



United States Department of Agriculture

Lessons Learned Southern Plains Cover Crops and Soil Health



Our Farms, Our Future – SARE Conference
April 2018 | Jodie Reisner – State Conservation Agronomist
Temple Texas

Natural
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Conservation
Service

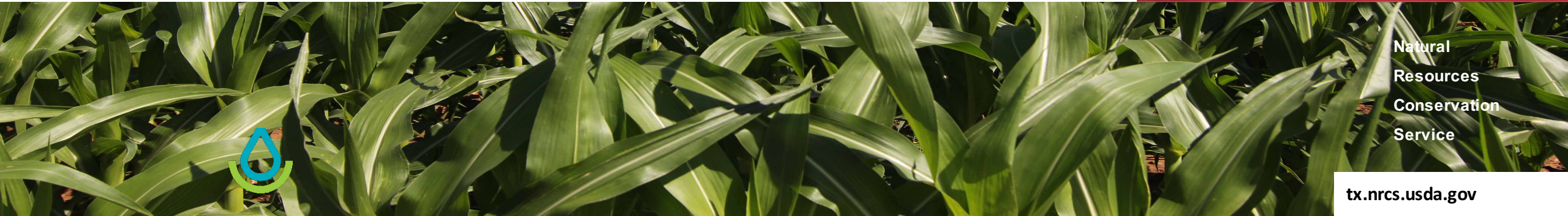
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Objectives

- Location of Southern Plains
- Climatic & Soil Conditions
- Cropping Systems
- Cover Crop & Soil Health Research
- Opportunities & Successes
- Challenges
- The Culture of Agriculture



Photo: Jodie Reisner



Location of Southern Plains

- USDA Climate Hubs
- National Agriculture Statistics Service (NASS) OK & TX



Source: USDA Climate Hubs



Climatic Conditions

Precipitation

- Typical rainfall range <10 to >55 inches.
- Arid in the West to Subtropical Humid in the Southeast and South.
- Evaporation exceeds precipitation in most of the state.

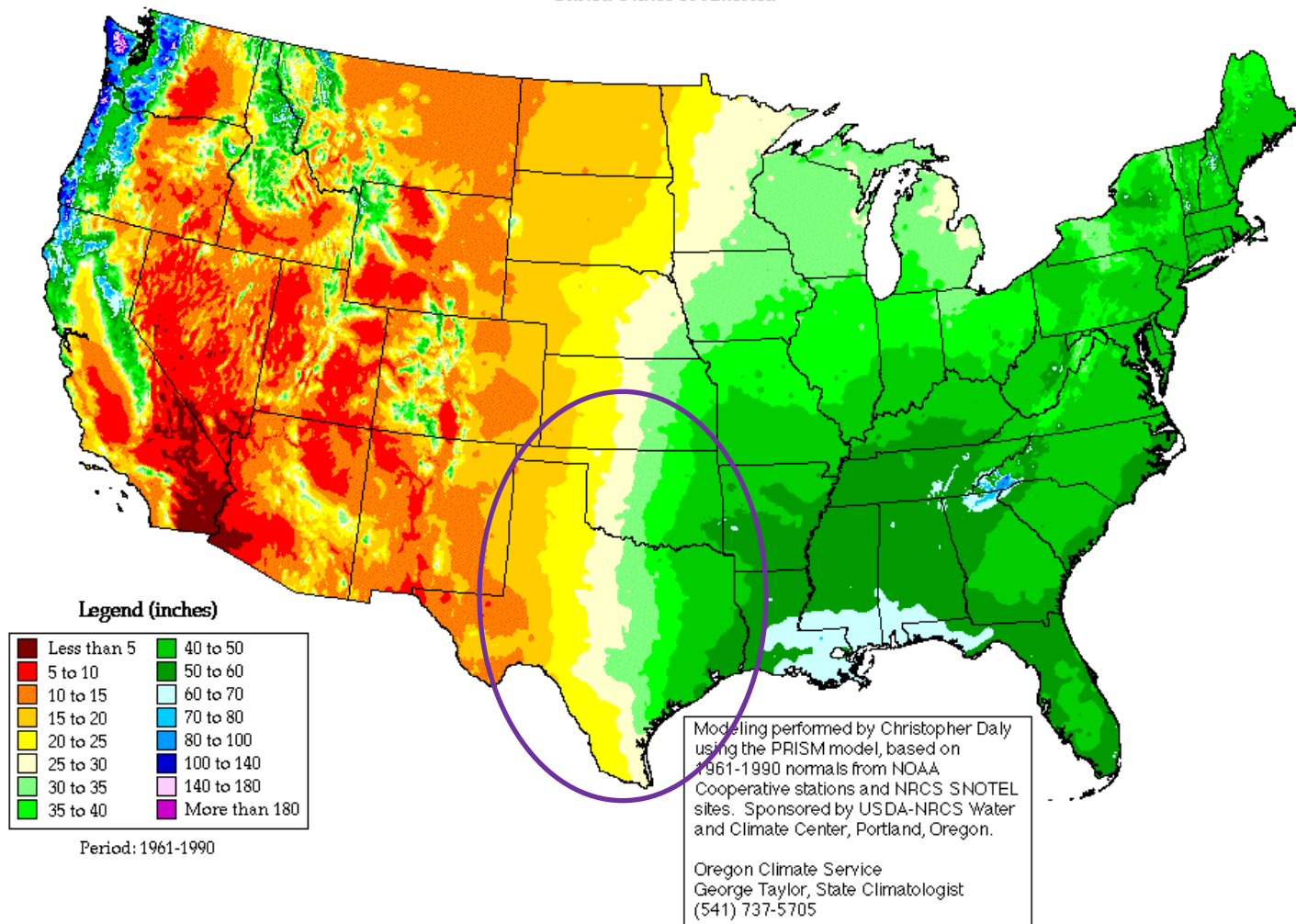
Irrigated Farms
Dryland Farming



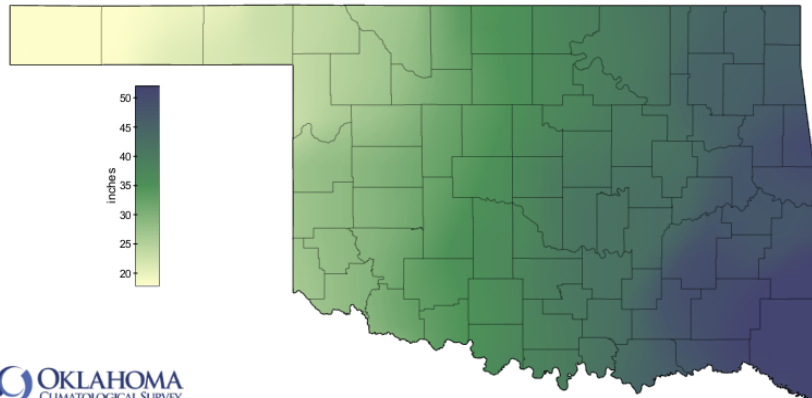
Source: NOAA

Annual Average Precipitation

United States of America

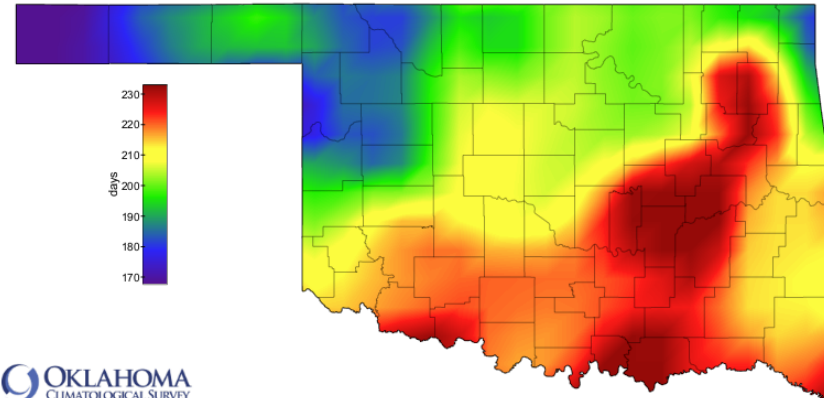


Oklahoma Conditions



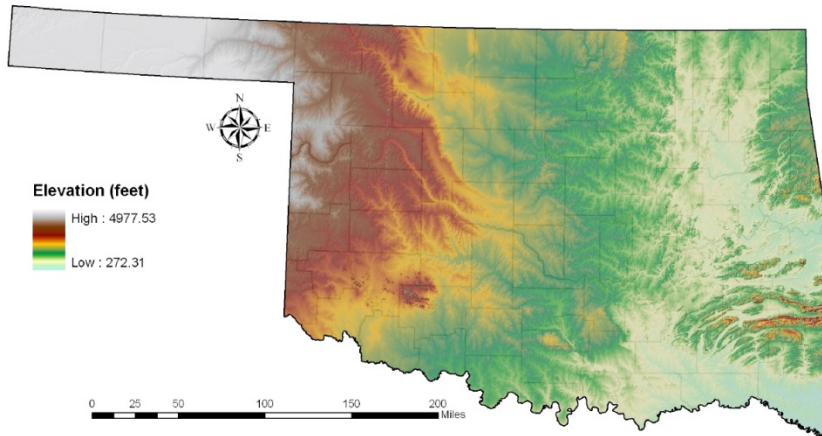
OKLAHOMA CLIMATOLOGICAL SURVEY
Normal Annual Precipitation
1981-2010

Calculated using normal data provided by NCDC. Created 4:59:26 PM July 26, 2011 CDT. © Copyright 2011

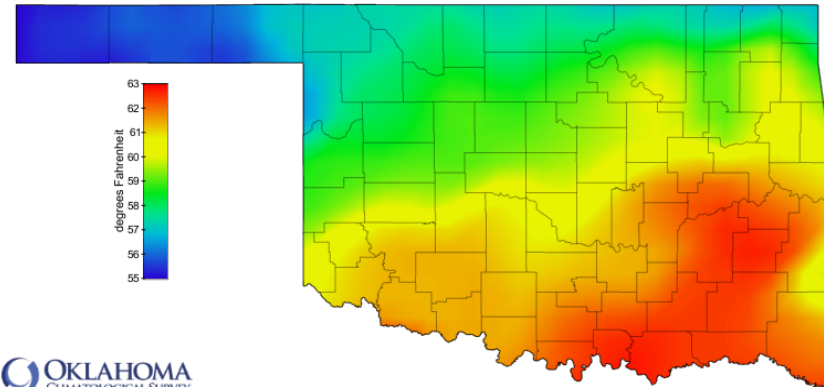


OKLAHOMA CLIMATOLOGICAL SURVEY
Average Length of Growing Season
1981-2010

Calculated using data archived at OCS. Created 3:48:35 PM September 27, 2012 CDT. © Copyright 2012



Elevation (feet)
High : 4977.53
Low : 272.31



OKLAHOMA CLIMATOLOGICAL SURVEY
Normal Annual Temperature
1981-2010

Calculated using normal data provided by NCDC. Created 4:59:25 PM July 26, 2011 CDT. © Copyright 2011



Source: Oklahoma Climatological Survey

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Climatic Conditions

Temperature

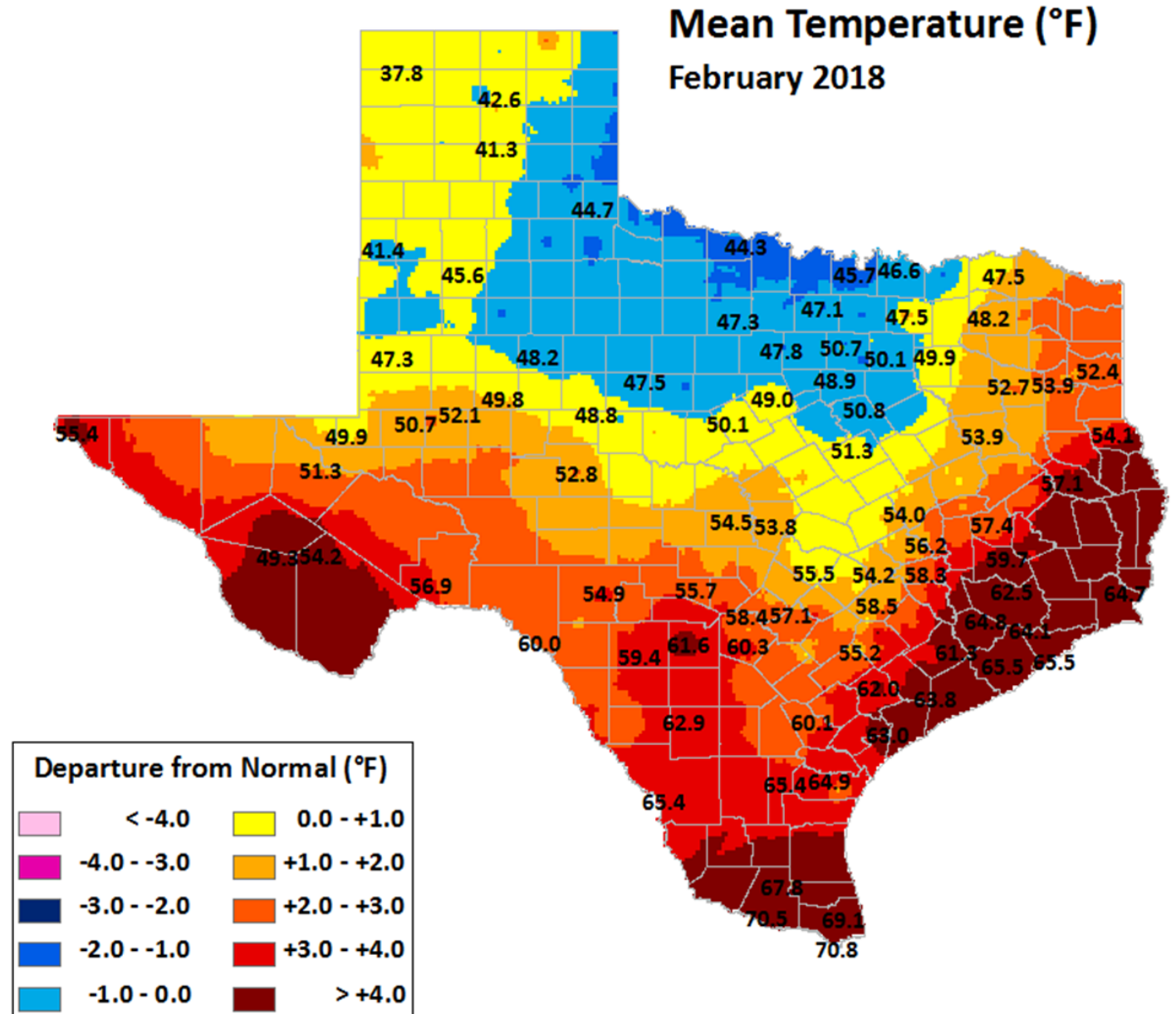
- Varies widely each month or on a weekly basis.
- Growing season length can vary from 175 days to 365 days.

Snow, freezing rain, to tropical conditions in south Texas.

Currently: Wildfires in the Panhandle

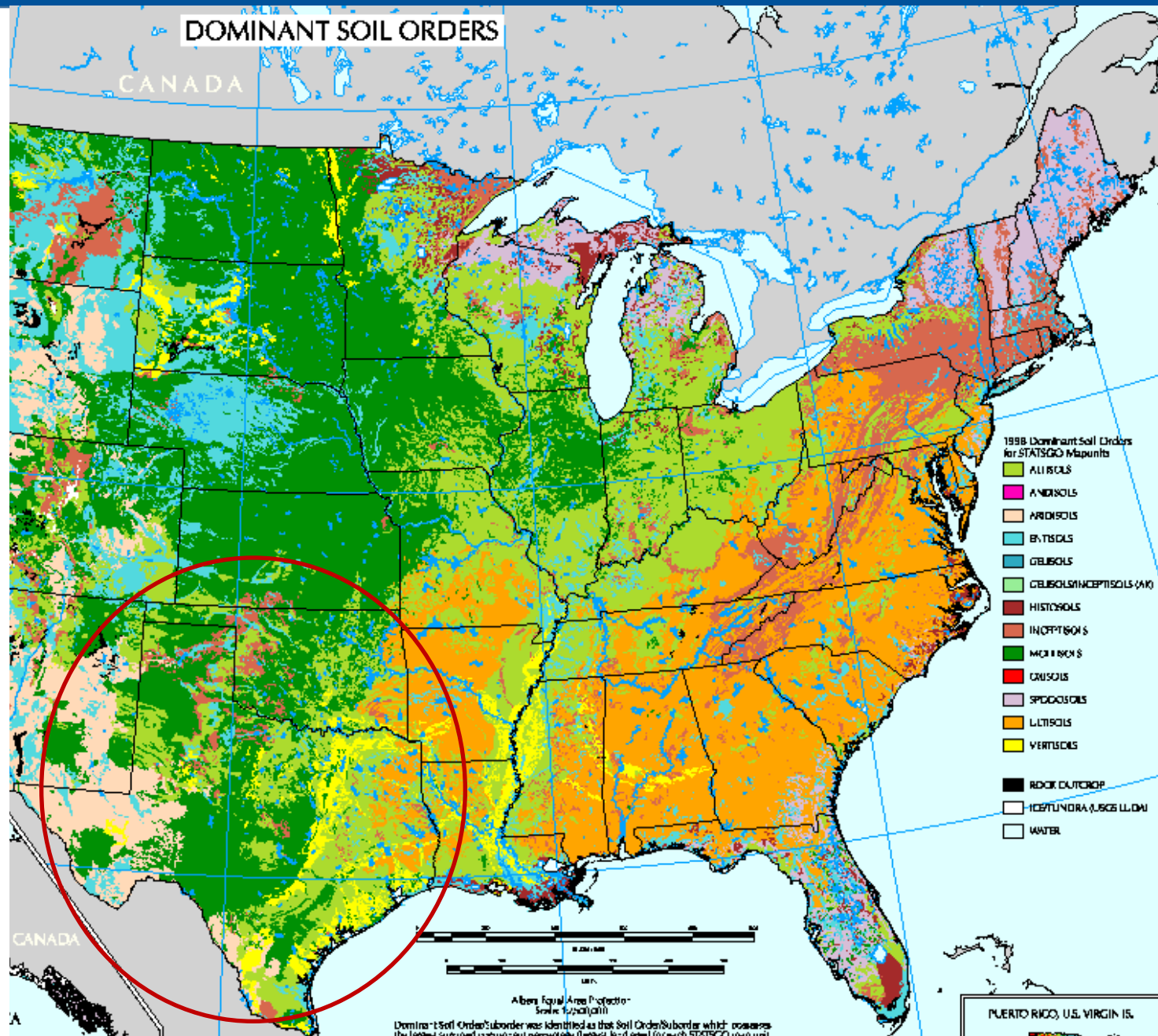


Source: Texas A&M



Soil Conditions

- Mollisols
- Vertisols
- Ultisols
- Alfisols
- Aridisols



Source: USDA-NRCS

Soil Conditions

Southern High Plains

- Clayey, loamy, to sandy
- Calcareous subsoils
- Oklahoma typically has ultisols in the east, alfisols and mollisols in the center, and inceptisols in the west.



Source: USDA-NRCS

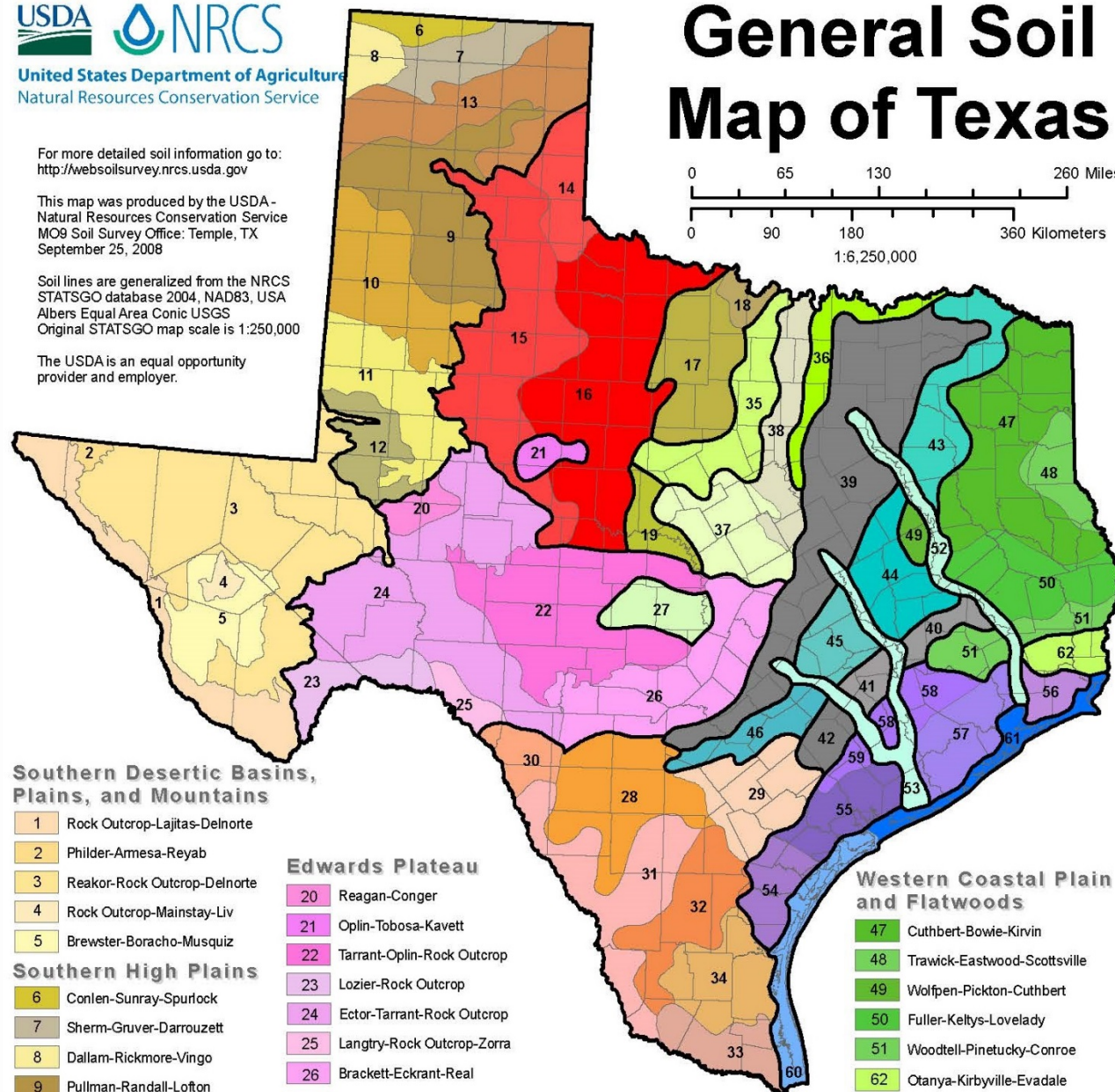
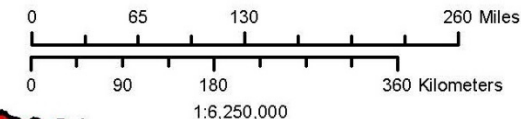
For more detailed soil information go to:
<http://websoilsurvey.nrcs.usda.gov>

This map was produced by the USDA -
Natural Resources Conservation Service
MO9 Soil Survey Office: Temple, TX
September 25, 2008

Soil lines are generalized from the NRCS
STATSGO database 2004, NAD83, USA
Albers Equal Area Conic USGS
Original STATSGO map scale is 1:250,000

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General Soil Map of Texas



Southern Desertic Basins, Plains, and Mountains

- 1 Rock Outcrop-Lajitas-Delnorte
- 2 Philder-Amesa-Reyab
- 3 Reakor-Rock Outcrop-Delnorte
- 4 Rock Outcrop-Mainstay-Liv
- 5 Brewster-Boracho-Musquiz

Southern High Plains

- 6 Conlen-Sunray-Spurlock
- 7 Sherm-Gruver-Darrouzett
- 8 Dallam-Rickmore-Vingo
- 9 Pullman-Randall-Lofton

Edwards Plateau

- 20 Reagan-Conger
- 21 Oplin-Tobosa-Kavett
- 22 Tarrant-Oplin-Rock Outcrop
- 23 Lozier-Rock Outcrop
- 24 Ector-Tarrant-Rock Outcrop
- 25 Langtry-Rock Outcrop-Zorra
- 26 Brackett-Eckrant-Real

Western Coastal Plain and Flatwoods

- 47 Cuthbert-Bowie-Kirvin
- 48 Trawick-Eastwood-Scottsville
- 49 Wolfpen-Pickton-Cuthbert
- 50 Fuller-Kelty-Lovelady
- 51 Woodtell-Pinetucky-Conroe
- 62 Otanya-Kirbyville-Evadale

Cropping Systems

Row Crops – cotton, corn, wheat, sorghum, rice, soybeans, canola, peanuts, oats.

Native Rangeland
Introduced Pastures

Oklahoma – Wichita Mountains in SW
Ouachita Mountain in SE



Cover Crops in
Bermuda Pasture



Cover Crop Research

Oklahoma – Oklahoma State University

Jason Warren, Adam Cobb, Noble Research Institute

Texas

- Lubbock – Dr. Katie Lewis
- Vernon – Dr. Paul DeLaune
- Subtropical Soil Health Initiative
- Stiles Farm – TAMU
- NRCS Plant Material Centers
- Prairie View A&M
- Tarleton Farms

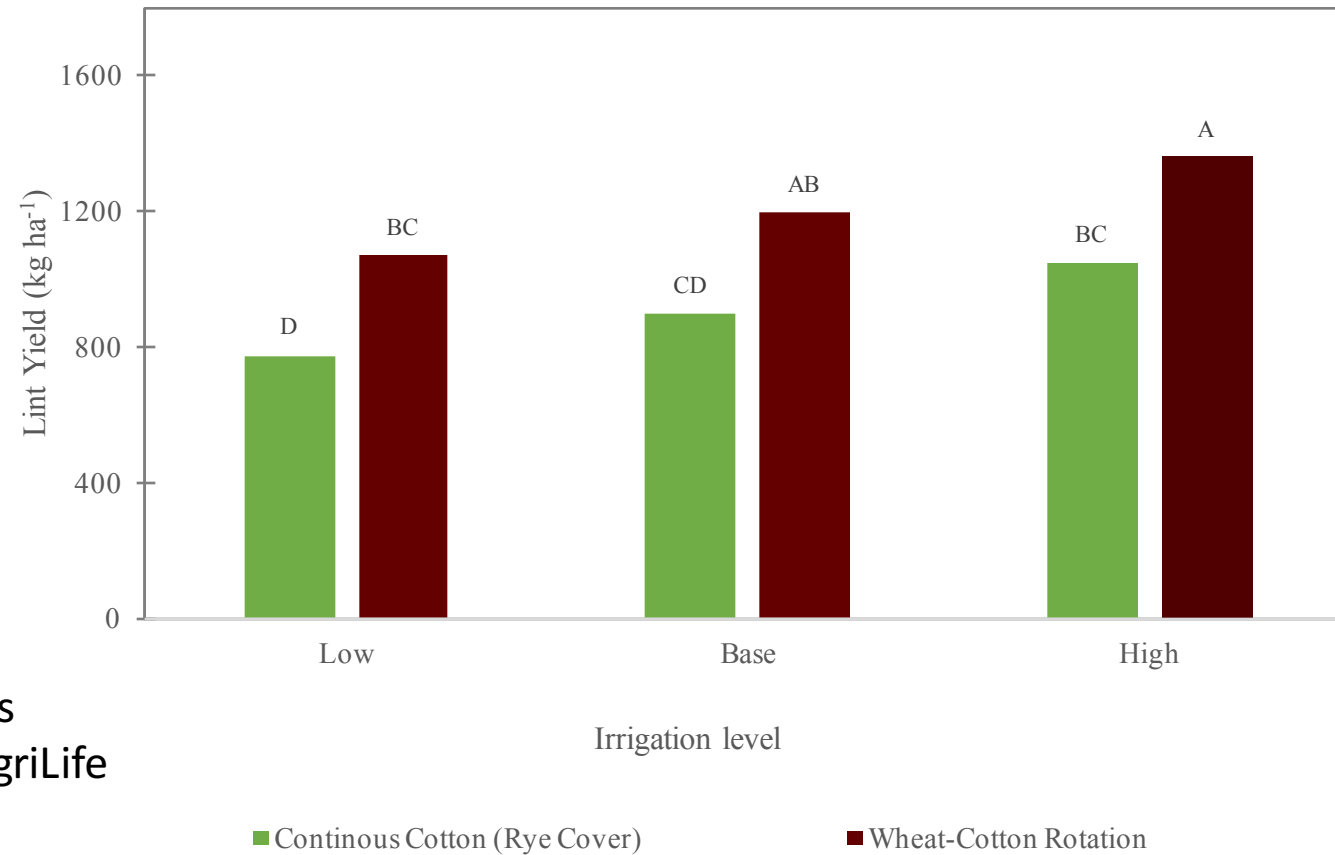


Cover Crops after Cotton in Brazo Bottomlands



Cotton Lint Yield

Combined years, 2014 – 2016



Slide Credit: Katie Lewis
Wayne Keeling Texas AgriLife

Summary

- **Rotation vs. continuous cotton with rye cover**
 - Cotton/wheat rotation has consistently increased lint yields compared to continuous cotton with rye cover
 - Pathogens, water, and nutrients
 - Continuous cotton with rye cover has increased SOC more so than rotation - unlike yield response

Slide Credit: Katie Lewis
Wayne Keeling Texas AgriLife



**Soil health promoting practices
need to be regionally focused**

Successes

Matt Braun – Kiowa County,
Oklahoma

Previous: Dryland no till cotton,
wheat, corn, sorghum, and sesame

Changes: Cover Crops

Results: Improved weed control,
increased infiltration, reduced wind
erosion, improved cotton yield



Wheat Cover between Cotton Crops
Western Oklahoma



Successes

R.N. Hopper – Texas Panhandle

Floyd and Hale Counties

Previous: minimum till/100% cotton,
output of irrigation well dropping, wind
erosion

Changes:

- Corn/Wheat/Cotton
- No Till
- Cover Crops

Results:

- Save Irrigation Water
- Reduction of Wind Erosion



Photos: Brandt Underwood and Jodie Reisner





03.04.2017 18:13

Cotton in Corn Residue
Cover Crop Mix after
Wheat
Wheat Cover Crop after
Corn

Photos:
Brandt Underwood and
Jodie Reisner



03.04.2017 18:28



United States Department of Agriculture

Challenges - Erosion



02.04.2017 23:29

Photos: Jodie Reisner





Challenges

- Wind Erosion
- Water Quantity and Quality
- Fragile Soils



Challenges - Pests - Social

Wild Hogs

Voles

Farmers need a peer to peer network
Economic and Social Risk



Challenges - Culture of Agriculture



- Graze out wheat
- Sand fighter
- Fallow in rotations
- Monocultures – low residue crops
- Perseverance





07/21/2016



07/21/2016

Photo: Caleb Stone - OK

Tips for Success

- Set goals with the farmer
- Start with a single farm or small acreage
- Talk about realistic expectations and timeframes - commitment
- Think SYSTEM – Implement as a SYSTEM
 - Rotation, timing, tillage, cover crops, animals
- Know your environment – farmers who are successful know their environment and work it out.



Photos: Jodie Reisner

Soil Health Management Principles

1. Minimize Disturbance
2. Maximize Soil Cover
3. Maximize Biodiversity
4. Maximize presence of living roots
5. Integrate Livestock when possible



Photos: Jodie Reisner

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