

SYSTEMS APPROACH TO SOIL HEALTH

Daniel Palic, District Conservationist
Holyoke/Julesburg FO
AREA II Soil Health Coordinator



United States Department of Agriculture
Natural Resources Conservation Service

Soil Health

What is it?

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

- Nutrient Cycle
- Water (infiltration & availability)
- Filtering and Buffering
- Physical Stability and Support
- Habitat for Biodiversity



United States Department of Agriculture
Natural Resources Conservation Service

SOIL CARBON is the key driver for the nutritional status of plants – and therefore the mineral density in animals and people.

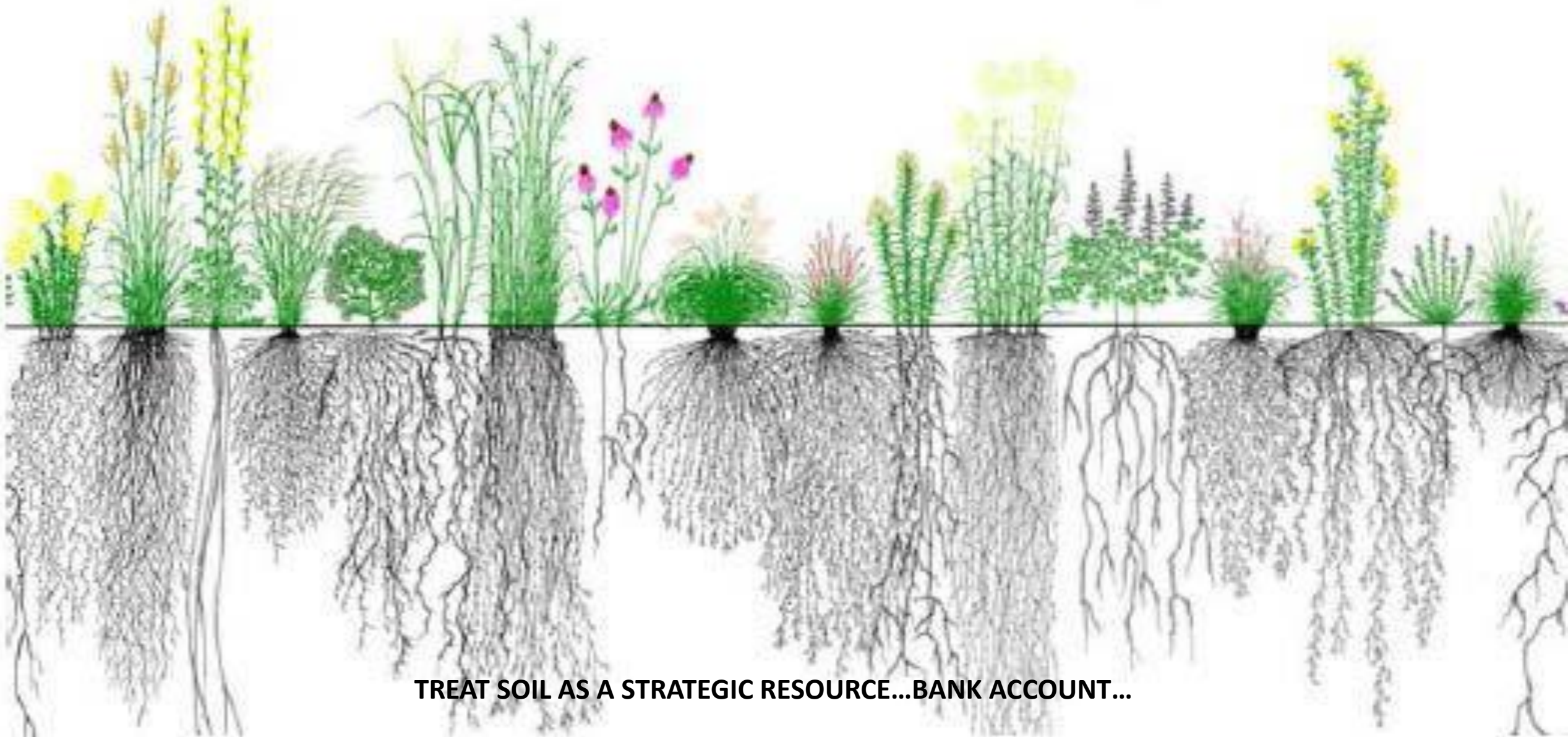
SOIL CARBON is the key driver for soil moisture holding capacity (*frequently the most limiting factor for production*).

SOIL CARBON is the key driver for farm PROFIT.



United States Department of Agriculture
Natural Resources Conservation Service

APPROXIMATELY 2/3 OF ORGANIC MATTER INCREASE WILL COME FROM PLANT ROOTS!



TREAT SOIL AS A STRATEGIC RESOURCE...BANK ACCOUNT...



Thinking for a Change

Feeding Soil Microbiology
What would you rather eat???



Replaced soil biology with artificial nutrients....



United States Department of Agriculture
Natural Resources Conservation Service

Fallow Stages

Dr Gary Peterson, Colorado State University

July
(Harvest)

Sept.

May
(Spring Plant)

Sept.
(Fall Plant)

Stage I
[Orange]
(2.5 mo)

Stage II
[Blue]
(7.5 mo)

Stage III
[Red]
(4.5 mo)

High T°;
Dry soil
surface
[W.P.]

Low T°;
Soil Surface at [F.C.]
Lower soil profile dry

High T°;
Wet soil
profile
[F.C.]

10 to 35 %
Precip. Stored

50 to 85%
Precip. Stored

- 4 to 5%
Precip. Stored

s Department of Agriculture
Conservation Service

SYSTEMS APPROACH



United States Department of Agriculture

Natural Resources Conservation Service

SOIL HEALTH WISDOM

Let one success drive your decisions, rather than one failure...

Ain't no sense in praying for rain when you ain't prepared for it all-R. Jones

“Lack of knowledge is not the problem...egos and existing knowledge are the road block”

How many acres taken out of crop production in US last year?

No longer use soil conservation...Think soil regeneration...

A goal without a plan is just a wish!

FACTS

- Over the past 40 years degraded 1/3 of the land
- LOSE 0-3% food production capacity/year due to soil degradation
- Soils have lost approximately 50% of organic matter from native prairie
- Erosion
 - CT-1.54 mm/year
 - NT-0.08 mm/year
 - Nature 0.01 mm/year
 - Soil production/regeneration 0.02 mm/year
 - Erosion tied to lifespan of civilizations (500-1000years)
 - (Dr David Montgomery "Dirt, The Erosion of Civilization")



United States Department of Agriculture
Natural Resources Conservation Service

MORE FACTS

- 95 % of life on land resides in soil
- Microbial activity drives the process of aggregation
- 30 % of world's cropland has been abandoned in the last 40 years due to soil decline
- Mineral depletion in vegetables since 1940 (Cu-76%, Ca-46% Fe-27%, Mg-24% & K-16%)
- Mineral depletion in meat since 1940 (Cu-24%, Ca-41%, Fe-54%, Mg-10%, K-16%, P-28%)
- Most the deficiencies observed in today's plants, animals and people are due to soil conditions not being conducive to nutrient uptake!

Soil Erosion



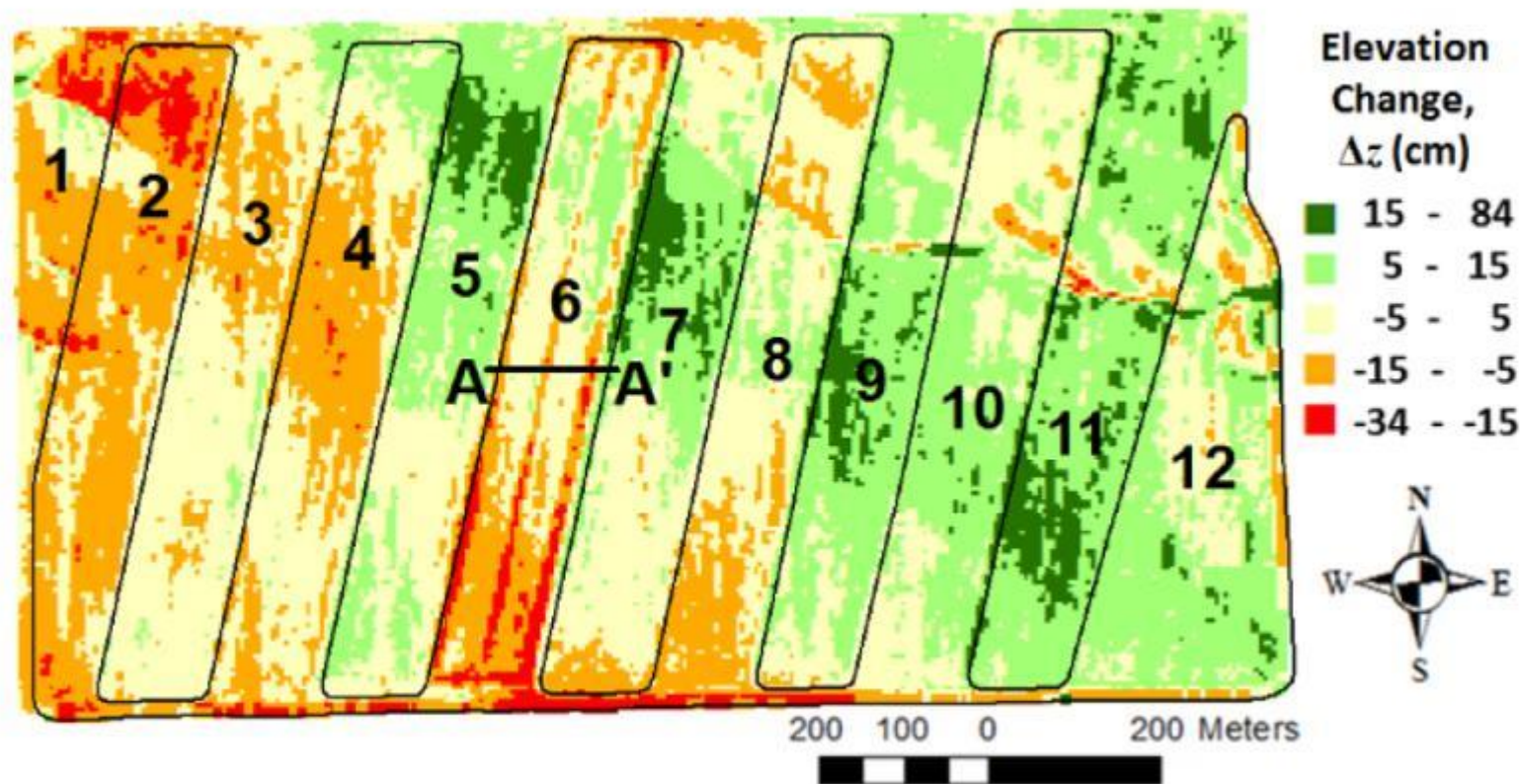


Figure 5. Map of Changes (2001-2009*) in Land Surface elevation (Δz) on a 5-m Grid within the Scott Field in Northeastern Colorado. Crop strip numbers are labeled over the alternating winter-wheat-fallow cropping system, and section A-A' is shown (details given in **Figure 11**). *Strips 2, 4, 6, 8 surveyed in 2010 to complete the 2009 DEM (from Sherrod *et al.*)⁶. [Please click here to view a larger version of this figure.](#)

March 5th, 2018



United States Department of Agriculture
Natural Resources Conservation Service



Look for
opportunities?



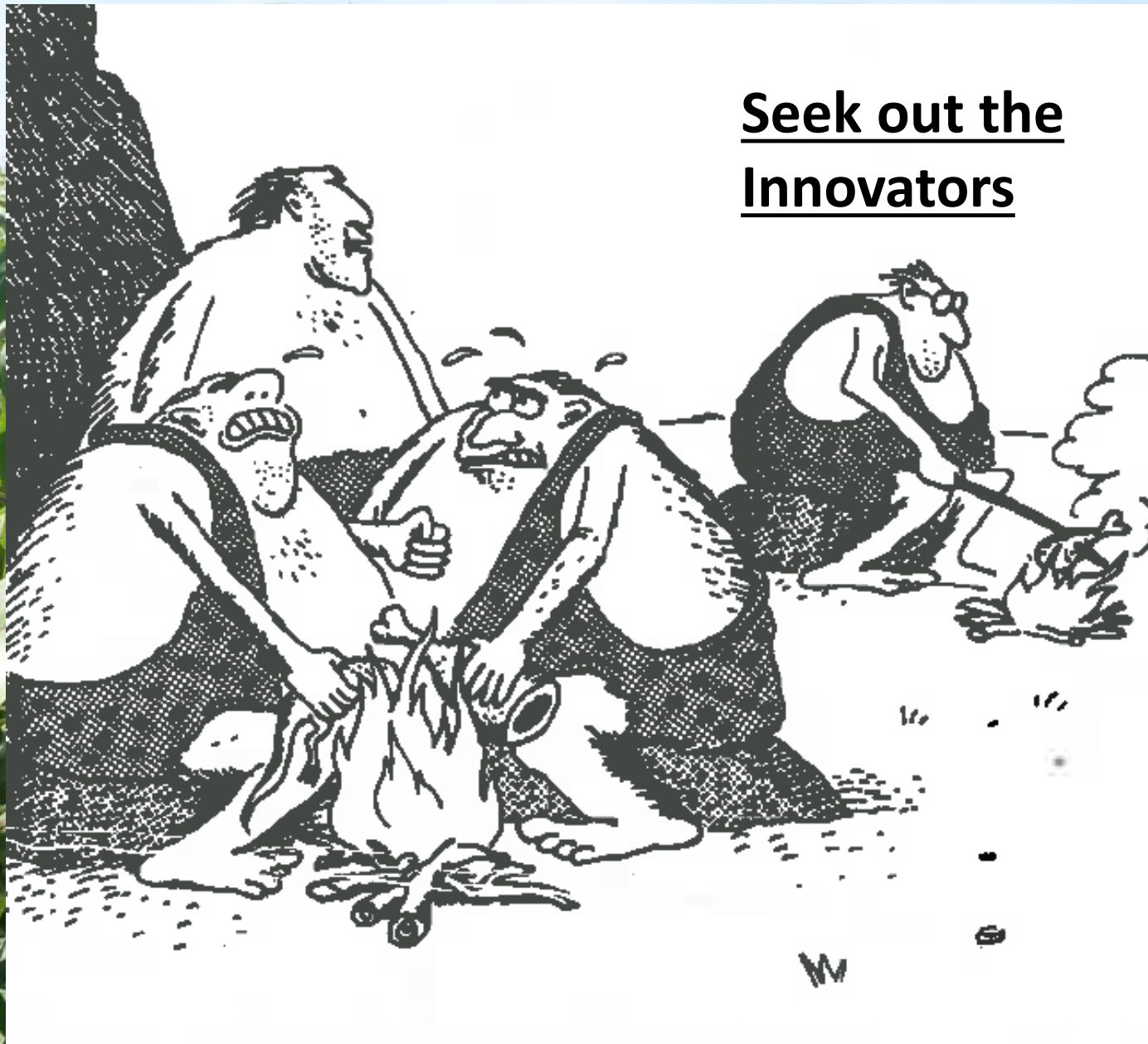
United States Department of Agriculture

Natural Resources Conservation Service

MISSED OPPORTUNITY?



Seek out the Innovators



"Hey! Look what Zog dol"



United States Department of Agriculture

Natural Resources Conservation Service

Holyoke/Julesburg



Thank You

For additional information, please visit www.co.nrcs.usda.gov

USDA is an equal opportunity employer, provider, and lender.



Department of Agriculture
Conservation Service