Soil Health for Climate Resiliency & Mitigation

Jennifer M. Moore, Ph.D.

Research Soil Scientist

USDA-ARS, Corvallis, OR

Oregon House Energy and Environment Informational

Virtual Meeting

5/26/2021

Goals of Presentation

- Climate change threats to Oregon agriculture
- Importance of agricultural soil management to help support climate goals
- Practices to support carbon drawdown and GHG emission reductions
- Importance of soil health for climate resiliency and environmental services beyond carbon

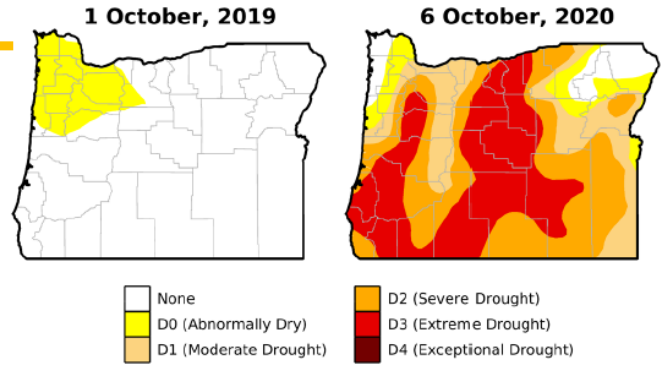
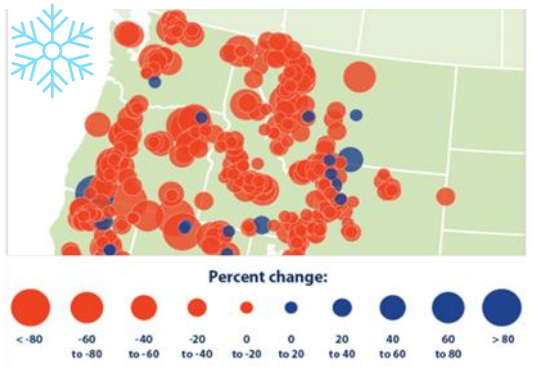


Figure from the Fifth Oregon Climate Assessment, 2021

https://phys.org/news/2018-10-sierra-nevada-snowmelt-runoff-threaten.html



Trends in April Snowpack in the Western United States, 1955–2020 (EPA)

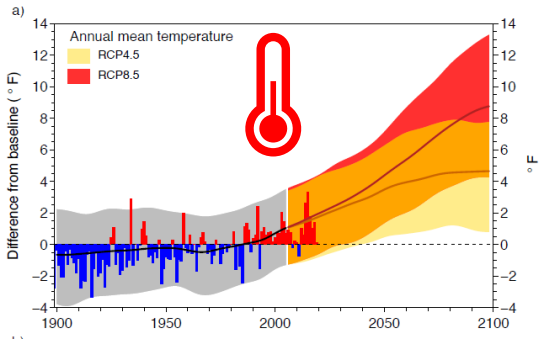


Figure from the Fifth Oregon Climate Assessment, 2021

https://www.statesmanjournal.com/story/news/2020/10/30/climate-change-oregon-wildfires-2020/6056170002/

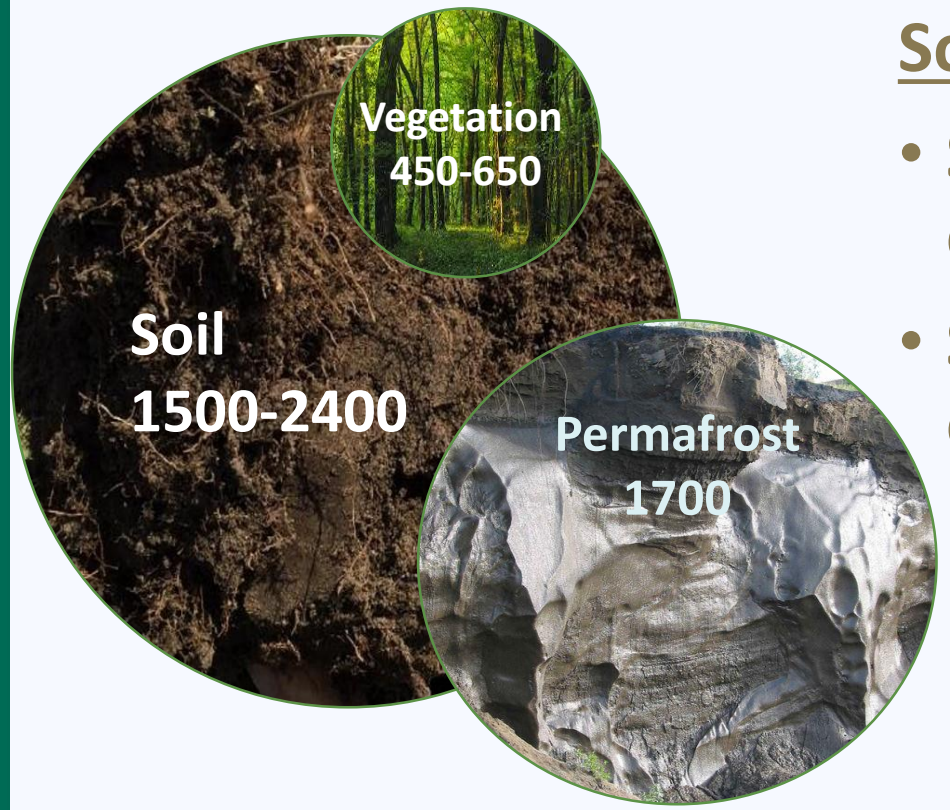
https://today.oregonstate.edu/news/report-climate-change-taking-toll-oregon-state-has-many-options-adaptation

Climate Change Threats to Oregon Agriculture

- Increased drought frequency and intensity
- Shifts in streamflow peaks
- Reduced snowpack
- Increased annual temperatures (increased pests and invasives)
- Increased wildfire threats
- More intense rainstorms and increased flooding
- Ocean acidification and warming

Source: Fifth Oregon Climate Assessment, 2021

Major Global Carbon Sinks (Gigatons C)



Soil is a major carbon sink!

- Soil stores 2-3x more carbon than atmosphere
- Soil stores 2-5x more carbon than vegetation

Modified from IPCC report from https://carbon2018.globalchange.gov/downloads/SOCCR2_Ch1_Overview_Global_Carbon_Cycle.pdf

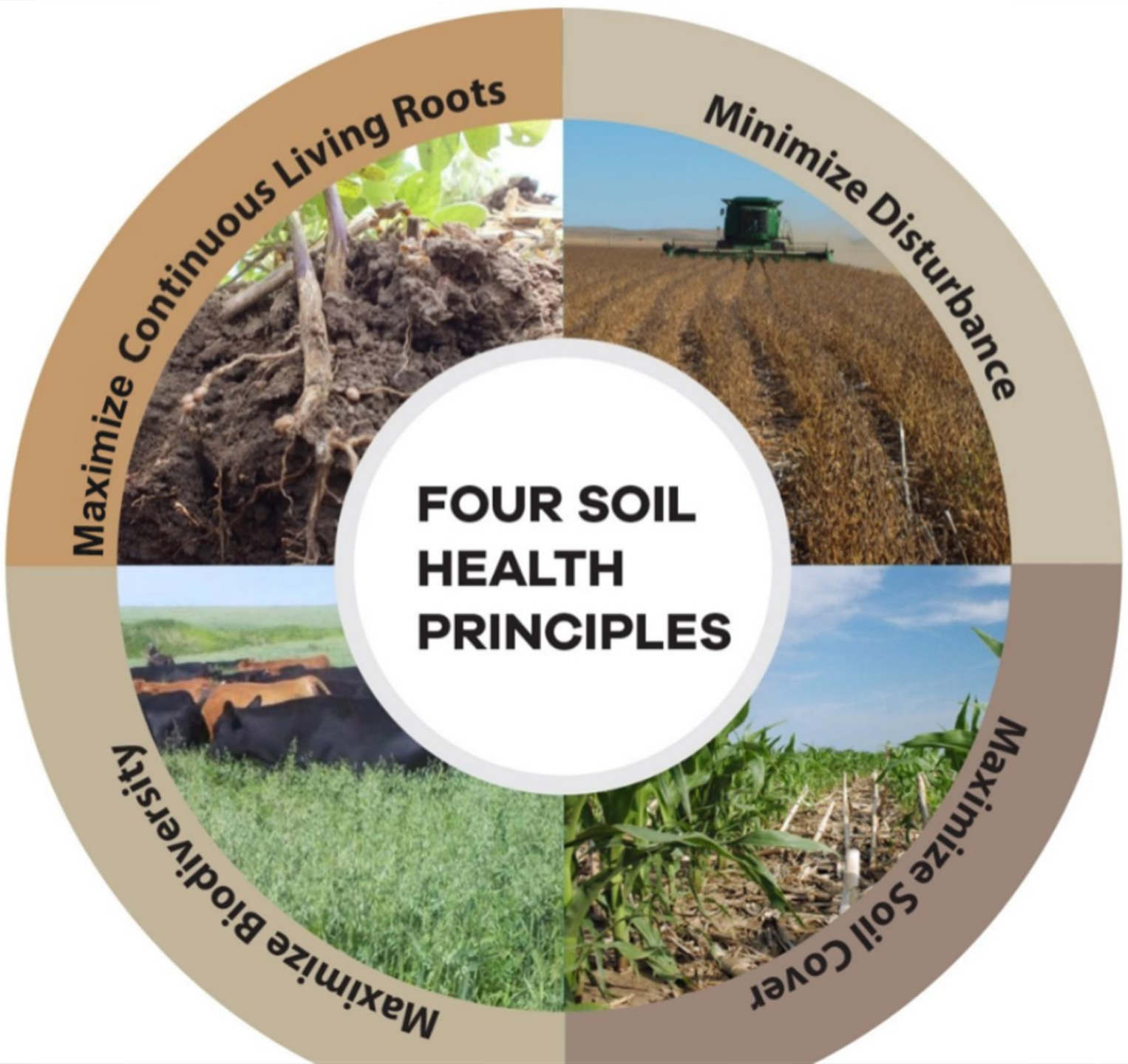
USDA ARS
United States Department of Agriculture
Agricultural Research Service

Soil Acts as a Carbon Bank

- Management practices can increase or deplete soil carbon impacting the global carbon budget
- Goal is to choose practices where additions & protection are GREATER than removal & losses

USDA ARS
United States Department of Agriculture
Agricultural Research Service

How do we build healthy, resilient soils?

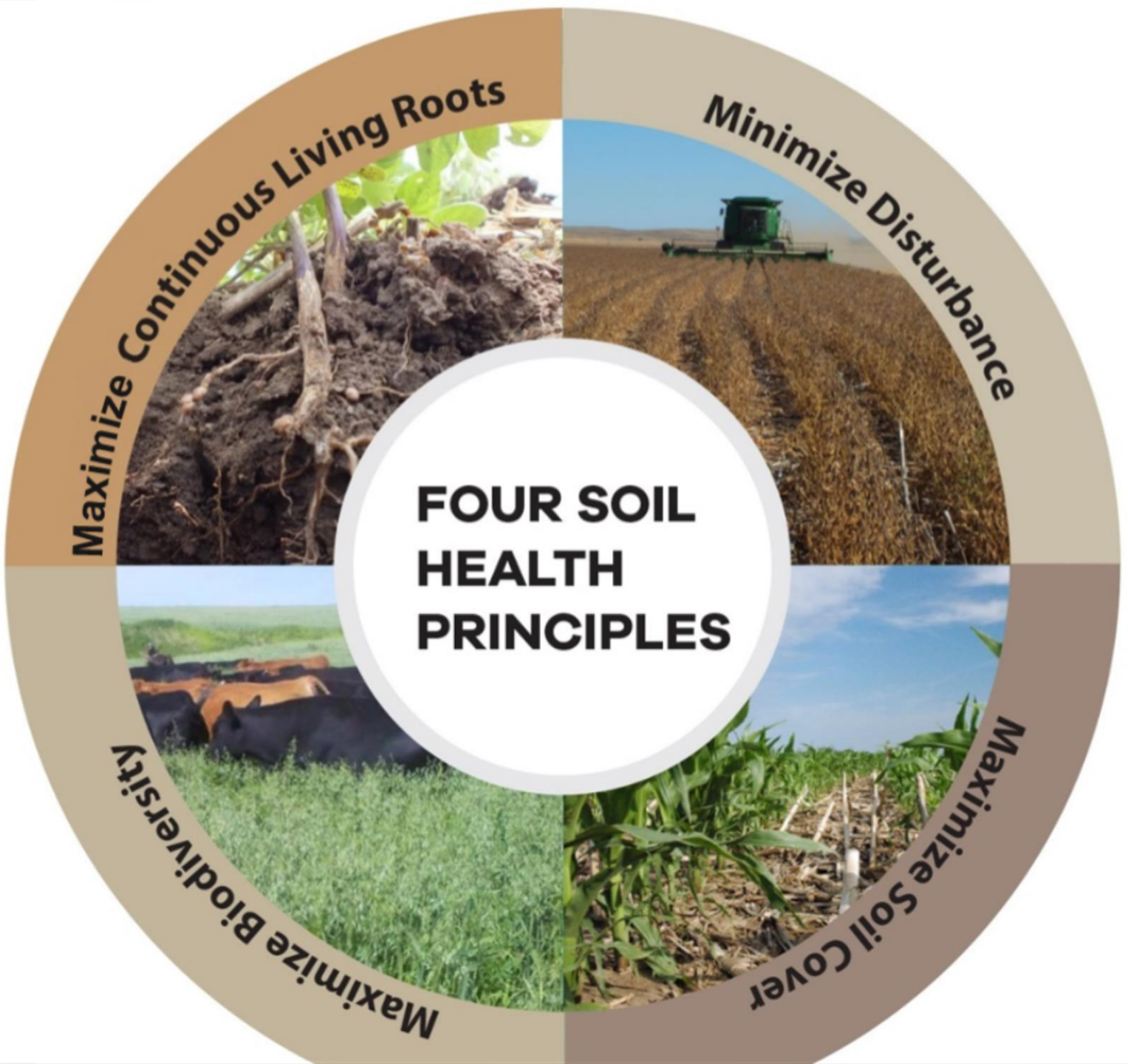


*Modified from USDA-NRCS-Principles for High Functioning Soils Factsheet

How do we build healthy, resilient soils?

Cover Crop
Crop Rotation
Add perennials to rotation
Integrate Livestock
Rotational Grazing
Pollinator Planting
Organic mulches
Strip cropping
Silvopasture
Agroforestry

No-till or Reduced Tillage
Controlled Traffic
Prescribed Fire
Nutrient Mgt
IPM
Residue Retention
Mulching
Composting
Biochar

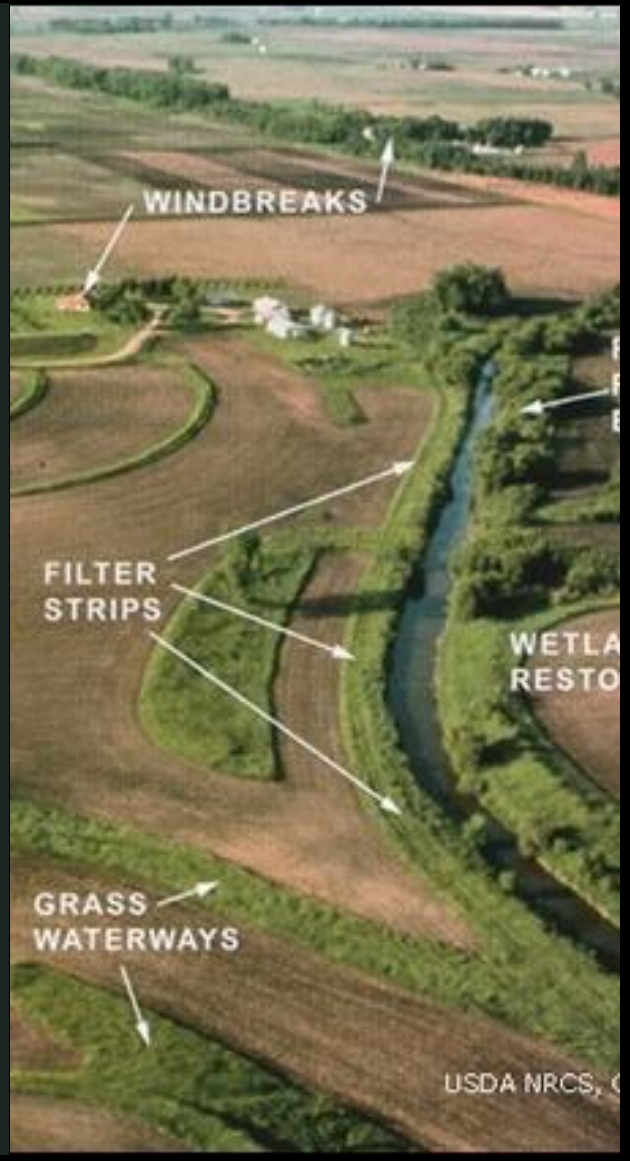


Multiple Co-Benefits from Agricultural Soil Management and Soil Health

- Carbon sequestration and potential GHG emission reductions
- Resiliency to intense precipitation or temperature extremes
- Water quality and quantity
- Air quality
- Biodiversity
- Productivity

Soil Health Management Can Help Build Resilient, Healthy Systems

- Flexibility for practice adoption and location (field vs. landscape)
- Accommodate the diverse agricultural systems, soils, and climates in OR
- Producers currently leading the effort should be included to help expand future adoption
- Multiple environmental and economic co-benefits



Thank You

Jennifer.Moore@usda.gov

541-738-4180 (office)