Addressing climate impacts to agricultural production: How dust monitoring and mitigation aligns with climate adaptation efforts in the US

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NCA4: Climate Science Special Report

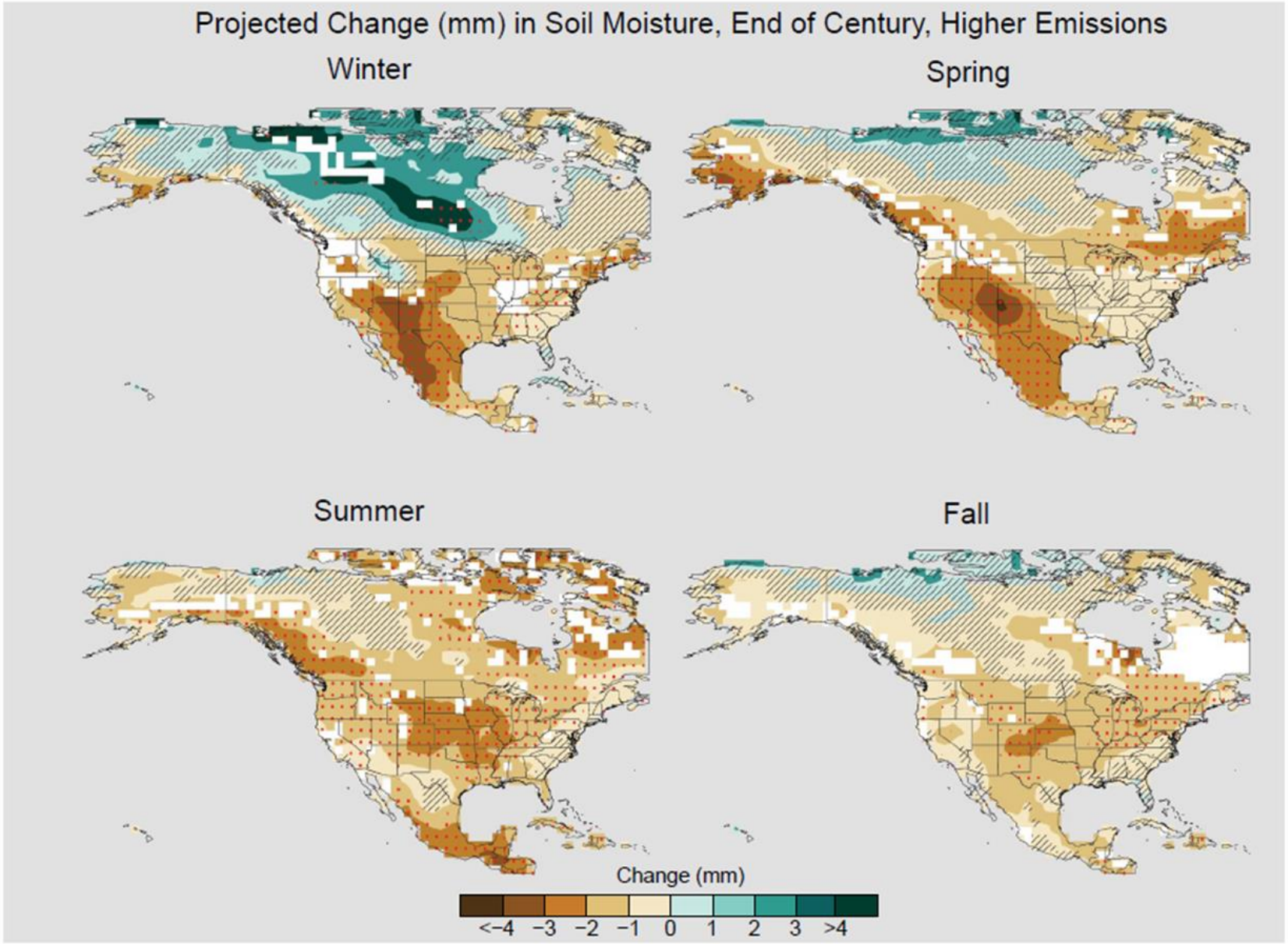
Heatwaves have become more frequent in the United States since the 1960s, while extreme cold temperatures and cold waves are less frequent.

Annual trends toward earlier spring melt and reduced snowpack are already affecting water resources in the western United States and these trends are expected to continue. Under higher scenarios, and assuming no change to current water resources management, **chronic, long-duration hydrological drought is increasingly possible before the end of this century**.

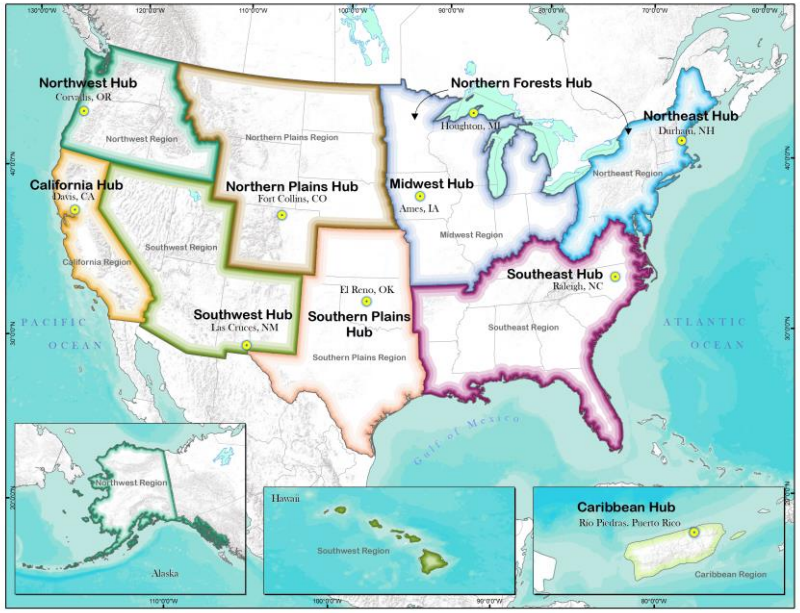
Recent droughts and associated heat waves have reached record intensity in some regions of the United States; however, by geographical scale and duration, the Dust Bowl era of the 1930s remains the benchmark drought and extreme heat event in the historical record. (*Very high confidence*)

Future decreases in surface soil moisture from human activities over most of the United States are *likely* as the climate warms under the higher scenarios. (*Medium confidence*)

Available on-line at: <science2017.globalchange.gov>


Projected Change (mm) in Soil Moisture, End of Century, Higher Emissions
Winter
Spring
Summer
Fall
Change (mm)
<−4 −3 −2 −1 0 1 2 3 >4

Climate Hub Project Evolution



Mission: Develop and deliver science-based, region-specific information and technologies to agricultural and natural resource managers, and communities, that enable climate-smart decision-making, and to provide assistance to implement those decisions.

Research and science synthesis

Tool development and technology transfer

Outreach and education

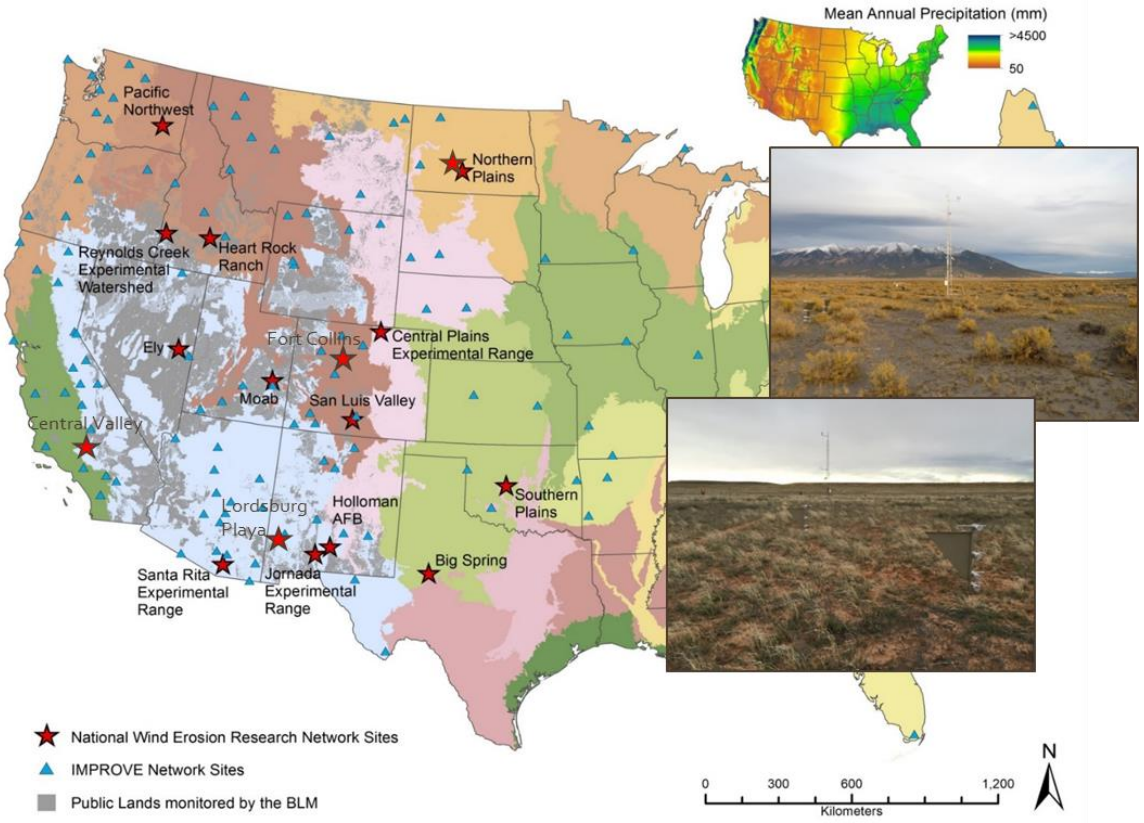
Roles

Research and science synthesis

Support National Wind Erosion Research Network

Air quality synthesis: Synthesize the national state of knowledge regarding integrated air quality and production agriculture impacts, with emphasis on regionally relevant issues in the Midwest-Northern Plains and Southern Plains-Southwest.

SWCS information



Tool development and technology transfer

On-line resource

Includes:

- measurement
- monitoring
- planning
- resources

Dust Mitigation Handbook

Outreach and education

- This symposium (co-production)
- Convene a Southern Plains-Southwest air quality and production agriculture science and applications workshop. Present outcomes from the national assessment effort, along with the NRCS Dust Mitigation Handbook 2018 liaison activity, and facilitate identification of regional research and management needs and priorities among ARS, NRCS, and other professionals.
- Develop and deliver at least two practitioner webinars for regional NRCS field staff. Build on existing efforts and capabilities (e.g., NRCS air quality team) and inform conservation practice standards, level of field staff knowledge, and resource concerns.

Symposium goals

Address dust monitoring and mitigation in semi-arid agricultural settings

- dust monitoring (e.g., National Wind Erosion Research Network establishment)
- mitigation (e.g., best practices for land management).

Discuss existing and projected regional dust generation and air quality

Evaluate interconnected impacts, such as changes in water availability, soil quality, and management practice implications for long-term sustainability and resilience

Provide an update on the new USDA-sponsored draft dust mitigation handbook

Discuss practicable solutions, future field research and demonstration projects