Northern Plains.

Want more information?

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