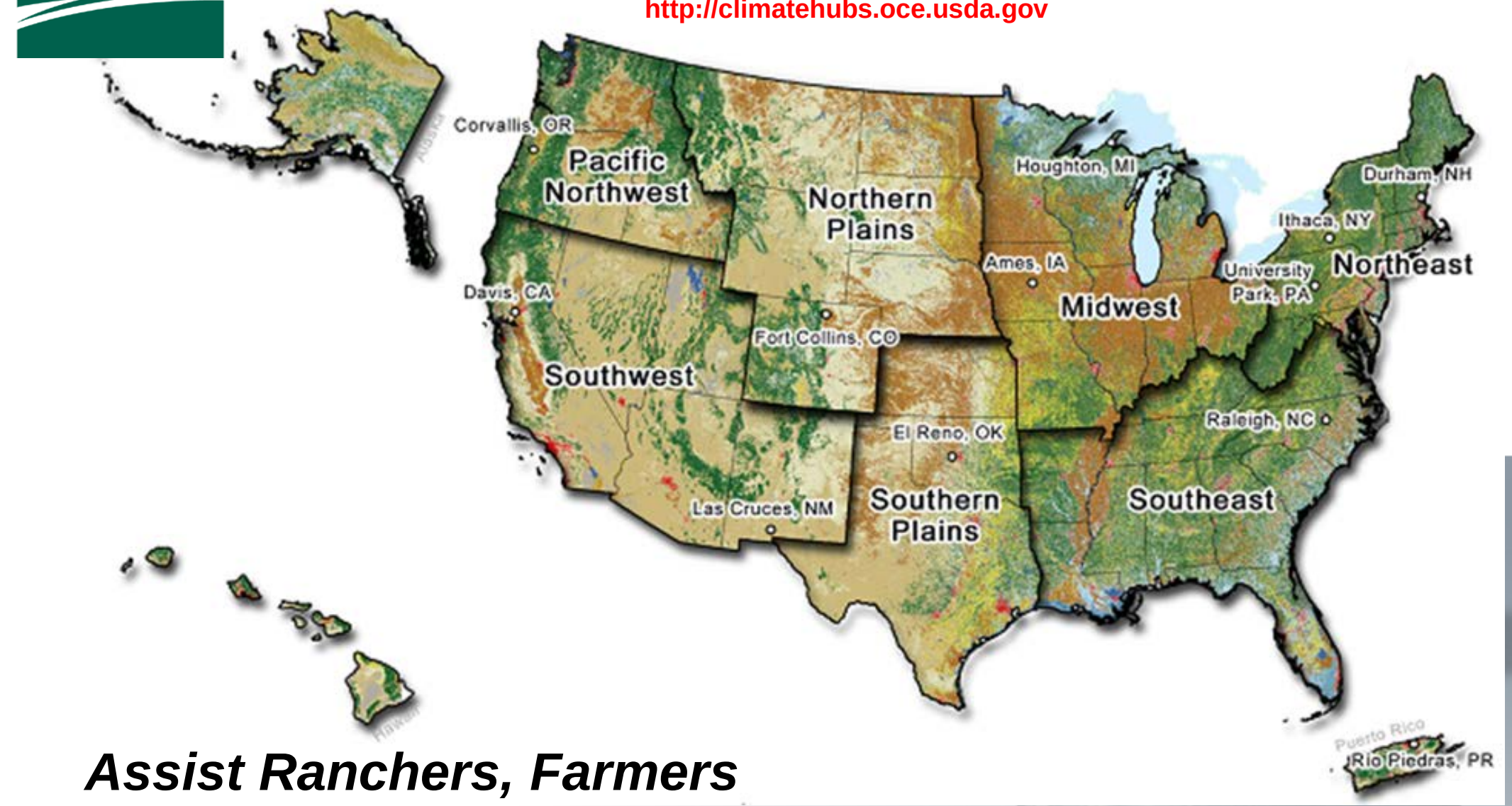
USDA Regional Climate Hubs

http://climatehubs.oce.usda.gov



Assist Ranchers, Farmers and Forest Land Managers with Decision-making

Justin D. Derner

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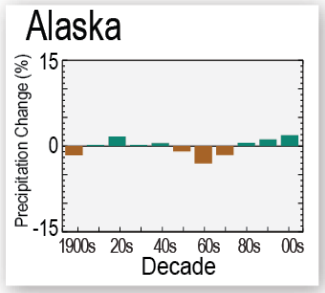
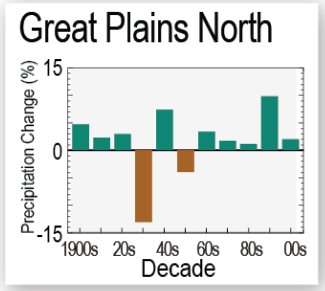
USDA Northern Plains Regional Climate Hub

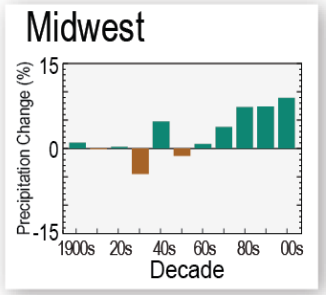
Road Map for Montana

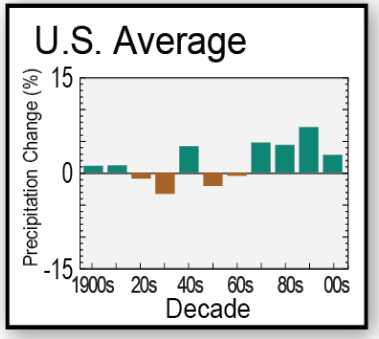
- Recent climate trends
  - Precipitation
  - Temperature
  - Growing season length
- Recent land use trends
  - Crops
  - Livestock (cattle)
- Projections of mid-21st century climate
  - Precipitation
  - Growing season length
- Adaptation strategies

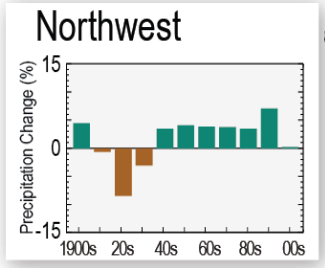
Precipitation change (from 1991) relative to 1900-1960

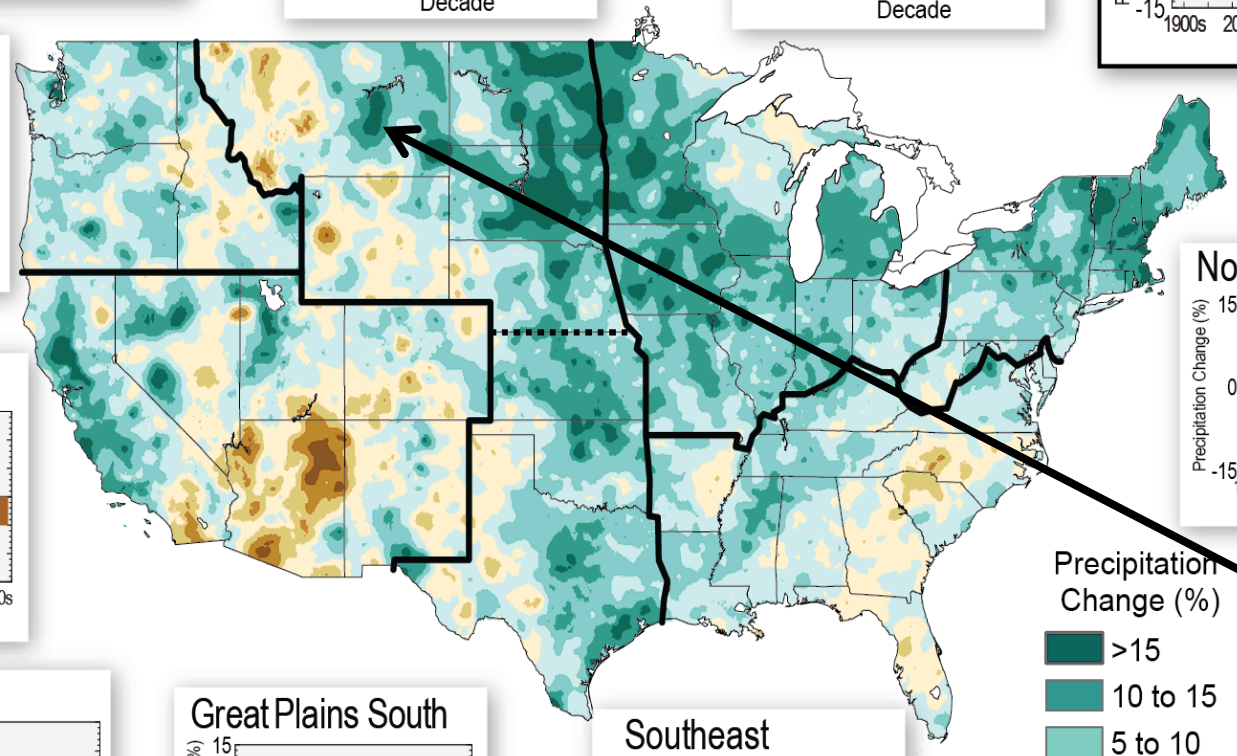


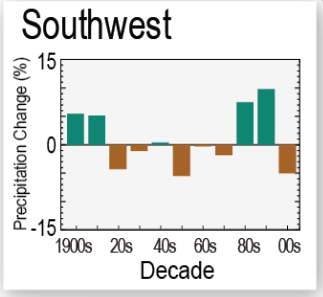


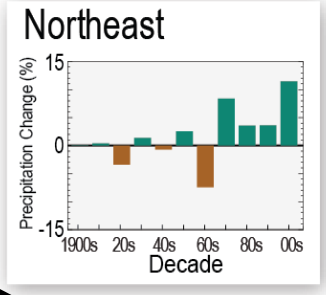


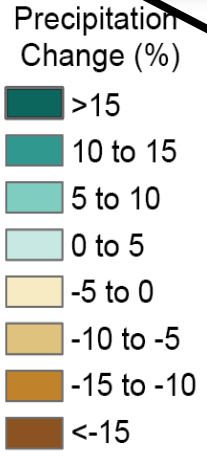


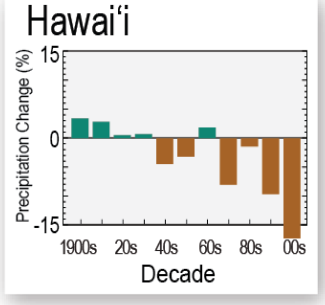


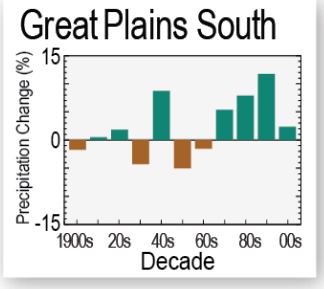


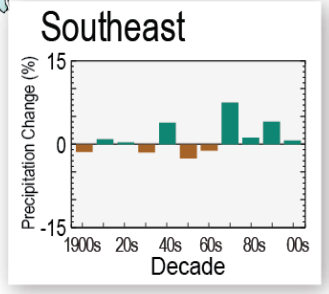








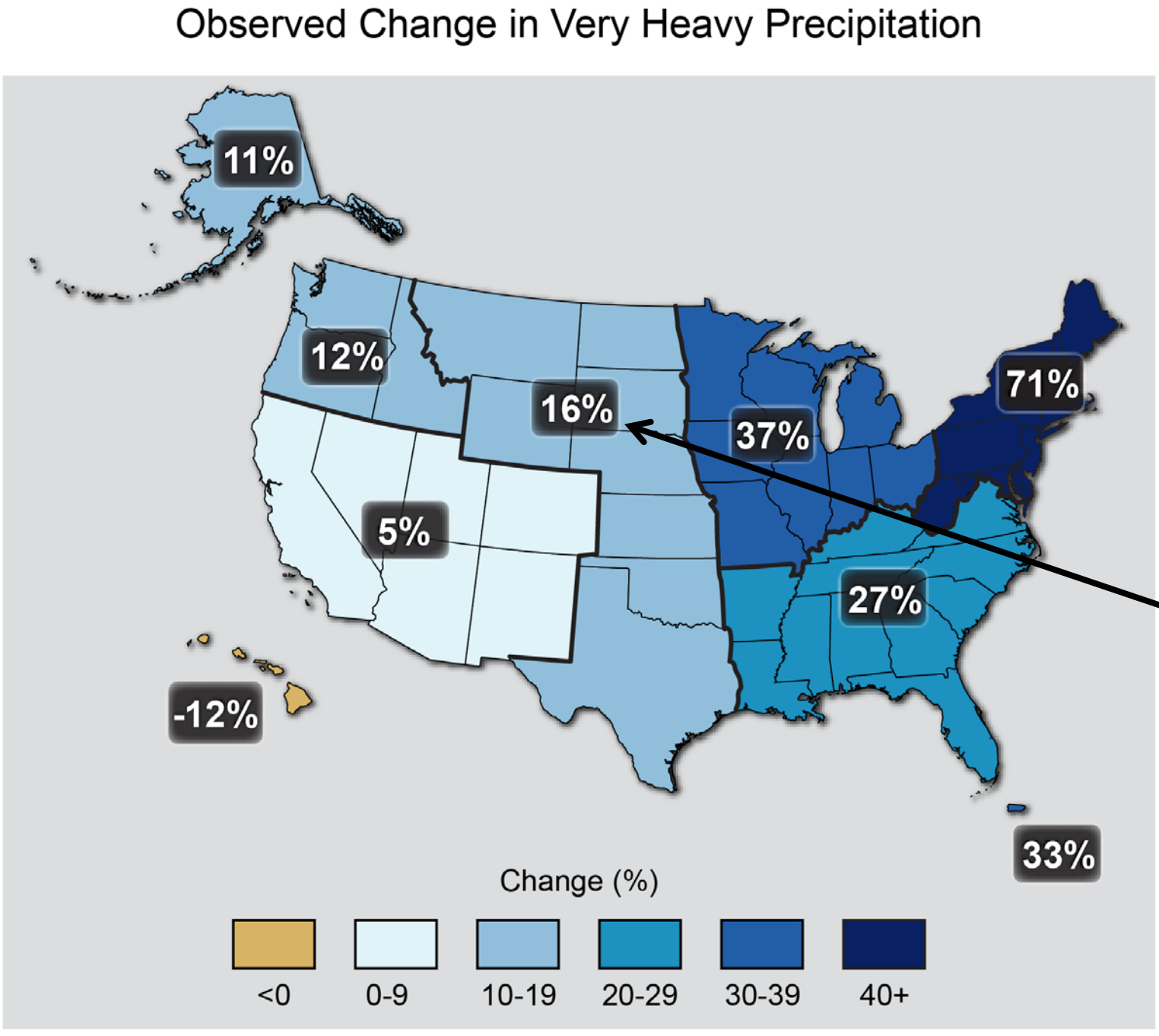




Substantial increase in precipitation across eastern part of Montana

National Climate Assessment 2014

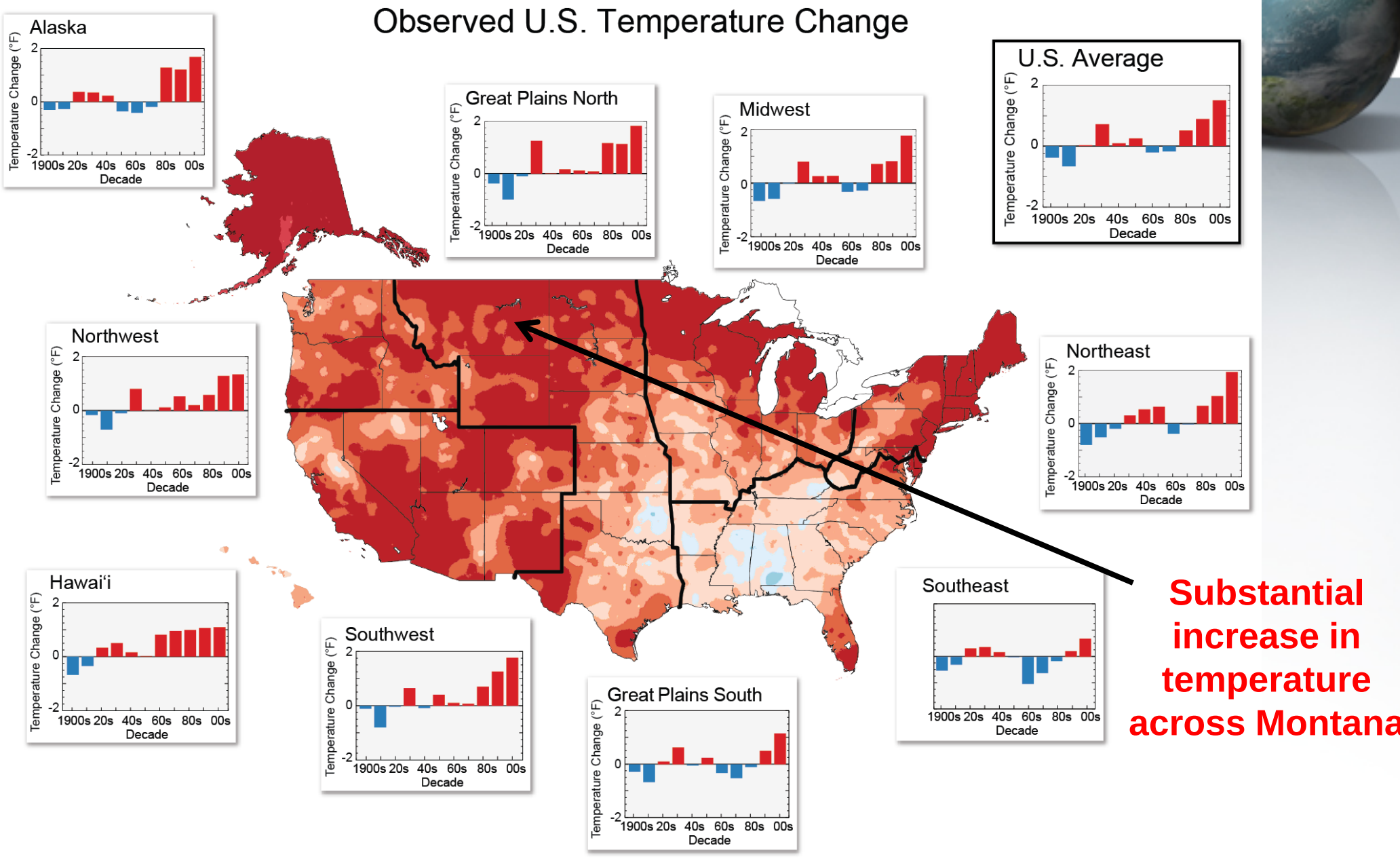
Very heavy precipitation change (from 1991) relative to 1900-1960



Largest increase in observed change in western half of US.

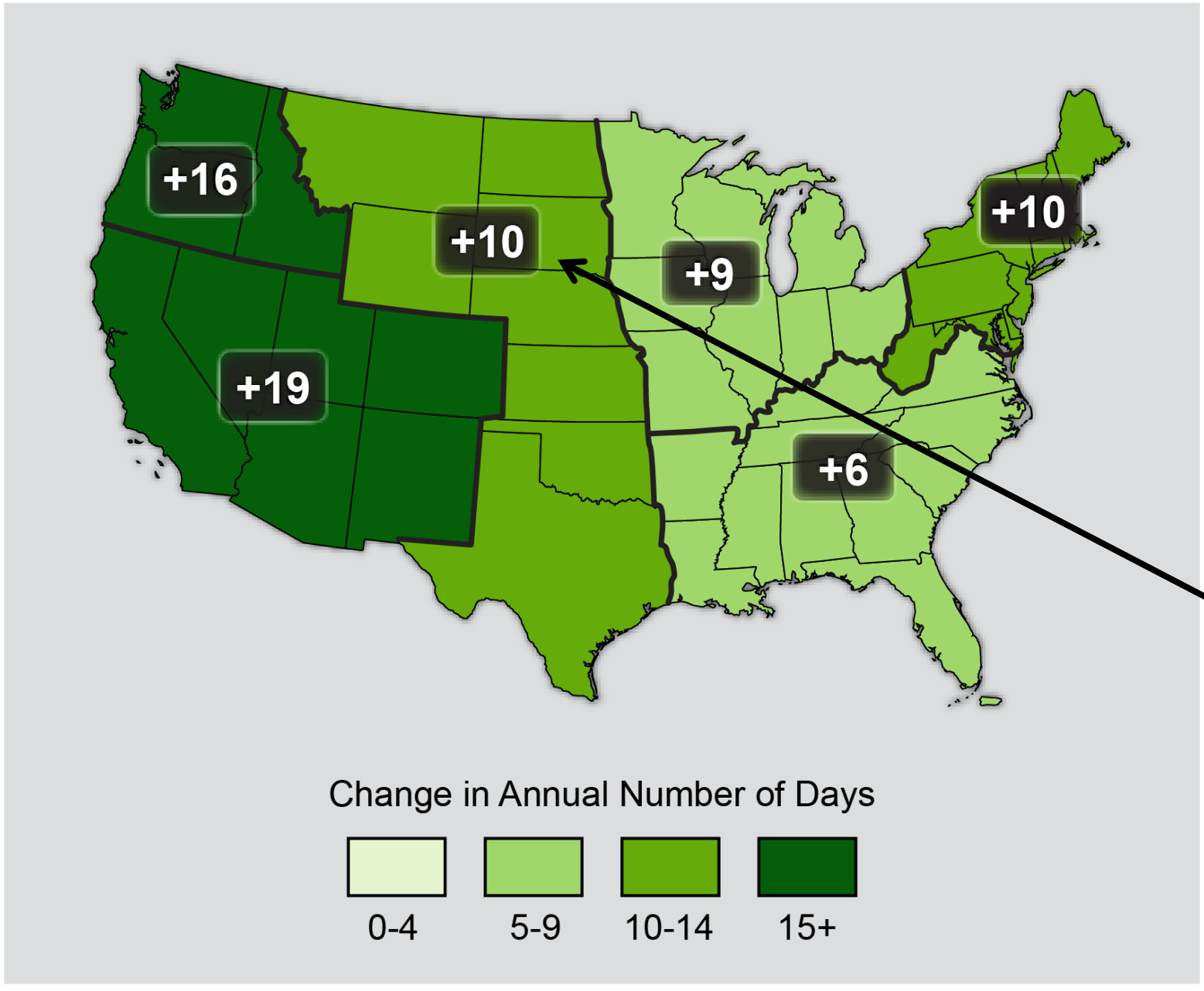
National Climate Assessment 2014

Temperature change (from 1991) relative to 1900-1960



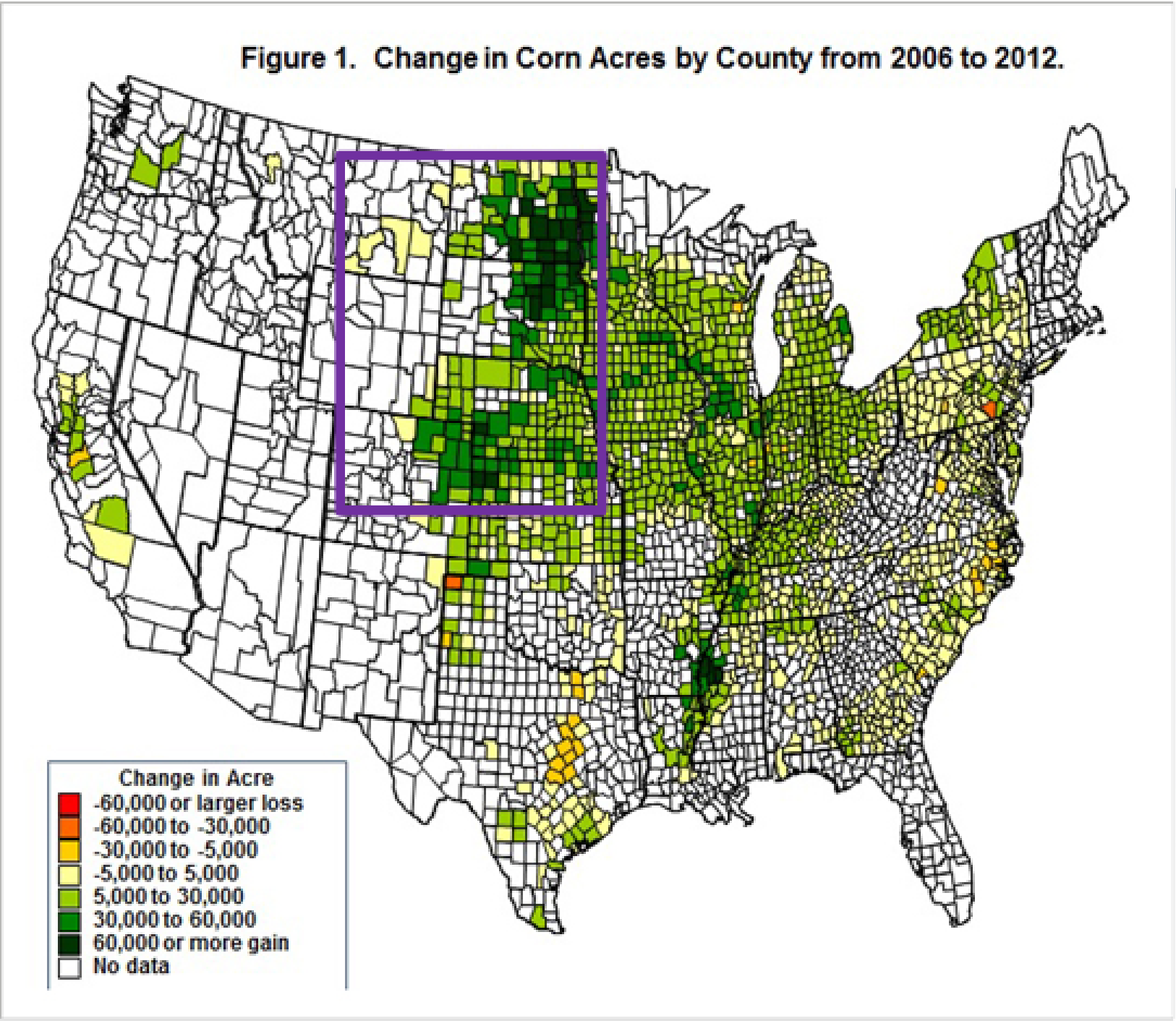
National Climate Assessment 2014

Frost-free season length (from 1991) relative to 1900-1960

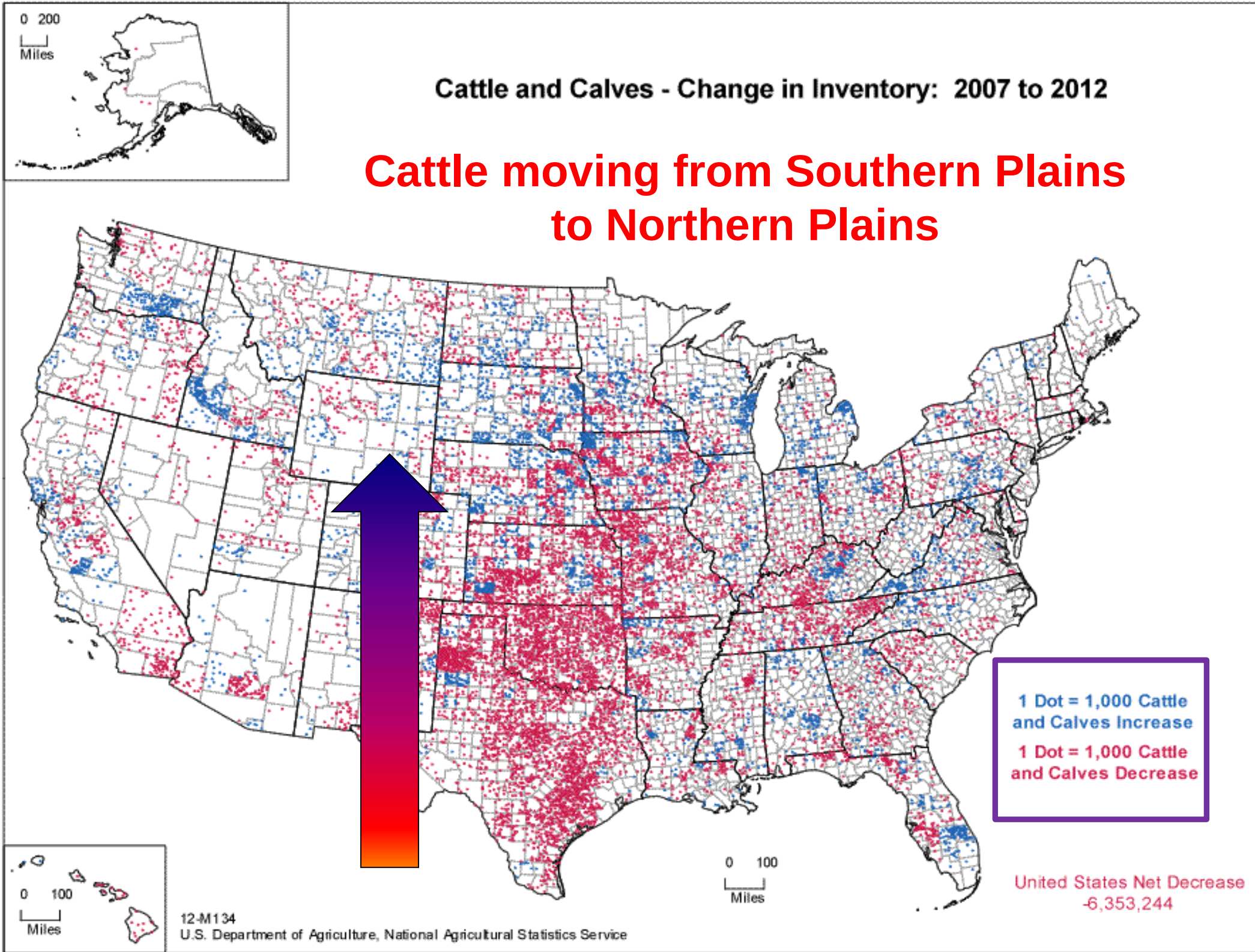


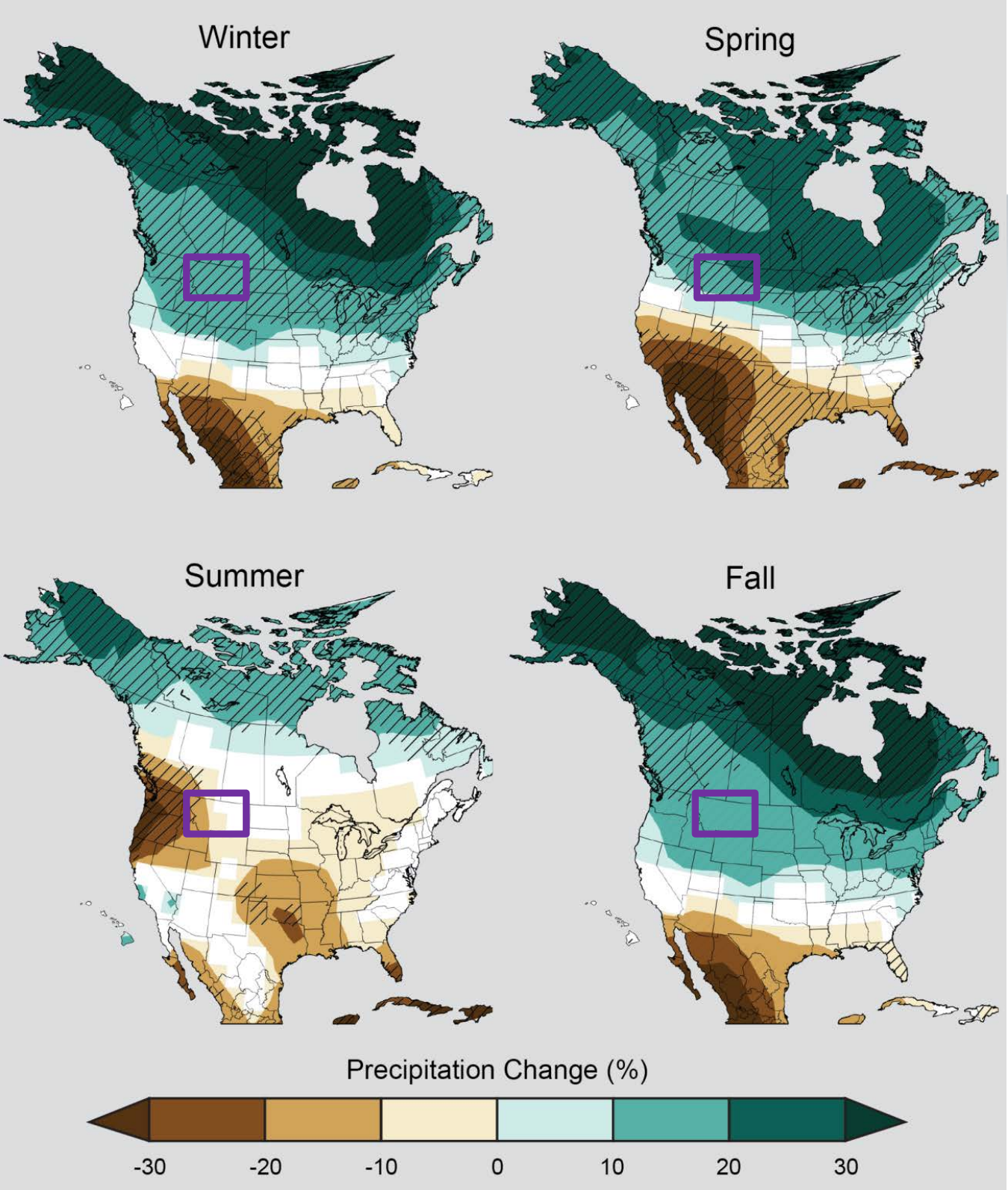
Week and a half increase in frost-free season length.

National Climate Assessment 2014



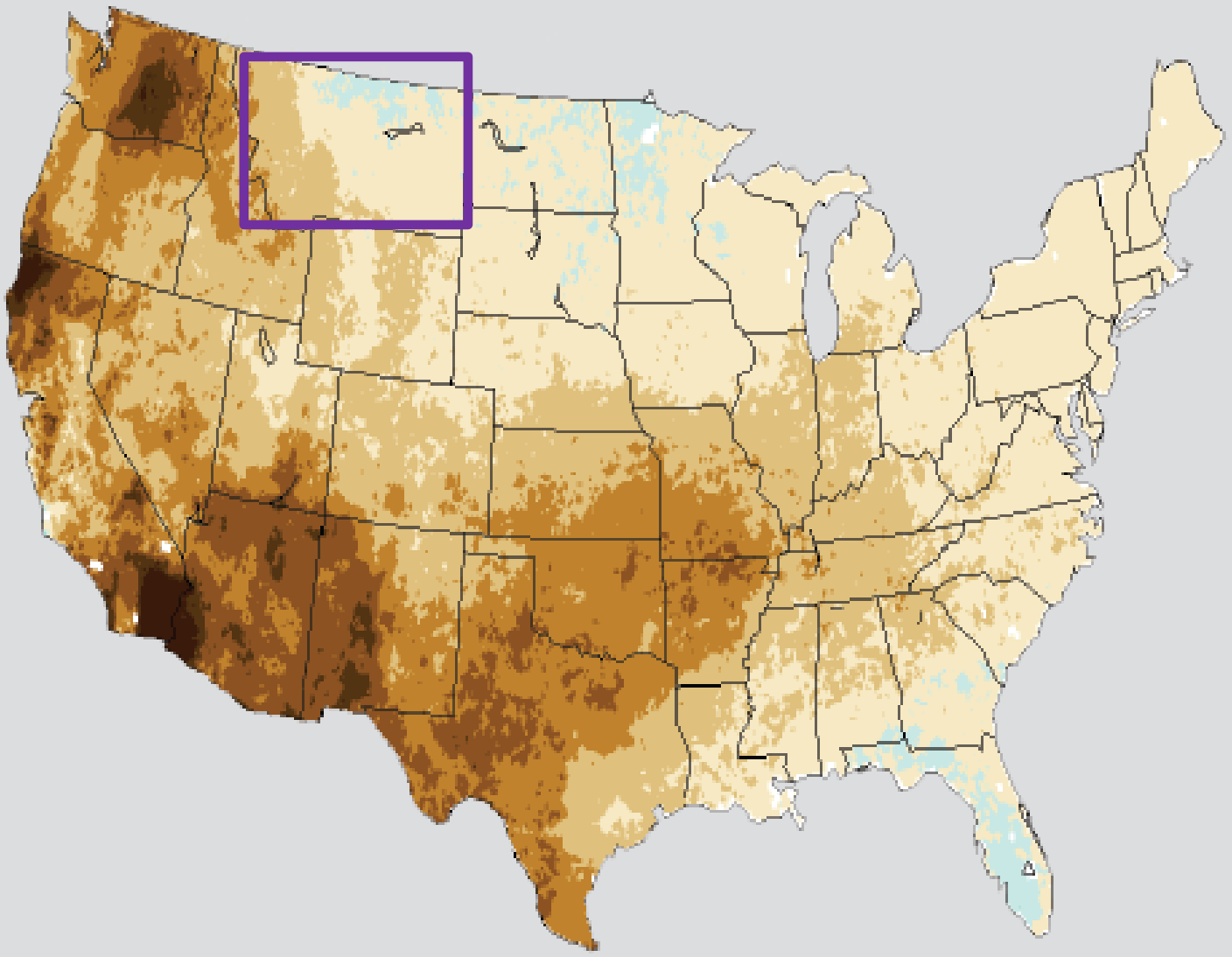
Change in corn acres by county from 2006 to 2012 shows substantial increases in eastern part of Northern Plains (data from USDA, National Agricultural Statistics Service).


0 200
Miles
Cattle and Calves - Change in Inventory: 2007 to 2012
Cattle moving from Southern Plains to Northern Plains
1 Dot = 1,000 Cattle and Calves Increase
1 Dot = 1,000 Cattle and Calves Decrease
0 100
Miles
United States Net Decrease
-6,353,244
0 100
Miles
12-M134
U.S. Department of Agriculture, National Agricultural Statistics Service
2012 Census of Agriculture



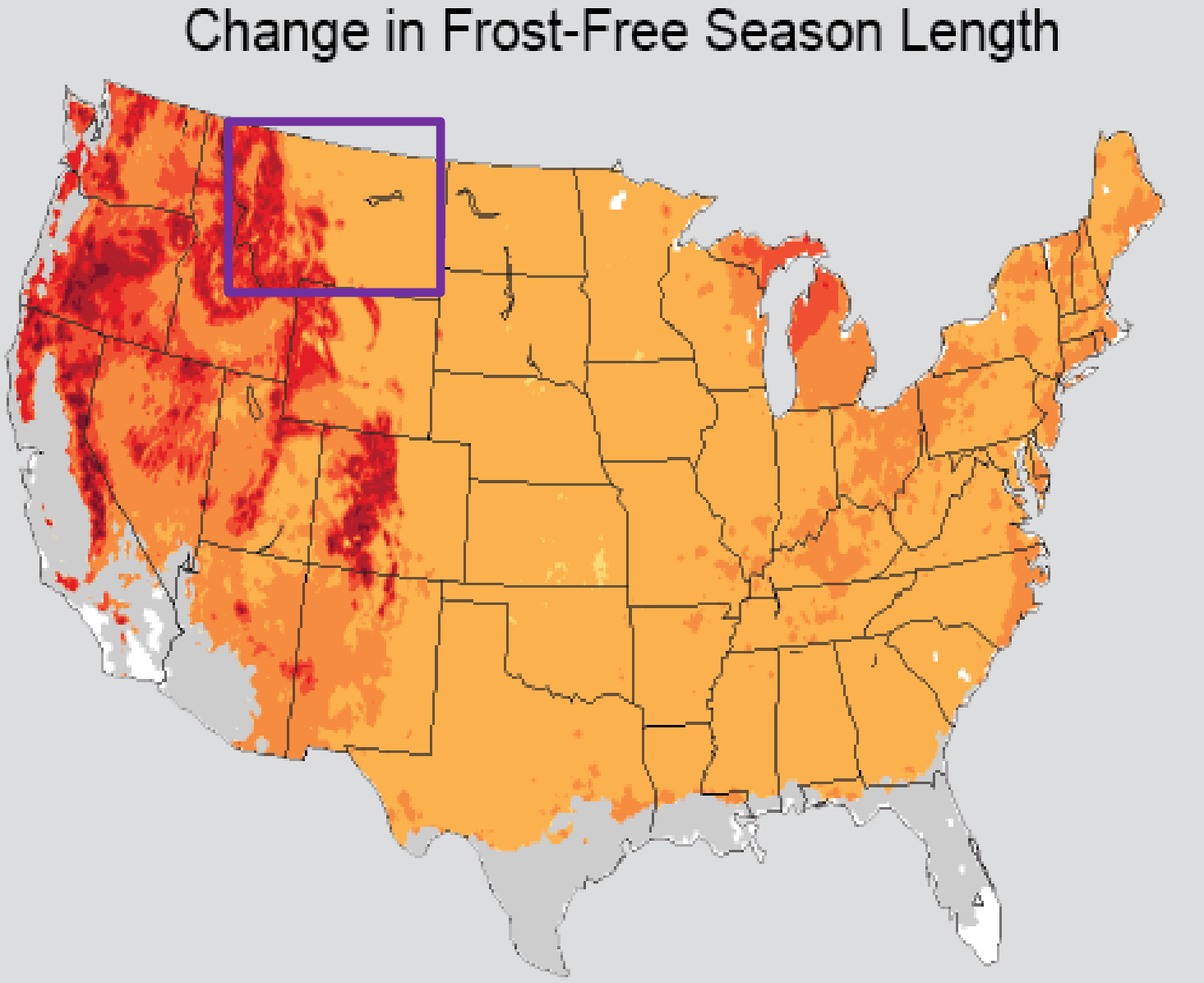
Montana expected to have wetter winters, springs, and falls, and slightly drier summers.

National Climate Assessment 2014



Slight increases in west part, but decreases in northern part of Montana.

National Climate Assessment 2014



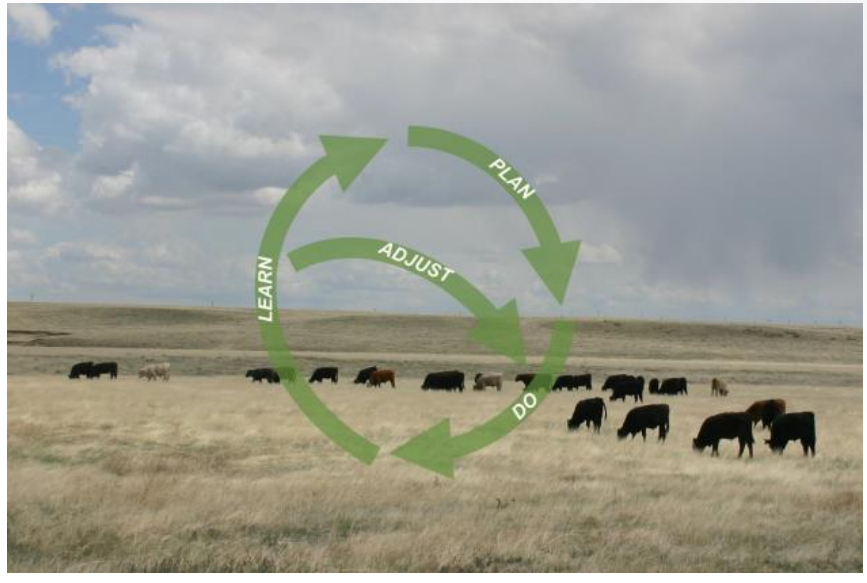
Longer and warmer growing seasons with mountain areas most impacted.

National Climate Assessment 2014

Adaptive Management

- **Enterprise flexibility in**
  - **Crop species, varieties, planting dates, rotations, cover crops, more "crop per drop"**

- **Flexible stocking with *high quality precipitation forecasts* could double economic returns for ranchers**
  - **Torell et al. *2010 Rangeland Ecology and Management* 63:415-425.**



Questions?

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