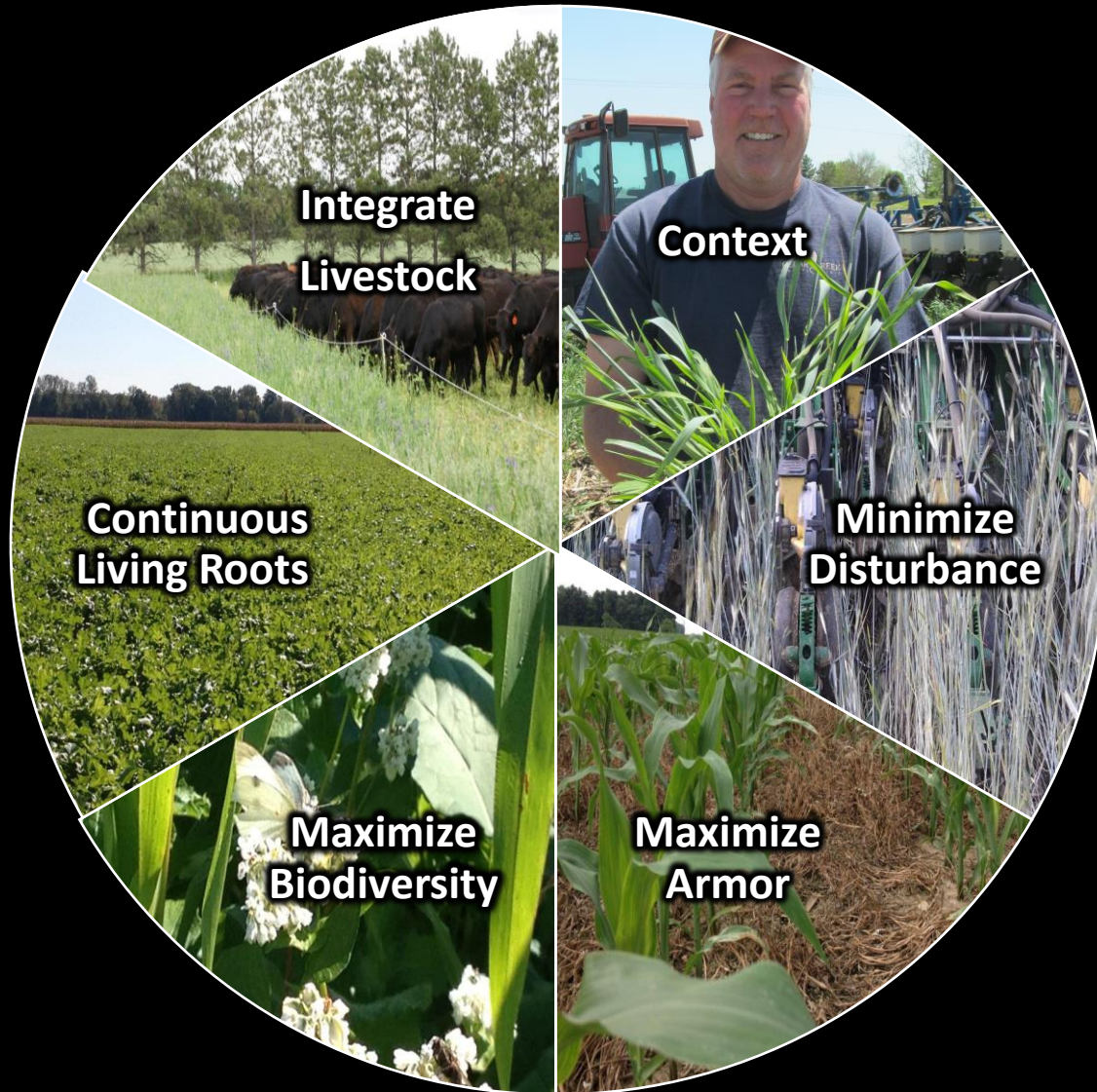


Healing The Land With Native Plants



Principles of Soil Health To Support Regenerative Agriculture



Growing Interest In Regenerative Agriculture

Forbes

Regenerative Agriculture: The Next Trend In Food Retailing



Jack Uldrich Former Forbes Councils Member

Forbes Business Council COUNCIL POST | Membership (Fee-Based)



Aug 19, 2021, 07:00am EDT

[Jack Uldrich](#) is a leading global futurist, best-selling author, and keynote speaker. He is also the founder/CEO of The School of Unlearning.

Center For Regenerative Agriculture And Resilient Systems

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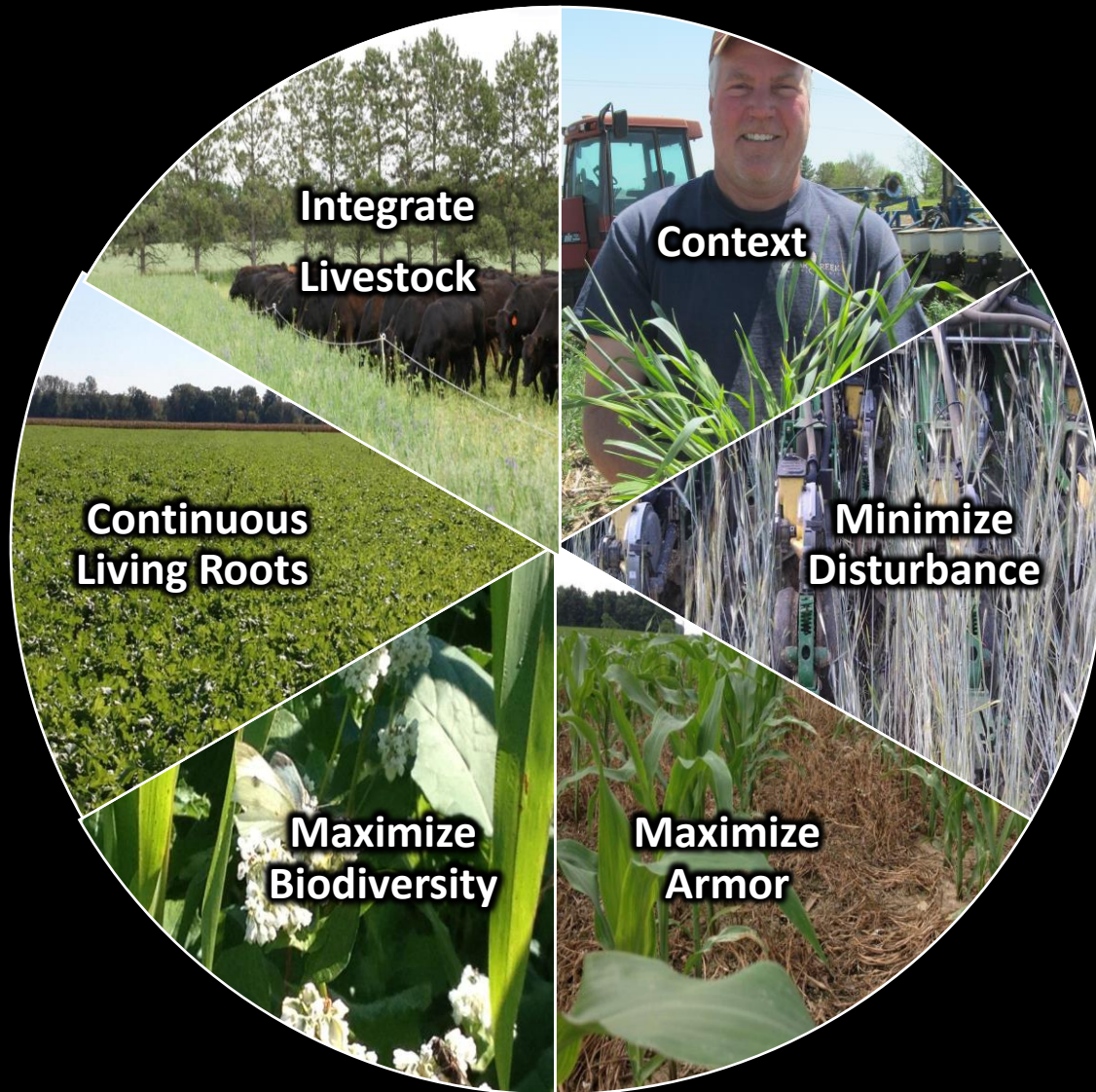
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Could Regenerative Agriculture Increase the Nutritional Quality of Our Food?

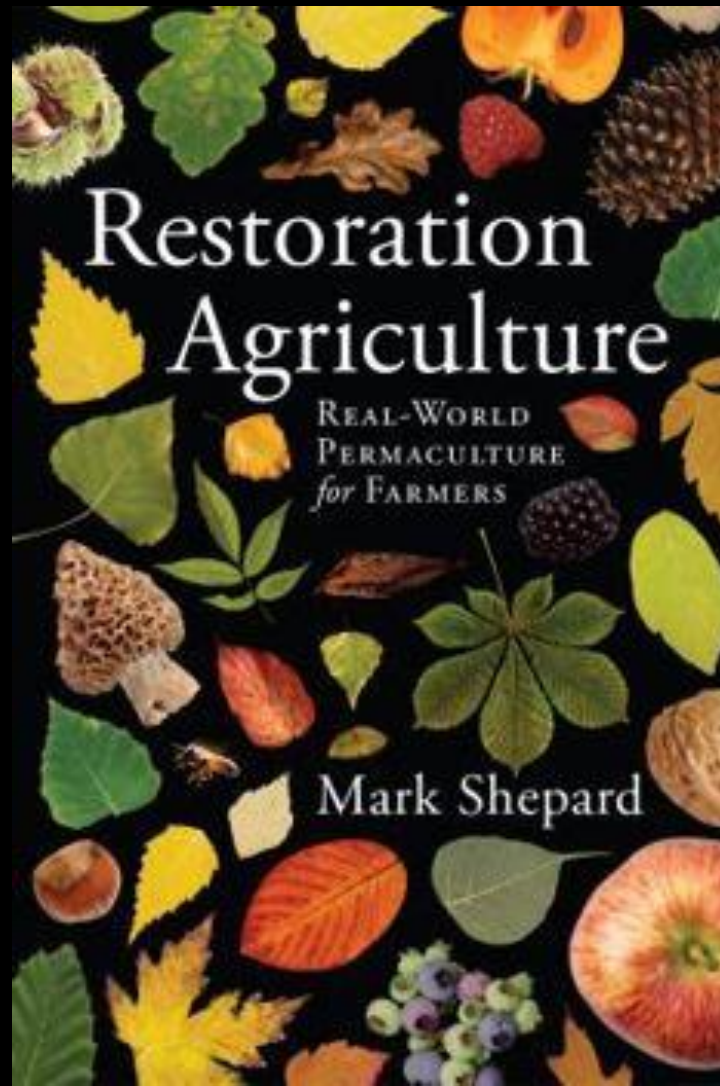
by Sheryl Karas M.A., CRARS staff



What do natives bring to the table?



Lots of options when it comes to “natives”



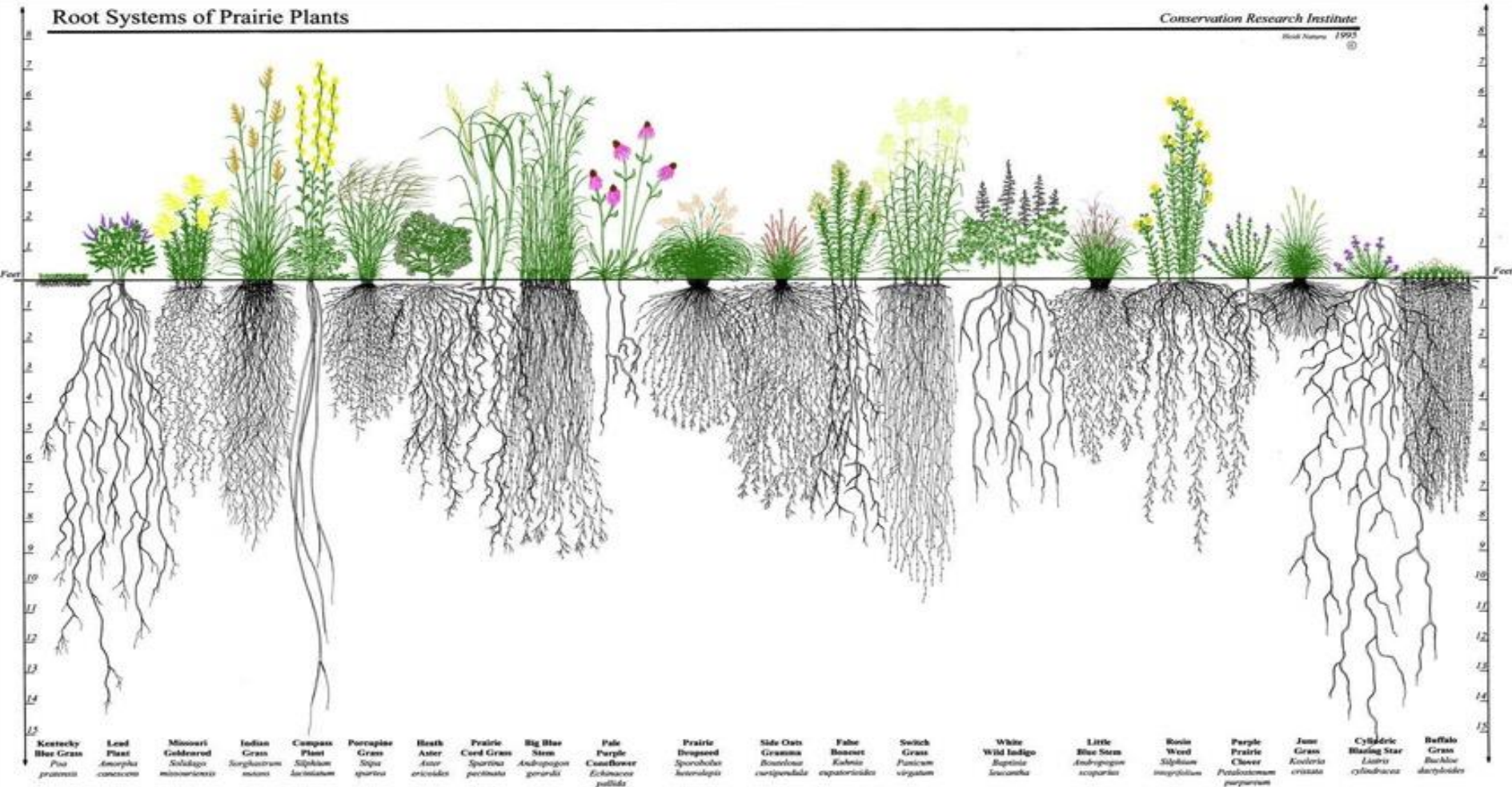
Reduction in the Carbon content of the soil with time of soil use



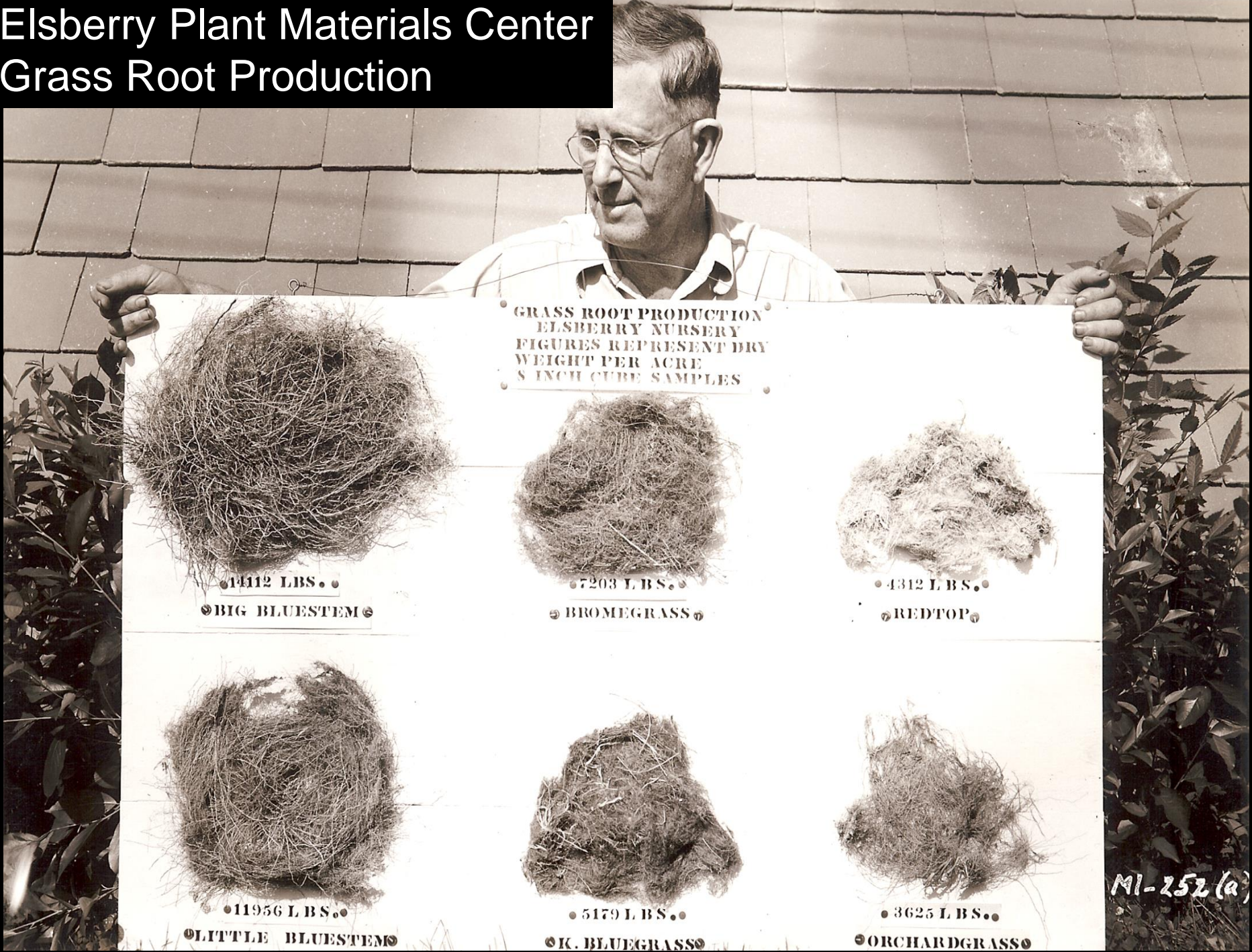
What is the carbon level in today's grasslands?

- Historical Tillage
- Continuous Grazing
- Haying
- Nitrogen Fertilizer
- Introduced cool season grasses with lower C/N ratio

Approximately 2/3 Of SOM Comes From Roots!



Elsberry Plant Materials Center Grass Root Production



GRASS ROOT PRODUCTION
ELSBERRY NURSERY
FIGURES REPRESENT DRY
WEIGHT PER ACRE
8 INCH CUBE SAMPLES



•14112 LBS. •
•BIG BLUESTEM •



•7203 LBS. •
•BROMEGRASS •



•4312 LBS. •
•REDTOP •



•11956 LBS. •
•LITTLE BLUESTEM •



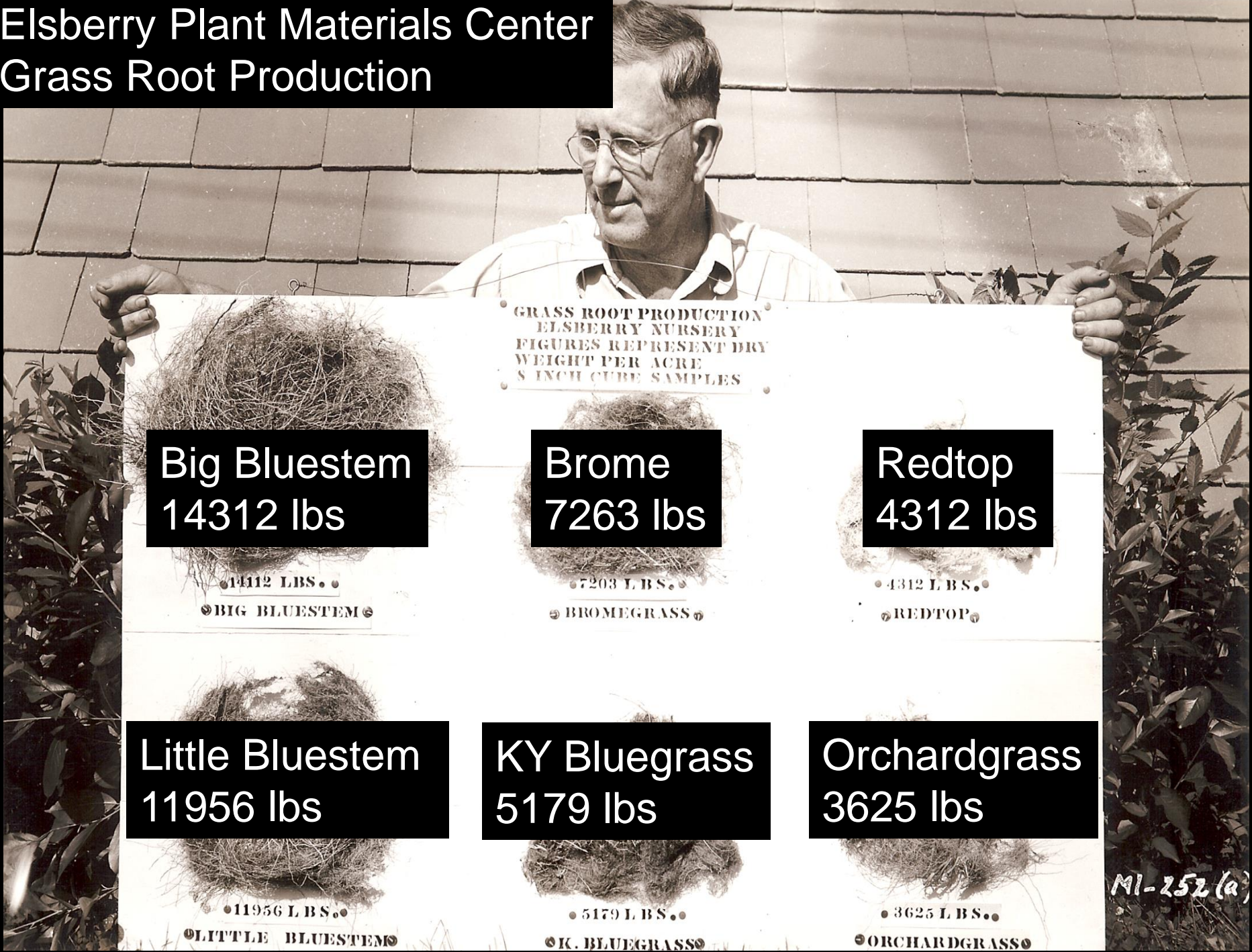
•5179 LBS. •
•K. BLUEGRASS •



•3625 LBS. •
•ORCHARDGRASS •

M1-252 (a)

Elsberry Plant Materials Center Grass Root Production



GRASS ROOT PRODUCTION
ELSBERRY NURSERY
FIGURES REPRESENT DRY
WEIGHT PER ACRE
8 INCH CUBE SAMPLES

Big Bluestem
14312 lbs

14312 LBS.
BIG BLUESTEM

Brome
7263 lbs

7263 LBS.
BROMEGRASS

Redtop
4312 lbs

4312 LBS.
REDTOP

Little Bluestem
11956 lbs

11956 LBS.
LITTLE BLUESTEM

KY Bluegrass
5179 lbs

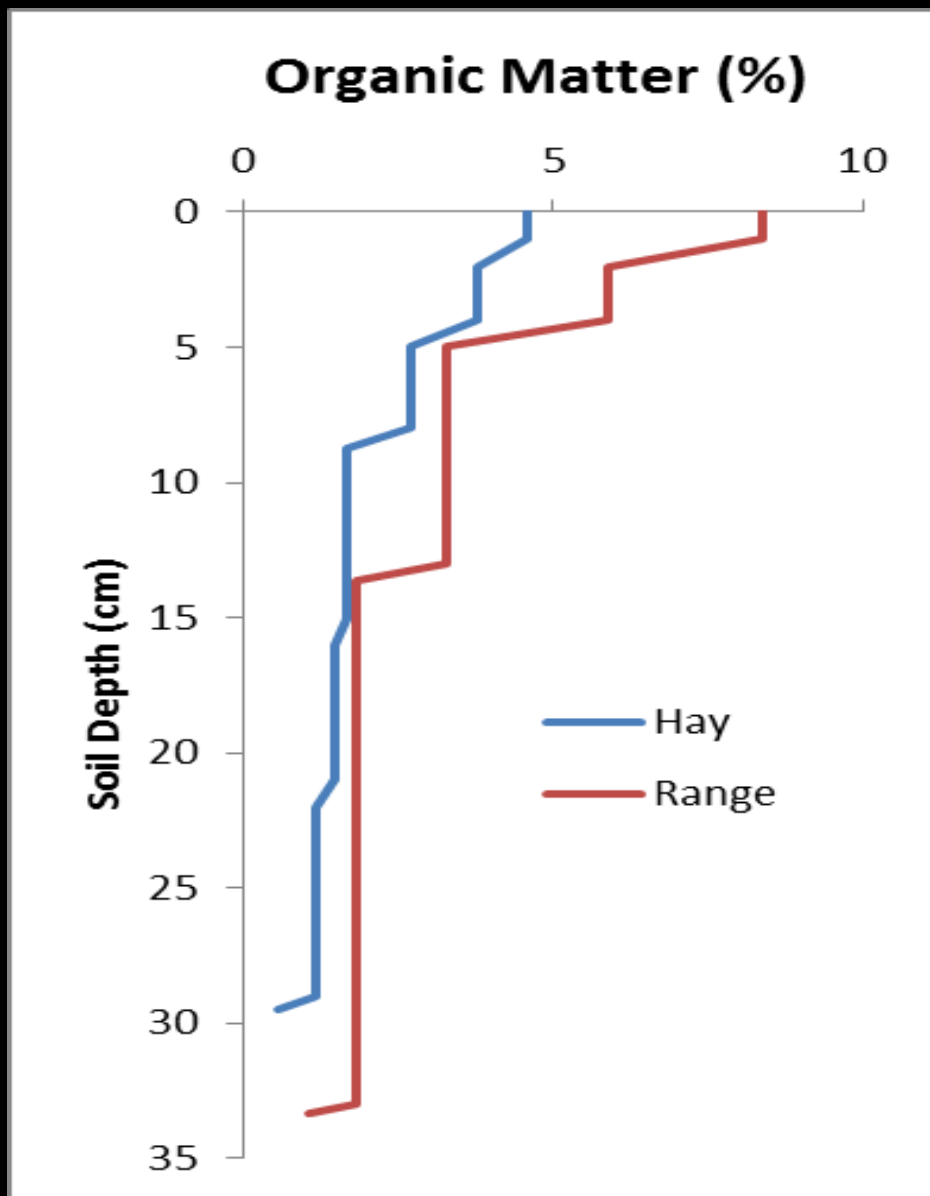
5179 LBS.
K. BLUEGRASS

Orchardgrass
3625 lbs

3625 LBS.
ORCHARDGRASS

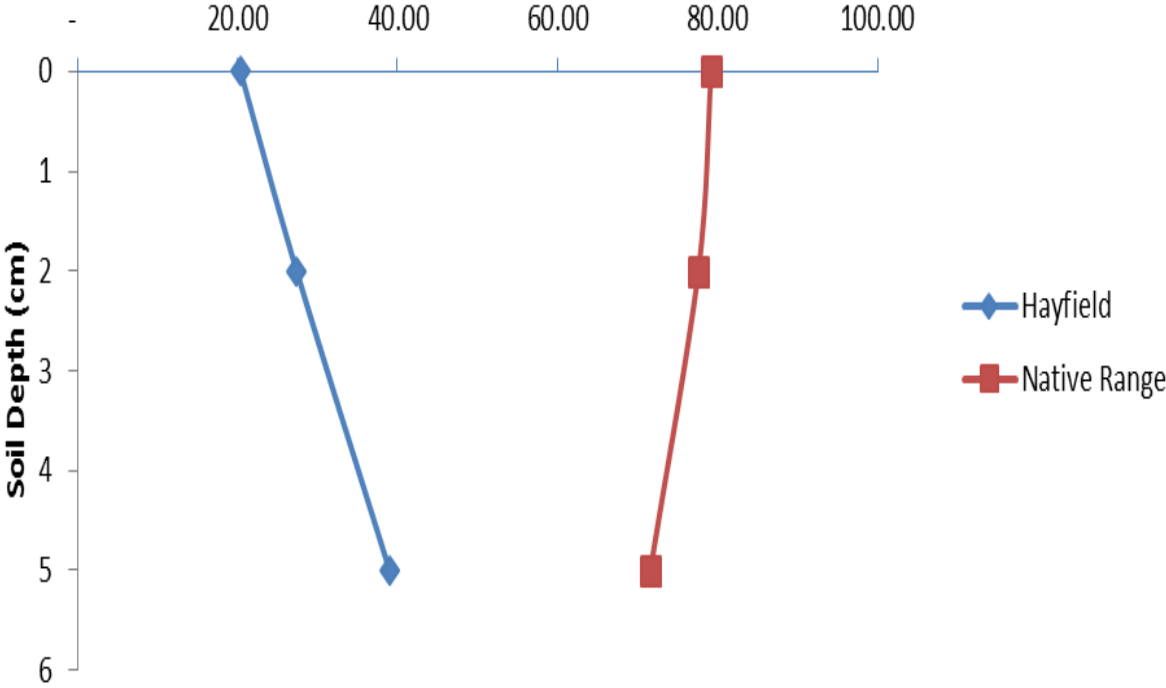
M1-252 (a)

Mellette County, Kube soil



Mellette County, Kube soil

Aggregate Stability (%)



Why is Aggregate Stability Important?



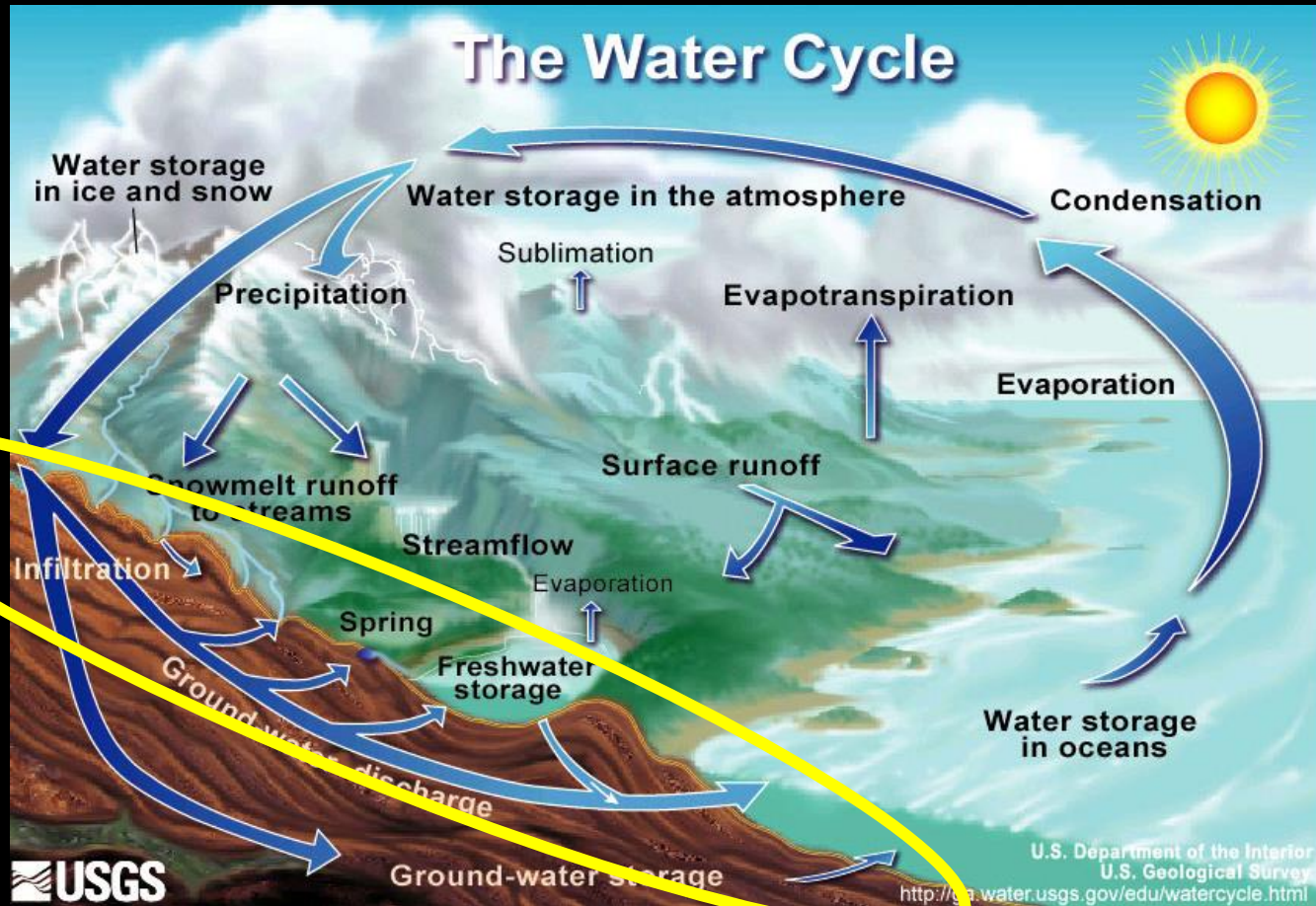
What is the most limiting
natural resource in plant production?

Sunshine?

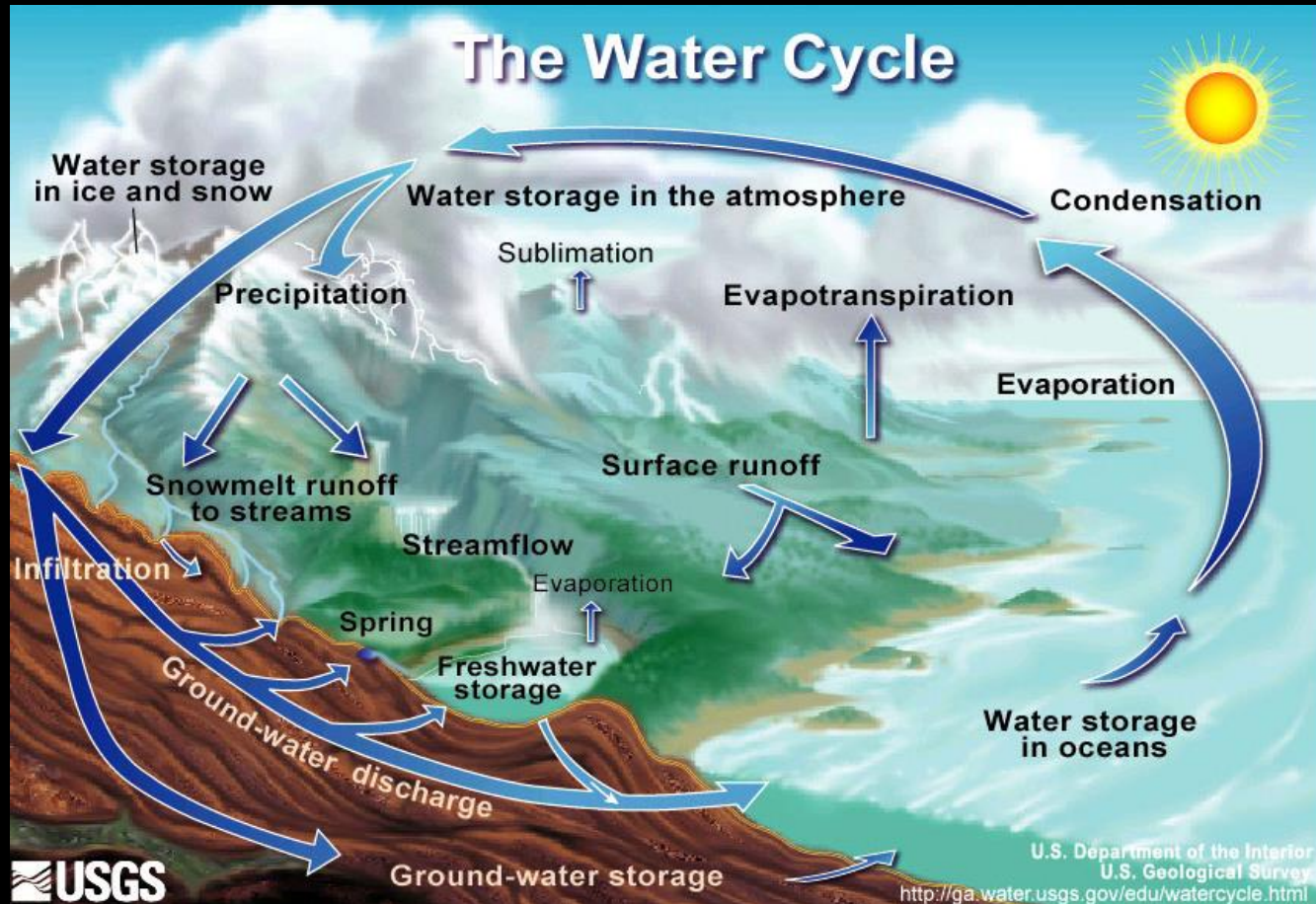
Minerals?

Water?

What is the most important item in the water cycle???



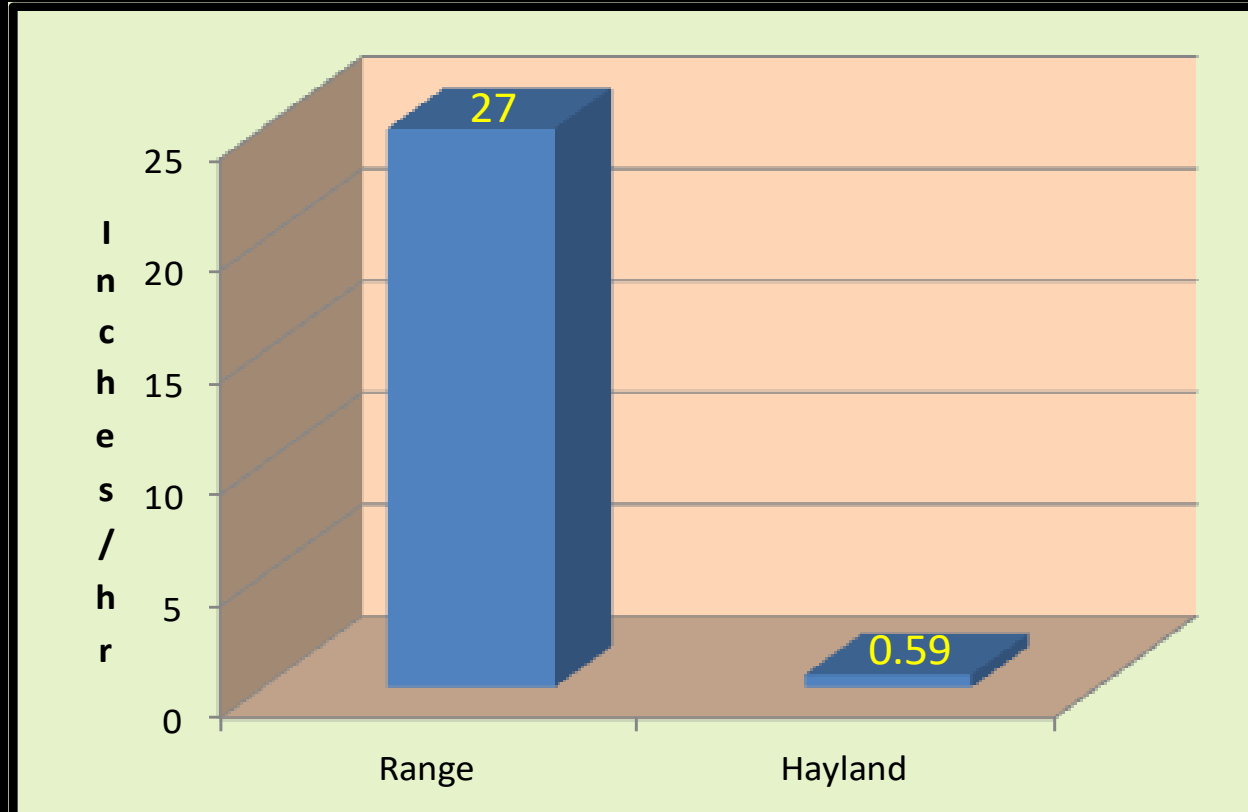
Let's talk about the water cycle for a minute!



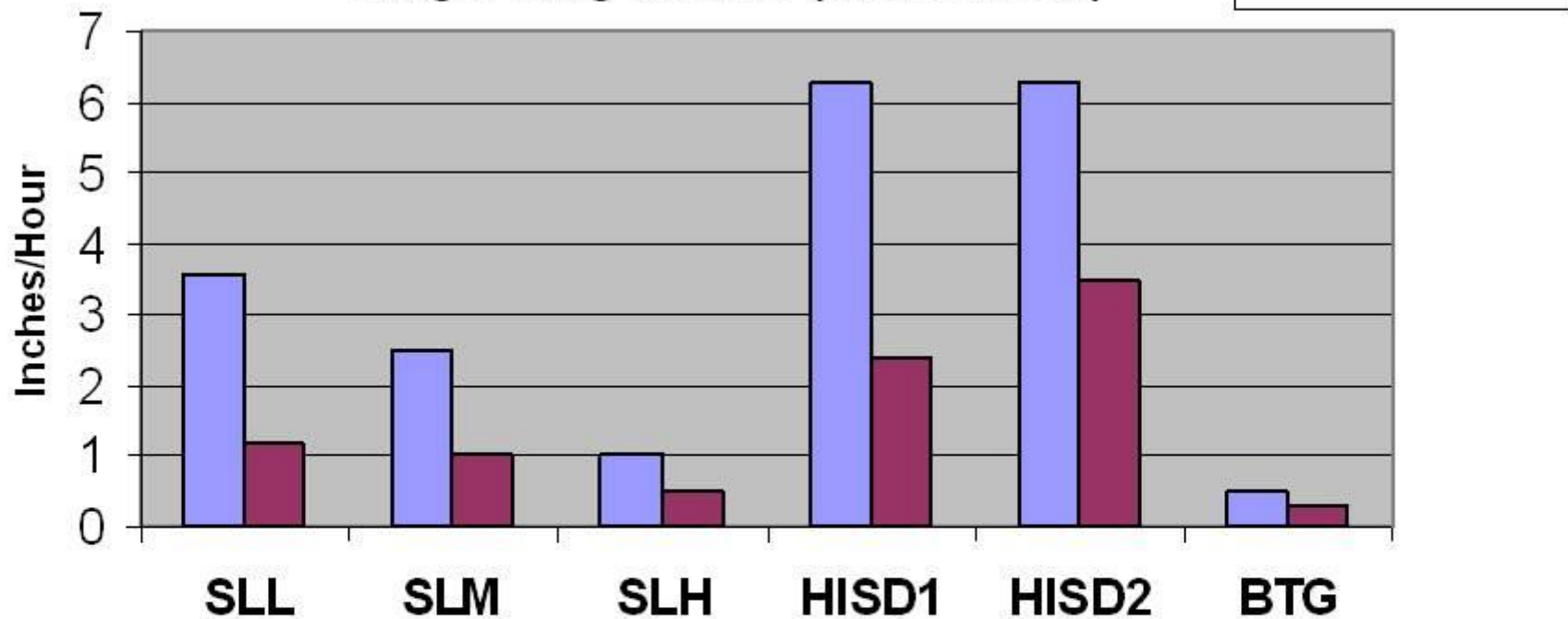
Mellette County, Kube soil



Infiltration Rate



Grassland Grazing Systems Water Infiltration Rates
Loamy Ecological Site (Williams Loam)
Single Ring Method (Inches/Hour)



SLL- Kentucky bluegrass dominated
SLM- Kentucky bluegrass dominated
SLH- Kentucky bluegrass dominated
HSD1- Diverse native community
HSD2- Diverse native community
BTG- Brome Tame Grass Pasture

What about water efficiency?

- C3 plants flourish in cool, wet, and cloudy climates, where light levels may be low, because the metabolic pathway is more energy efficient if water is plentiful.
- C4 plants, which inhabit hot, dry environments, have very high water-use efficiency, so that there can be up to twice as much photosynthesis per gram of water as in C3 plants, but C4 metabolism is inefficient in shady or cool environments.
- C4 plants are only 3% of vascular plants in the world yet they produce 20% of the global primary productivity.(Ehleringer et al, 1997)

Pounds of water needed to produce one pound of dry forage

<u>Plants</u>	<u>lbs. of water used</u>
Sideoats grama	992 lbs.
Little bluestem	874 lbs.
Big bluestem	815 lbs.
Western wheatgrass	1183 lbs. ^{/1}
Kentucky bluegrass	1881 lbs.
Corn	221 lbs.
Wheat	550 lbs.

Weaver J. E. 1941 NE /1 A.C. Dillman 1931 ND,

Productivity

Type of plant	ShU	CyU	MDU
Big bluestem	2500	9000	8000
Indiangrass	2500	9000	8000
Eastern Gama	3000	11500	9000
Orchardgrass	-	7000	5500
Timothy	-	6000	4000
Brome	1500	8000	6500
Tall Fescue	1500	8000	6000

Many methods to get the job done!

- 2004 – Chemical, planted EGG/Corn then added V Rye/Bluestem/forbs
- 2006 – Natives came back with really good management
- 2008 – No-tilled Bluestem, Indiangrass into existing pasture w/o chemicals
- 2010 – No-tilled Easter Gama Grass into pastures w/o chemicals
- 2014 – Complete spray, smother, spray method with 50 specie mixture including native cool season grasses.
- 2017 – Fed native grass hay
- 2018 – Back to no-tilling w/o chemicals.



Soil Health

	Solvita Test CO ₂ -C(ppm) in 24 hrs after drying and rewetting	Haney Test 5 independent variables of biological/chemical properties
Field One	251.8	30.2
Field Two	582.4	58.6



20yrs later its 30% Fescue









What has been our primary historical use of native plants in Missouri?

- Conservation uses
- Wildlife habitat

If we want any real scale of natives we have to do what?

- Incorporate natives into working lands
- Soil health
- Water efficiency
- Forage quality/animal performance
- Basic volume







More convinced than ever!!

- SOM Potential
- C/N ratio
- Prairie's were a low N system
- Water cycle
- Moisture efficiency

Expand your knowledge – Read a Book

- *Teaming with Microbes* by Lowenfels and Lewis
- *Soil Biology Primer* by Elaine Ingham
- *The Hidden Half of Nature* by David Montgomery
- *The Worst Hard Times* by Timothy Egan
- *Collapse* by Jared Diamond
- *Dirt-The Erosion of Civilization* by David Montgomery
- *The Marvelous Pigness of Pigs* by Joel Salatin
- *Holistic Management* by Allan Savory
- *A Soil Owner's Manual* by Jon Stika
- *Growing a Revolution* by David Montgomery.
- *Dirt to Soil* by Gabe Brown

Doug Peterson

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