

unlock the  
**SECRETS**  
IN THE  
**SOIL**

# Imperatives & Opportunities for Enhancing Soil Health

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USDA-NRCS  
Washington, DC



United States Department of Agriculture  
Natural Resources Conservation Service

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## ***SOIL HEALTH:***

***The capacity of a soil to function as a vital, living ecosystem that sustains plants, animals, and humans.***

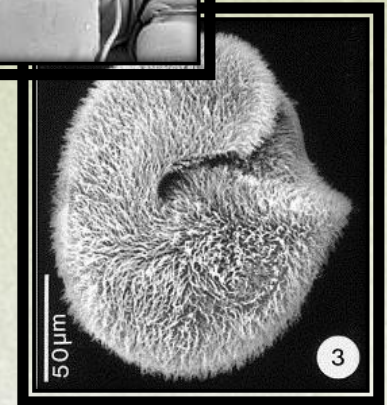
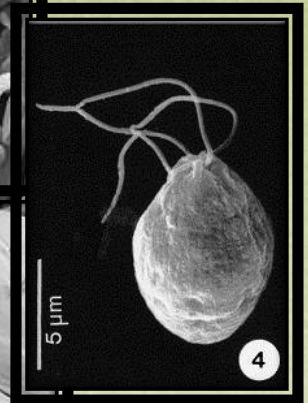
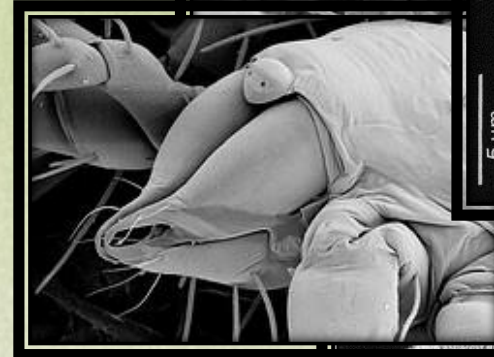
# The Elegant Universe Below...

More microorganisms in a teaspoonful of soil than there are people on earth

Soil microorganisms help:

- Make nutrients available to plants
- Bind soil particles together to increase water infiltration, reduce erosion, and reduce runoff

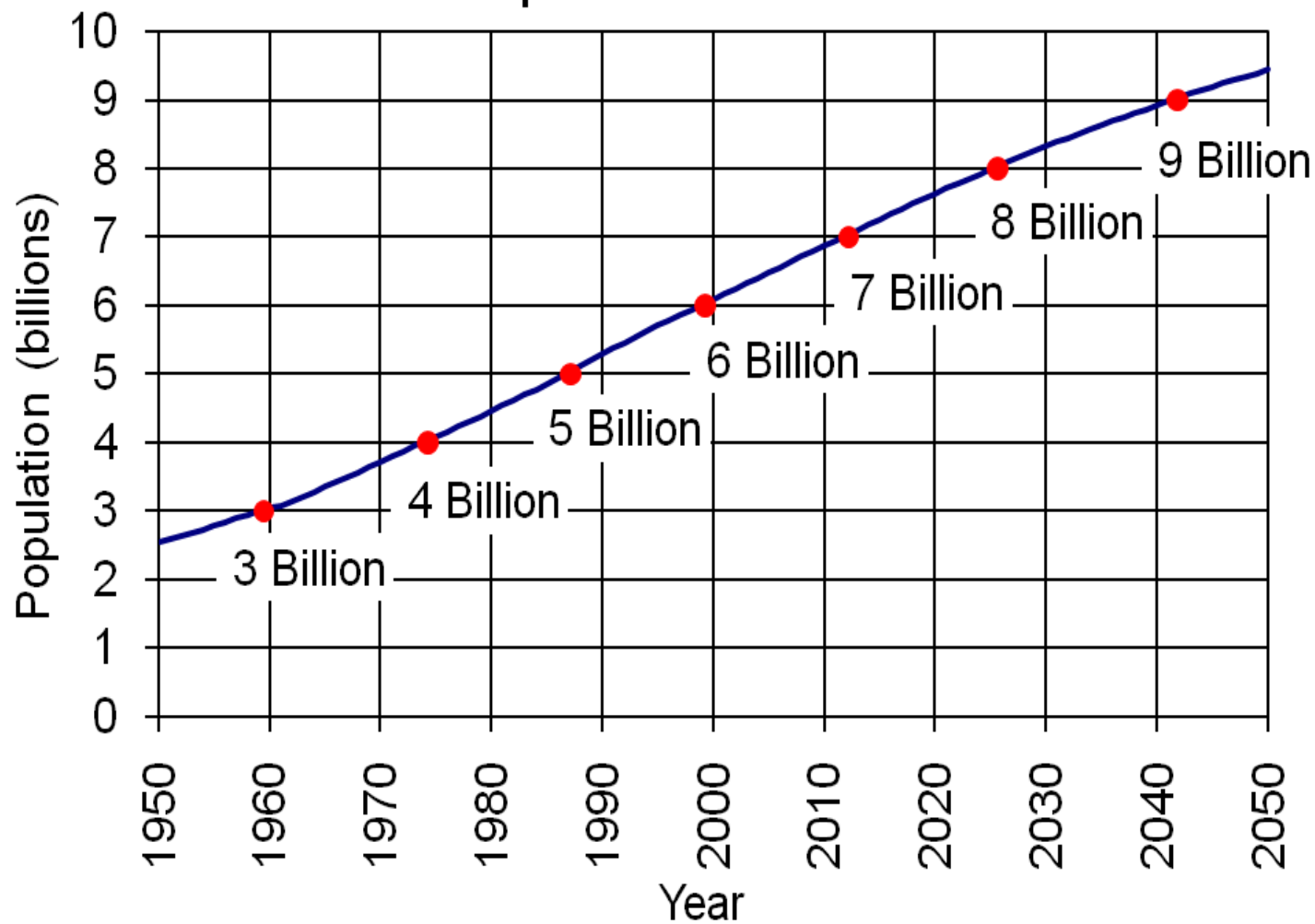
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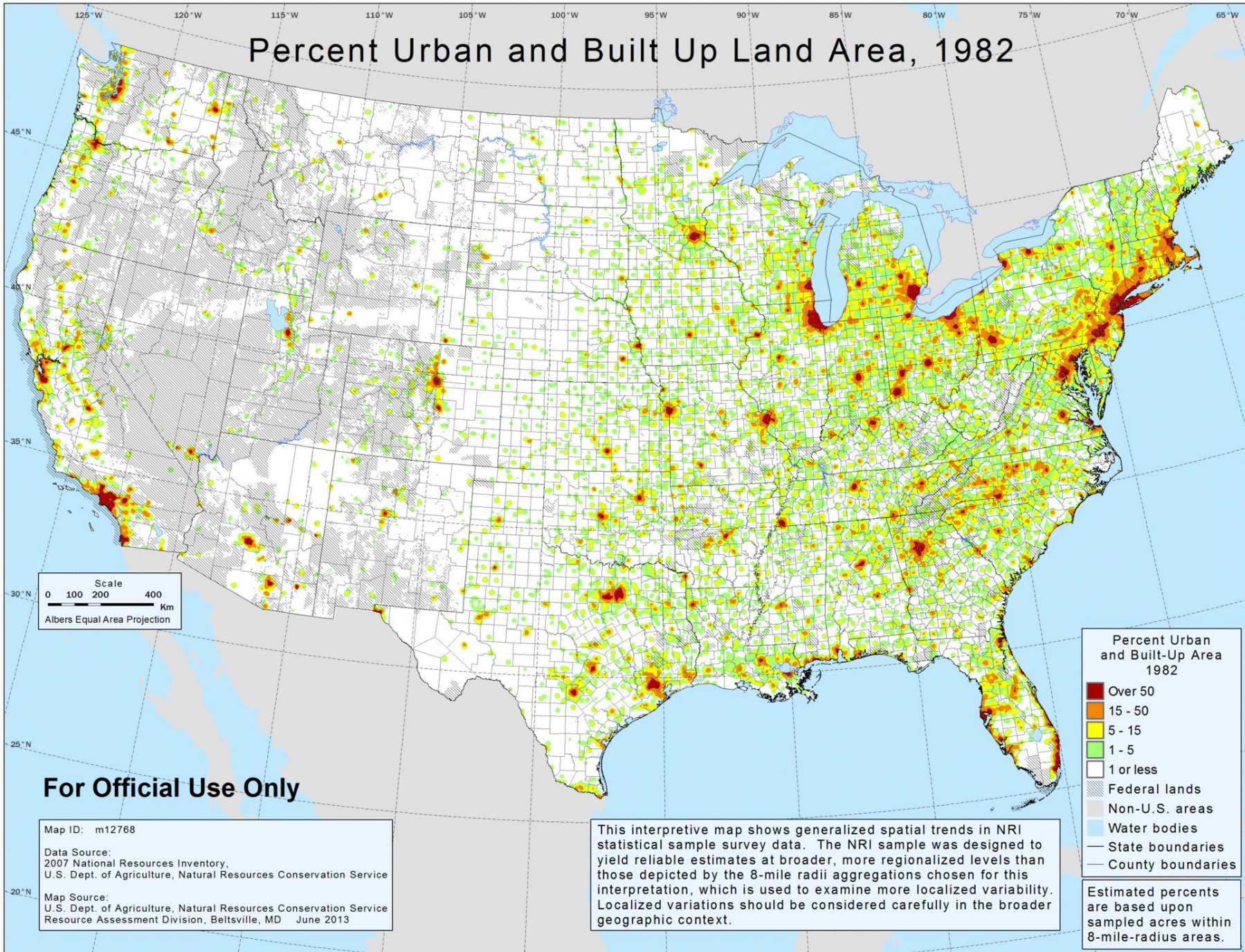
# The Imperatives

## World Population: 1950-2050



Source: U.S. Census Bureau, International Data Base, June 2011 Update.

# Percent Urban and Built Up Land Area, 1982



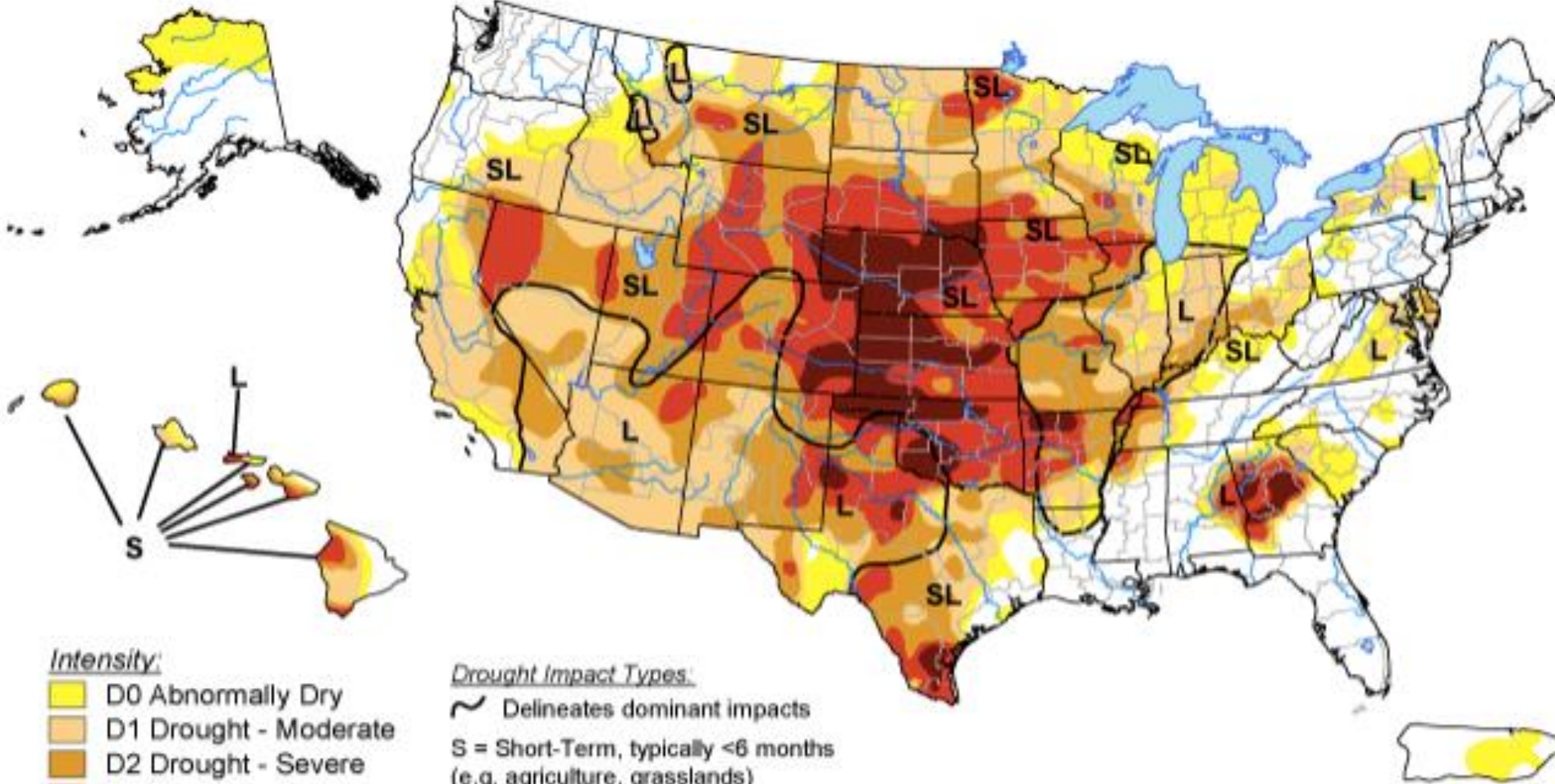
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# U.S. Drought Monitor

September 25, 2012


Valid 7 a.m. EDT



## Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

## Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months (e.g. hydrology, ecology)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu/>



Released Thursday, September 27, 2012

Author: Anthony Artusa, NOAA/NWS/NCEP/CPC

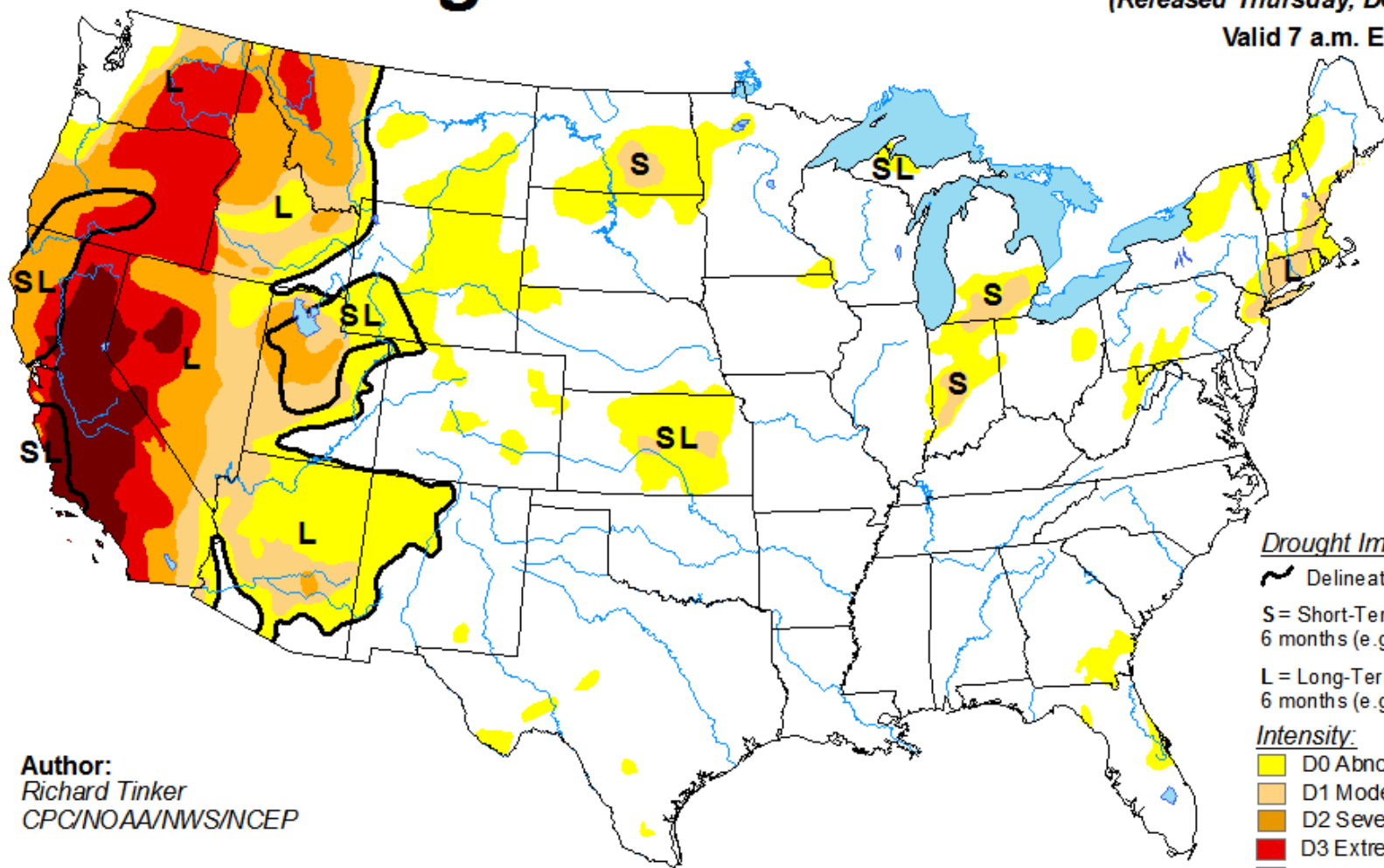


# U.S. Drought Monitor

December 8, 2015


(Released Thursday, Dec. 10, 2015)

Valid 7 a.m. EST








Author:  
Richard Tinker  
CPC/NOAA/NWS/NCEP

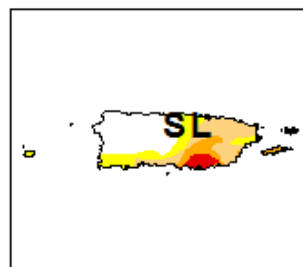
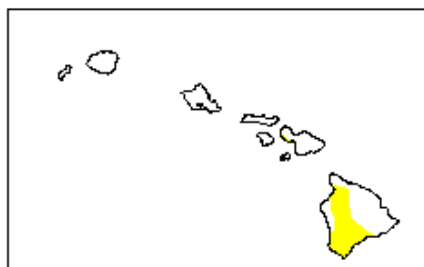
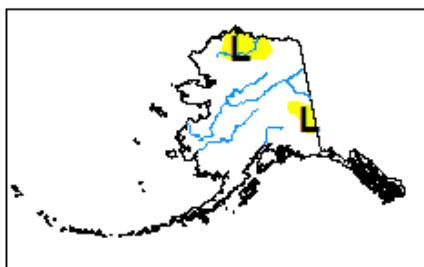
### Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

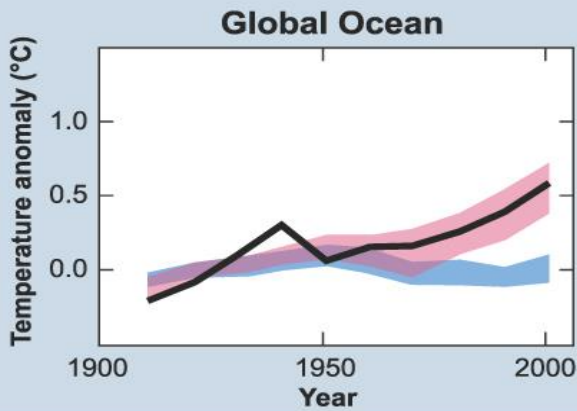
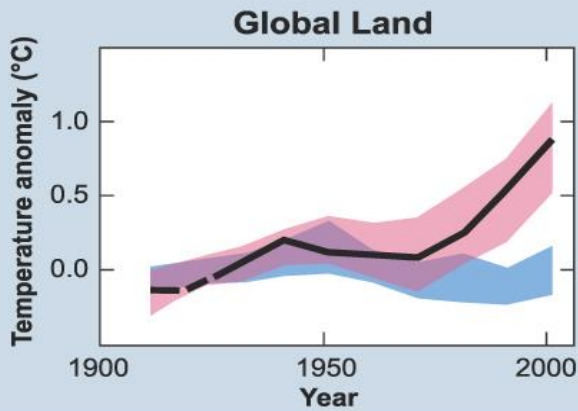
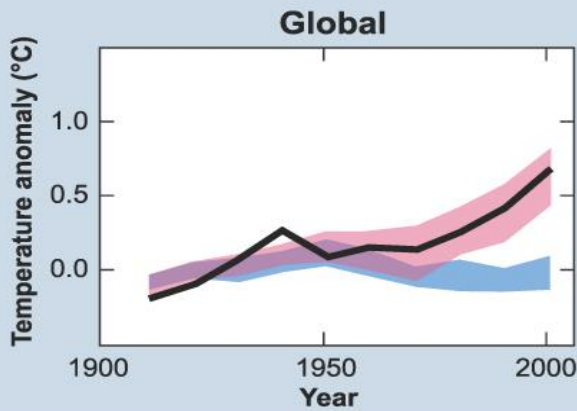
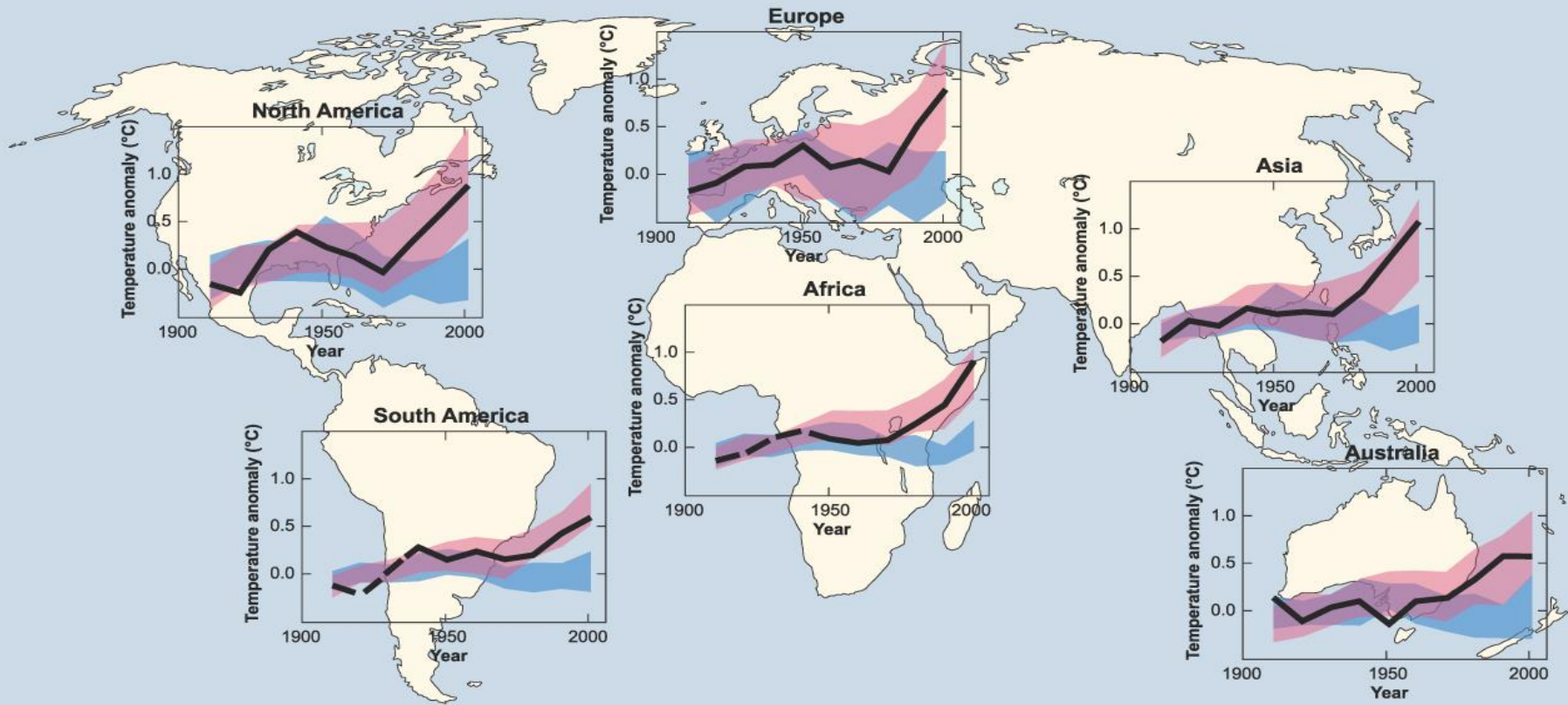
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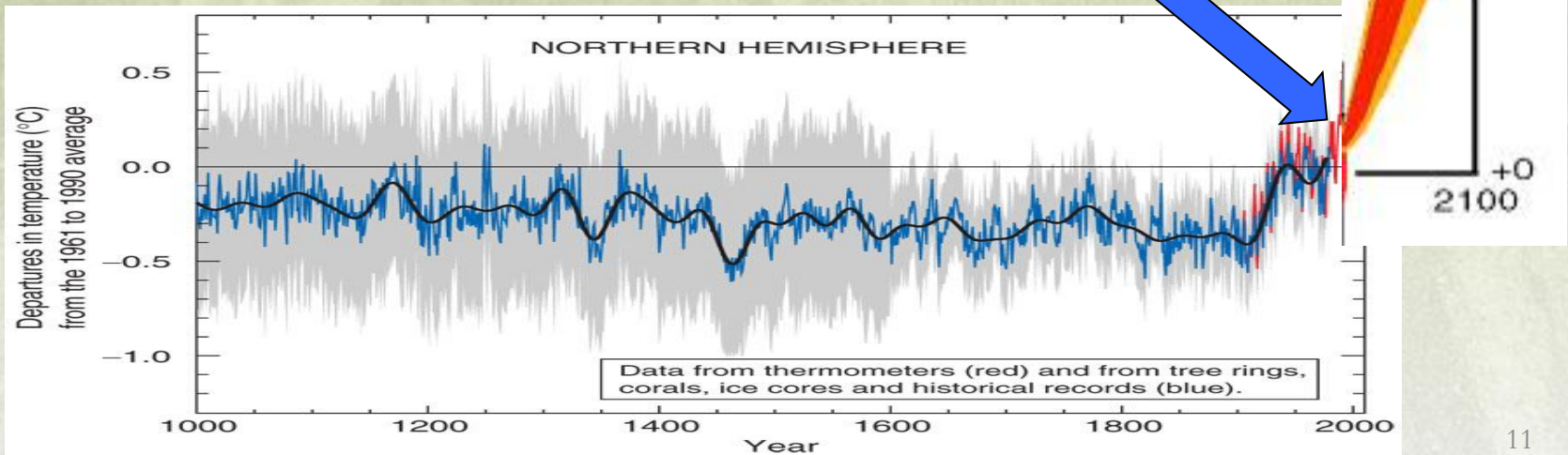
<http://droughtmonitor.unl.edu/>



models using only natural forcings
  observations

IPCC models using both natural and anthropogenic forcings

# Increasing Temperature



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# USDA-NRCS

## National Soil Health Campaign



# BEHOLD OUR *living* SOIL

*Healthy soil* is teeming with life.

And that life provides nearly everything we need to survive. That's why USDA's Natural Resources Conservation Service is working with America's farmers and ranchers to keep it *healthy* and *functioning—for life*.

Visit [www.nrcs.usda.gov](http://www.nrcs.usda.gov) to learn more.

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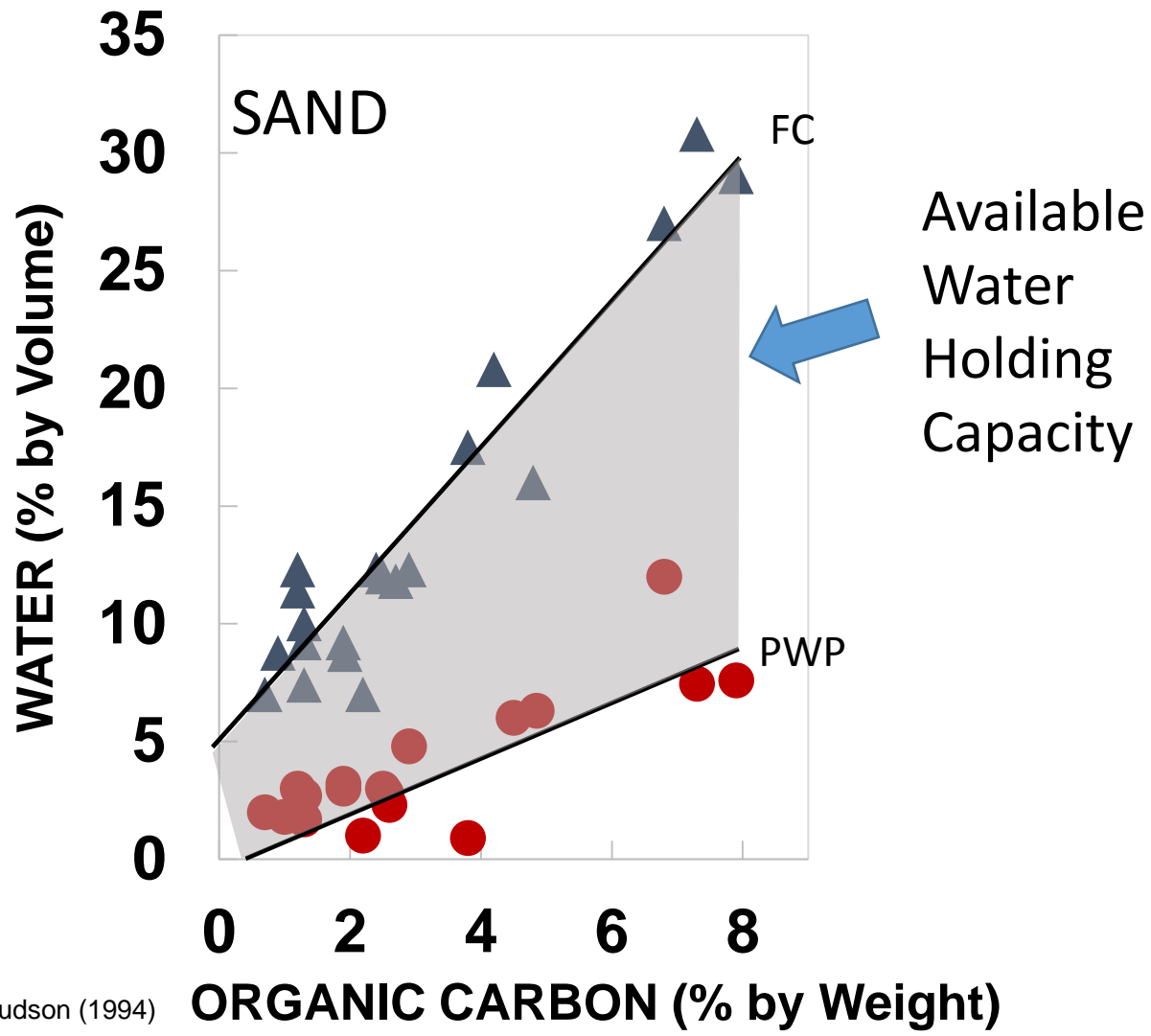


# The Opportunities



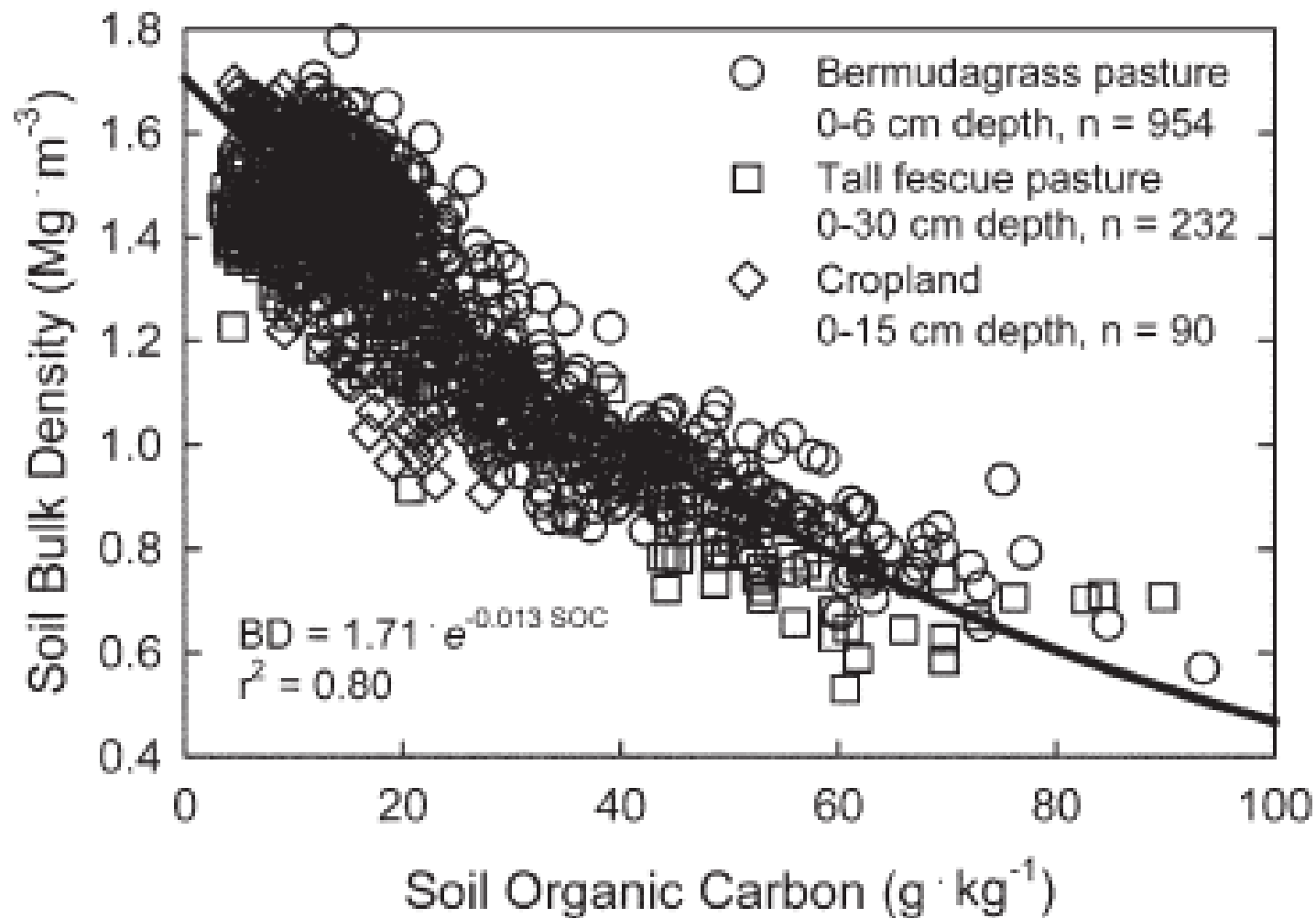
# The Opportunities

- Research



Adapted from Hudson (1994)





Georgia studies – Typic Kanhapludults.  
Franzluebbers (2010) SSSAJ 74:347–357





# South Dakota

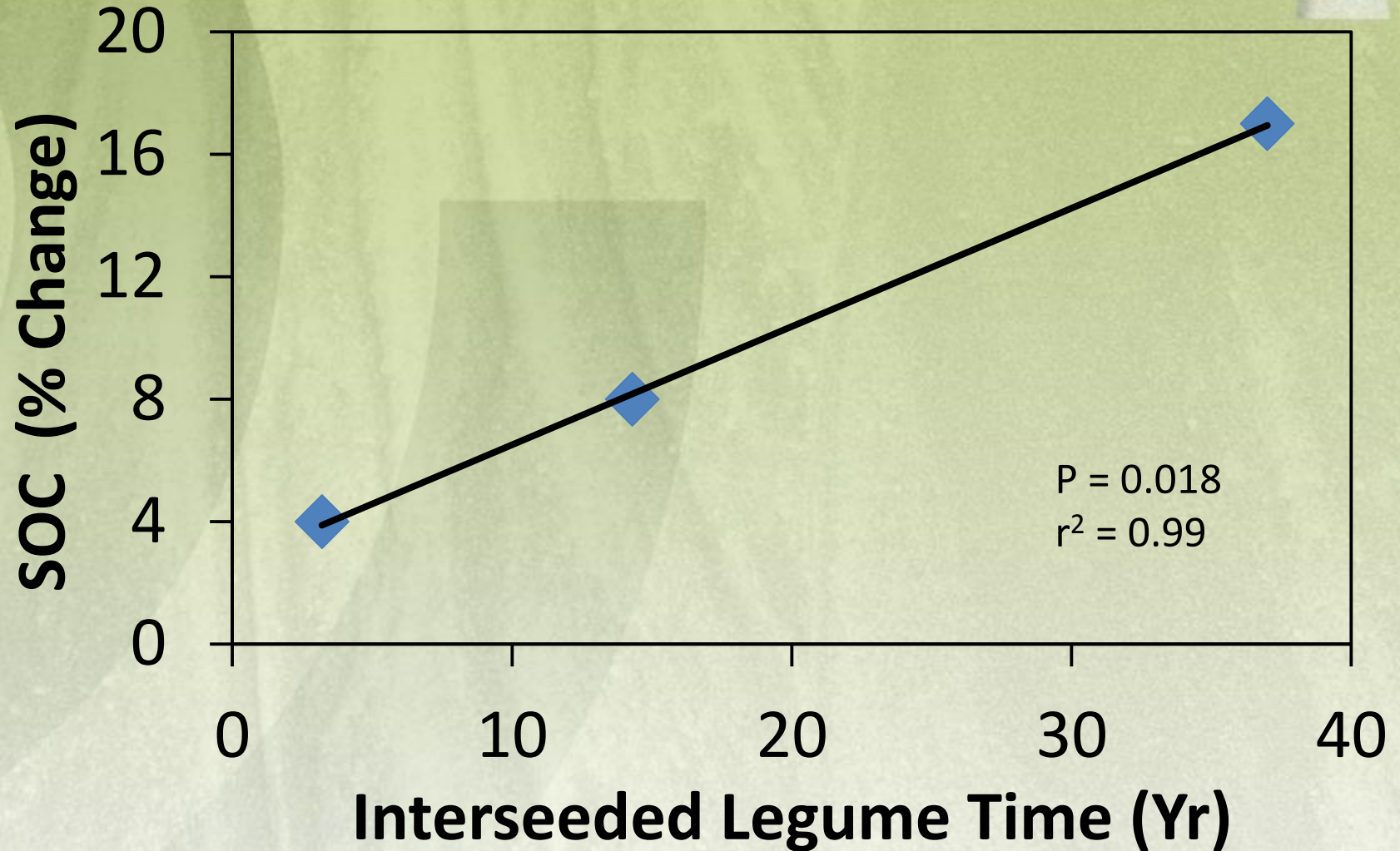
Continuous Grazing      Rotational Grazing

# Northern Mixed Grass Prairie Cheyenne, WY; 1982-2003



Treatment	Soil C, 0-5 cm (Mg/ha)	Soil N, 0-5 cm (Mg/ha)
Exclosure	10.8 b	0.94 b
Light Grazing	13.8 a	1.23 a
Heavy Grazing	10.9 b	0.94 b

# South Dakota, Mixed-grass Rangeland Yellow-flowering Alfalfa, 0-100 cm





# The Opportunities

- Research
- Farmers & Ranchers

















# What We Heard

- “All ranchers need to make a living, but beyond that, every ranch management is different!”
- “It’s an art. We are a week away from drought.”
- “You talk about soil health, but what we need is water!”



# What We Observed

- Adaptive Grazing Management
- Grass banking and rest
- Managing distribution of livestock
- Adjusting herd size based on rainfall



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- Adaptive Grazing Management
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***ALL THESE INFLUENCE SOIL CARBON!***



# The Opportunities

- Research
- Farmers & Ranchers
- Partnerships



# Farm Foundation Noble Foundation



Economics



Research



Education



Measurement





**National Corn Growers,  
Walton Foundation, Monsanto,  
TNC, EDF, NRCS, ARS, Universities**



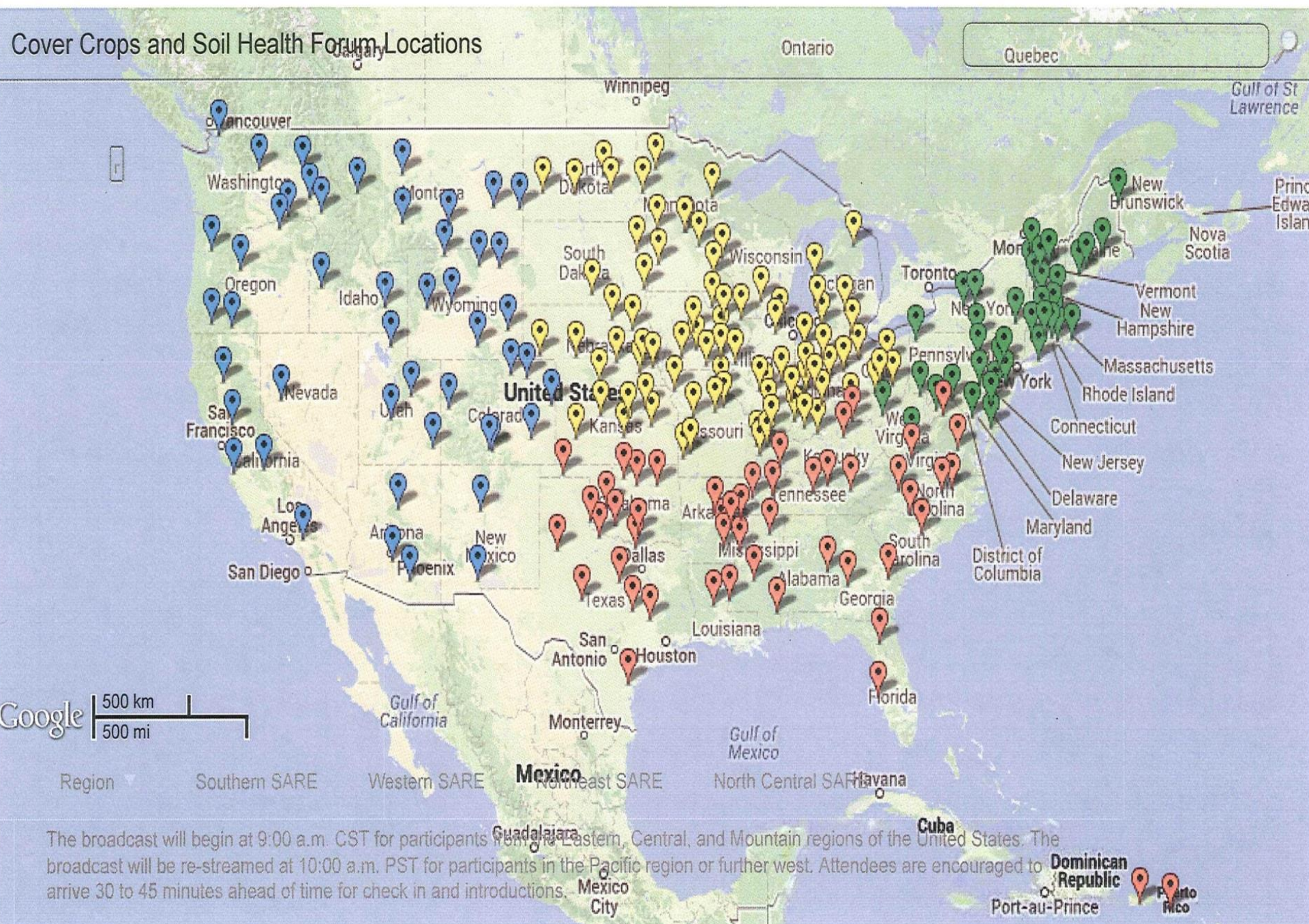
Sustainable Agriculture  
Research & Education



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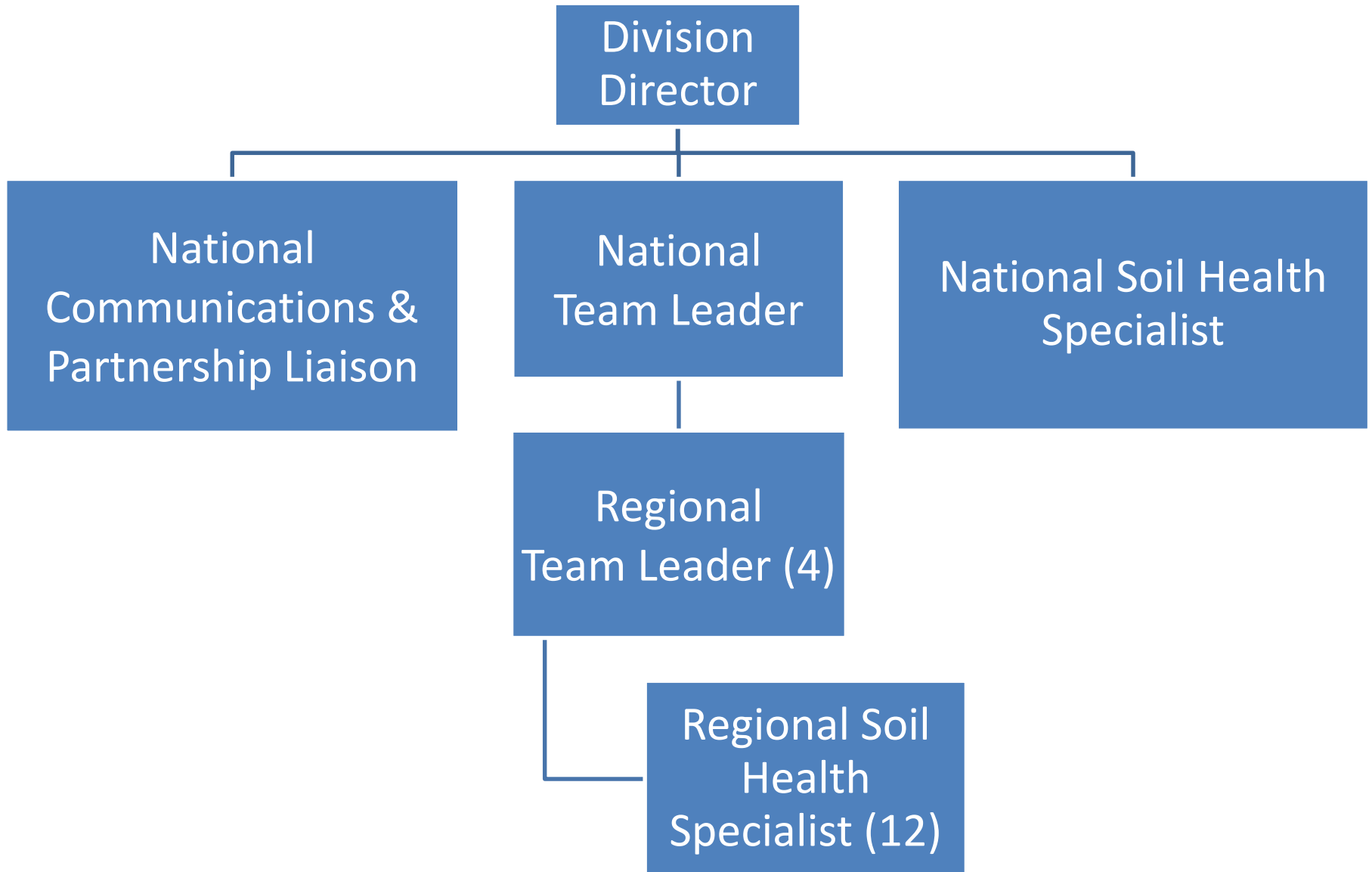
# Cover Crops and Soil Health Forum Locations



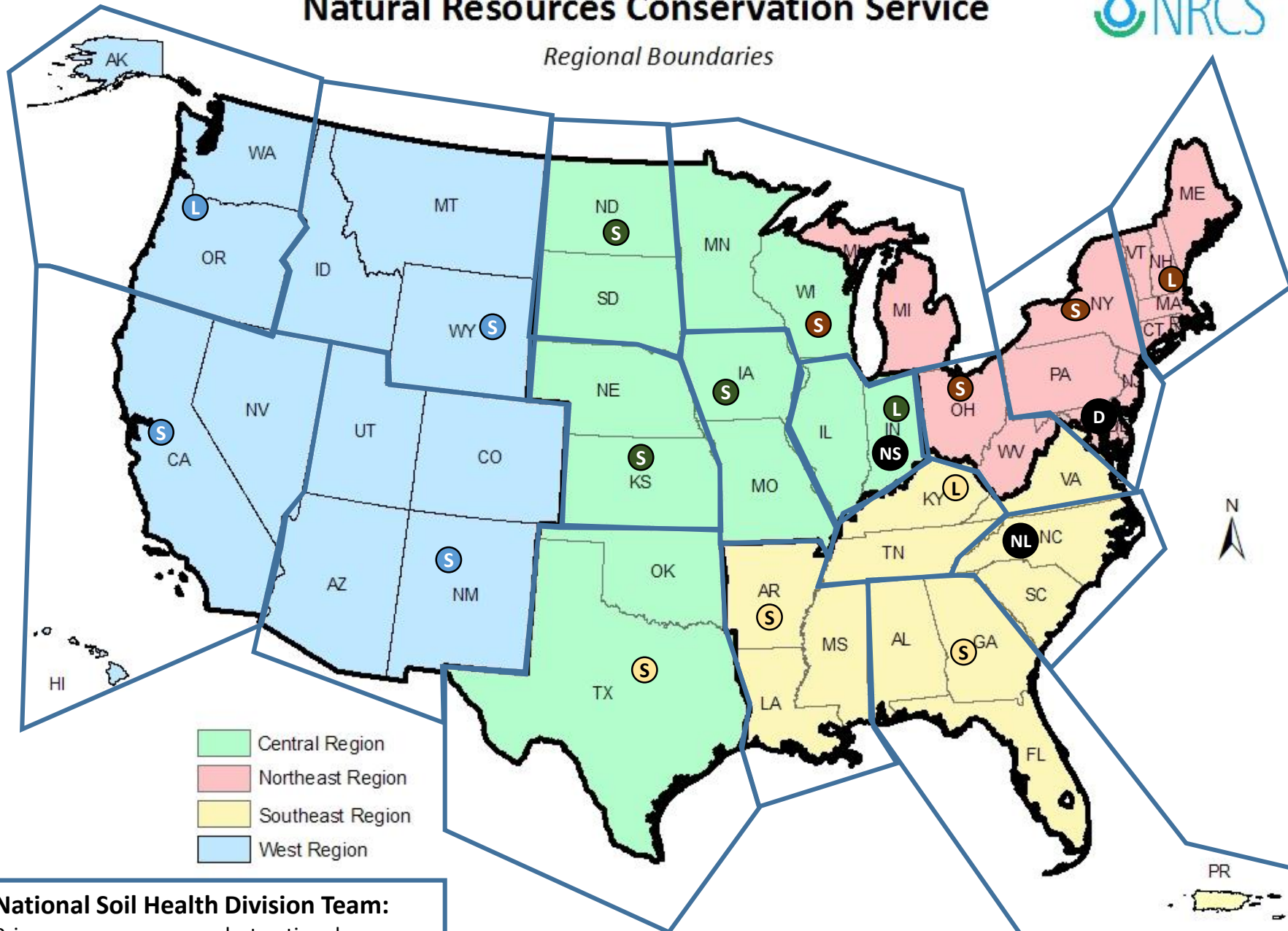
The broadcast will begin at 9:00 a.m. CST for participants from the Eastern, Central, and Mountain regions of the United States. The broadcast will be re-streamed at 10:00 a.m. PST for participants in the Pacific region or further west. Attendees are encouraged to arrive 30 to 45 minutes ahead of time for check in and introductions.

Dominican Republic  
Port-au-Prince  
P.R. Rico

# USDA-NRCS Soil Health Division



## Regional Boundaries



**National Soil Health Division Team:**  
Primary coverage areas, but national scope, responsibility, and collaboration



