



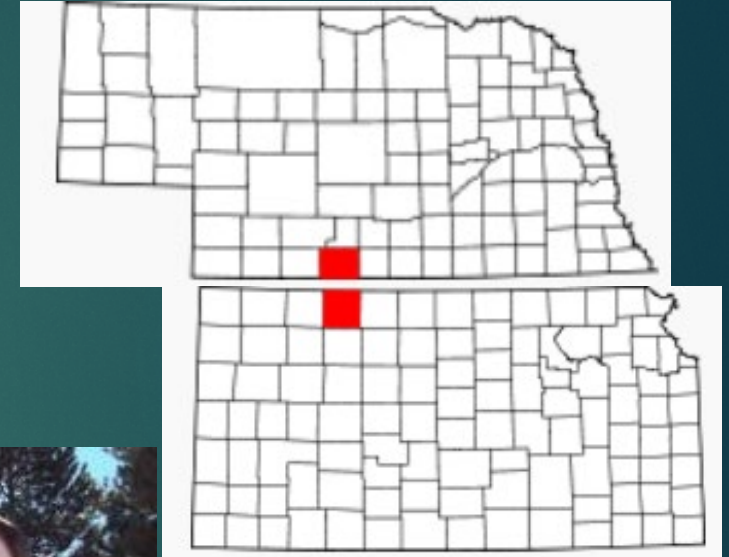
Soil Health


PRACTICAL APPLICATIONS

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Thompson Farm & Ranch LLC

- ▶ Furnas County Nebraska & Norton County Kansas
- ▶ Richard, Michael and Brian Thompson





“If you want to succeed you should strike out on new paths, rather than travel the worn out paths of accepted success.”

JOHN D. ROCKEFELLER

First Attempt In Learning

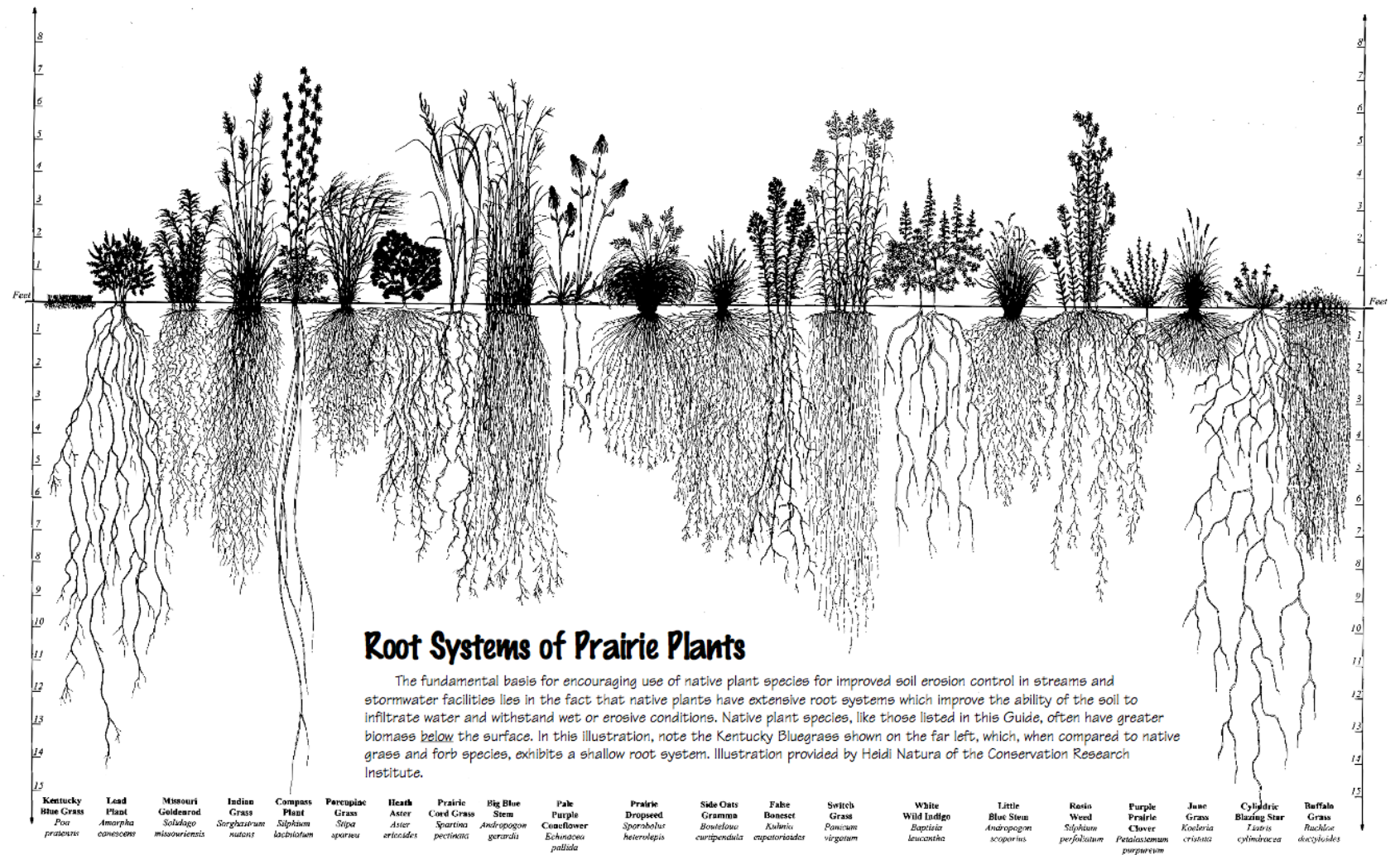


We need Diversity in our systems



How do we fix the soil?

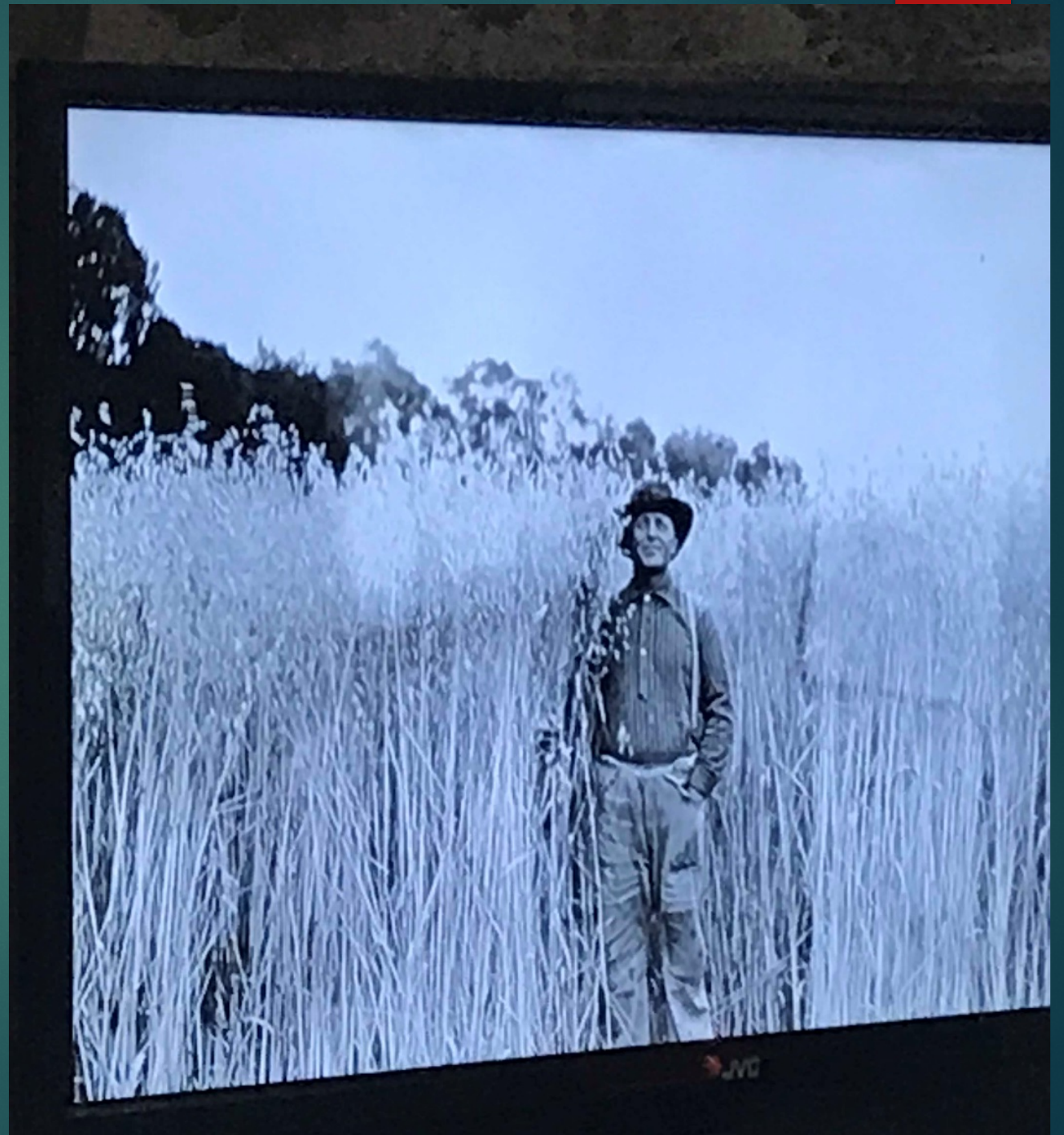
- ▶ Farm like Nature Made It (cover, living root, grazing) to help rebuild soil resiliency



Keep Living Roots in the Soil

- ▶ Why do I want to keep something growing?
- ▶ Photosynthesis restores carbon to the soil
- ▶ 1 part carbon holds 7 parts water
- ▶ Reduce Plowpans/Compaction layers
- ▶ Keeps Soil Cooler
- ▶ We can turn a plant into \$\$\$

A healthy
Carbon
rich soil!

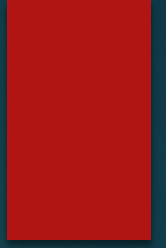


Carbon
mined
soil!

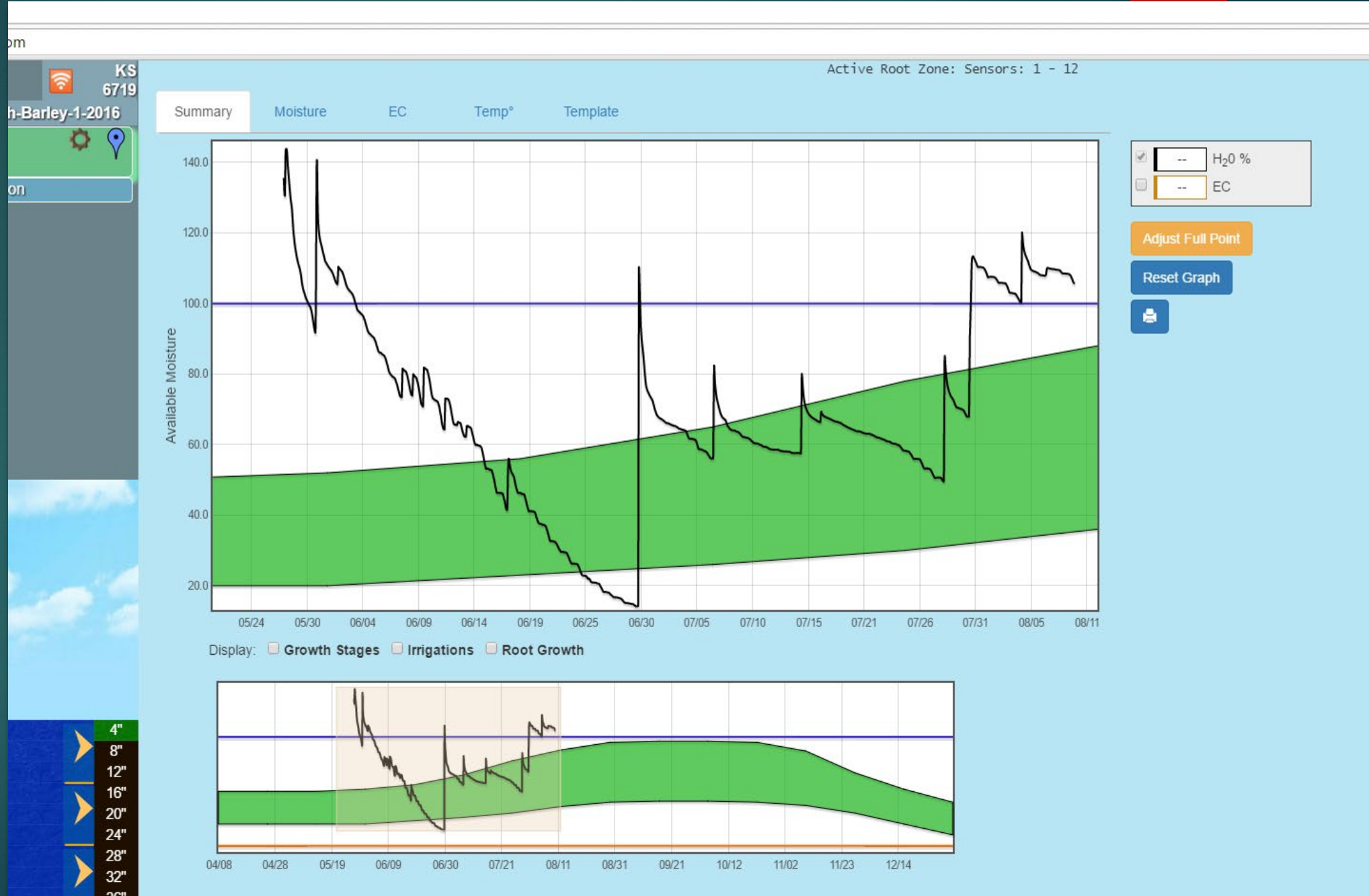




We Can Change Our
Soil!!!



USE
WATER
to
improve
soil!

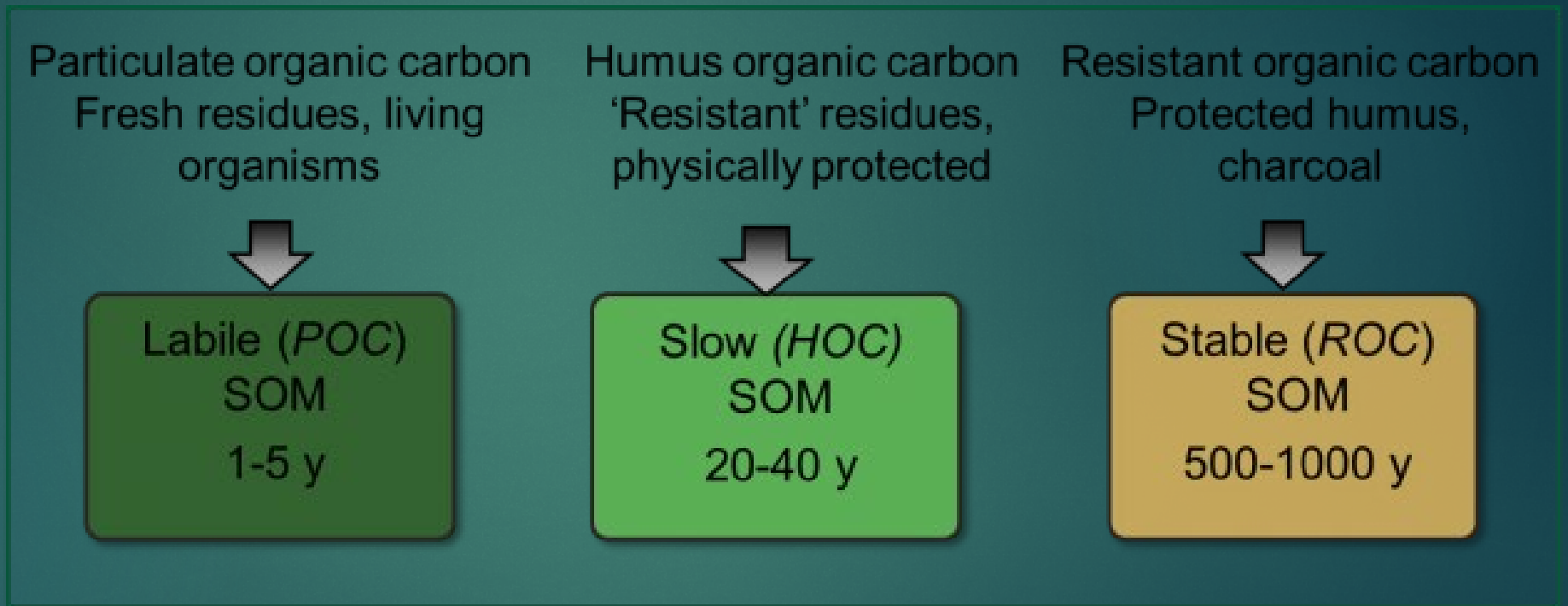


The
difference
carbon
makes....





Carbon Pools



Same soil different management



What about compaction?

- ▶ Compaction is a matter of time not herd density
- ▶ Compaction is not a problem if properly managed
- ▶ Leave plenty of residue to hold the cattle up

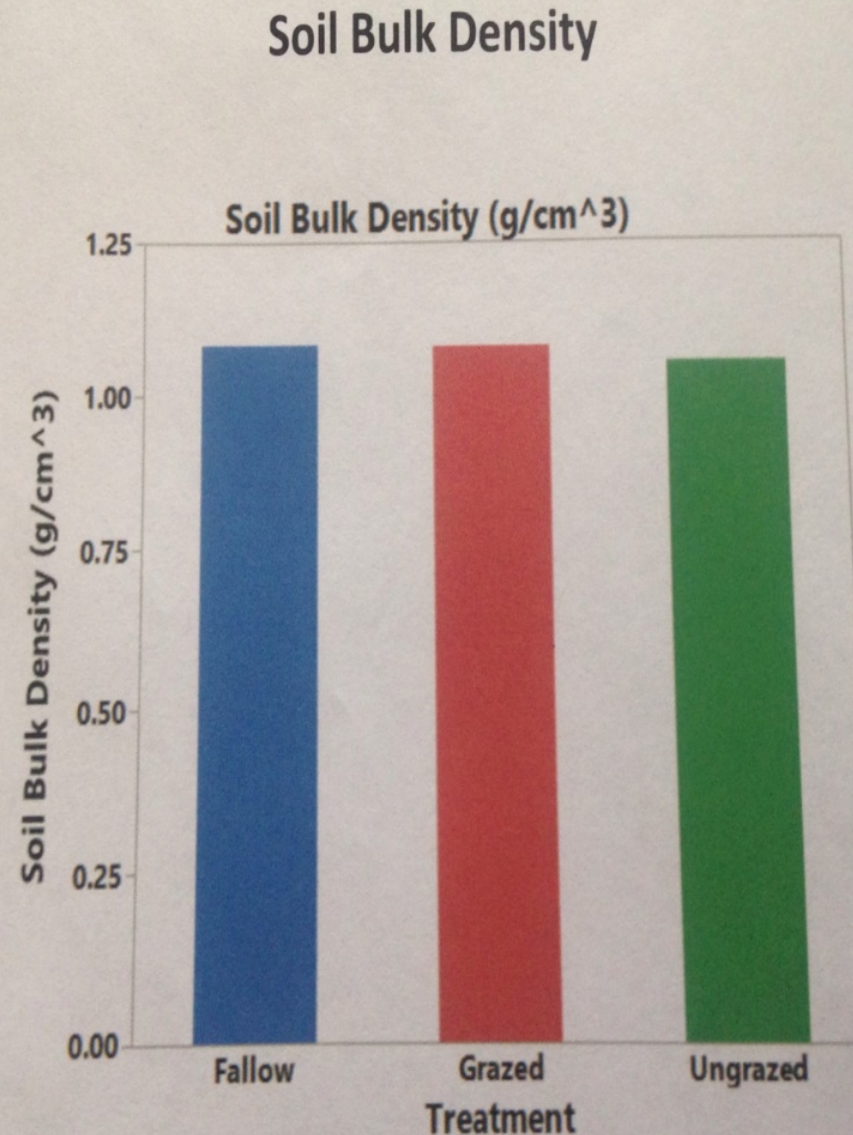
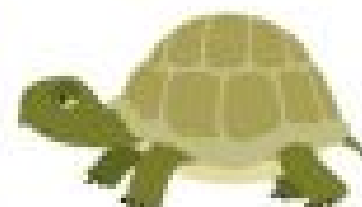


Table 1. Carbon to nitrogen ratios of crop residues and other organic materials

Material	C:N Ratio
rye straw	82:1
wheat straw	80:1
oat straw	70:1
corn stover	57:1
rye cover crop (anthesis)	37:1
pea straw	29:1
rye cover crop (vegetative)	26:1
mature alfalfa hay	25:1
Ideal Microbial Diet	24:1
rotted barnyard manure	20:1
legume hay	17:1
beef manure	17:1
young alfalfa hay	13:1
hairy vetch cover crop	11:1
soil microbes (average)	8:1



↑
slower

Relative
Decomposition
Rate

↓
faster



CARBON/NITROGEN RATIOS

Material	%N	C/N Ratio		
Activated Sldg.	5-6	6	Red Clover	1.8 27
Amaranth	3.6	11	Rice Hulls	0.3 121
Apple Pomace	1.1	13	Rotted Sawdust	0.25 200-500
Blood	10-14	3	Seaweed	1.9 19
Bread	2.10	—	Sewage Sludge	2-6.9 5-16
Cabbage	3.6	12	Sheep Manure	2.7 16
Cardboard	0.10	400-563	Shrimp Residues	9.5 3.4
Coffee Grnds.	—	20	Slaughter Waste	7-10 2-4
Cow Manure	2.4	19	Softwood Bark	0.14 496
Corn Cobs	0.6	56-123	Softwoods (Avg.)	0.09 641
Corn Stalks	0.6-0.8	60-73	Soybean Meal	7.2-7.6 4-6
Cottonseed Ml.	7.7	7	Straw (General)	0.7 80
Cranberry Plant	0.9	61	Straw (Oat)	0.9 60
Farm Manure	2.25	14	Straw (Wheat)	0.4 80-127
Fern	1.15	43	Telephone Books	0.7 772
Fish Scrap	10.6	3.6	Timothy Hay	0.85 58
Fruit	1.4	40	Tomato	3.3 12
Garbage (Raw)	2.15	15-25	Turkey Litter	2.6 16
Grass Clippings	2.4	12-19	Turnip Tops	2.3 19
Hardwood Bark	0.241	223	Urine	15-18 0.8
Hardwoods (Avg)	0.09	560	Vegetable Prod.	2.7 19
Hay (General)	2.10	—	Water Hyacinth	— 20-30
Hay (legume)	2.5	16	Wheat Straw	0.3 128-150
Hen Manure	8	6-15	Whole Carrot	1.6 27
Horse Manure	1.6	25-30	Whole Turnip	1.0 44
Humanure	5-7	5-10		
Leaves	0.9	54		
Lettuce	3.7	—		
Meat Scraps	5.1	—		
Mussel Resid.	3.6	2.2		
Mustard	1.5	26		
Newsprint	.06-14	398-852		
Oat Straw	1.05	48		
Olive Husks	1.2-1.5	30-35		
Onion	2.65	15		
Paper	—	100-800		
Pepper	2.6	15		
Pig Manure	3.1	14		

Table 3.1
**NITROGEN LOSS AND
CARBON/NITROGEN RATIO**

Initial C/N Ratio	Nitrogen Loss (%)
20.0	38.8
20.5	48.1
22.0	14.8
30.0	0.5
35.0	0.5
76.0	-8.0

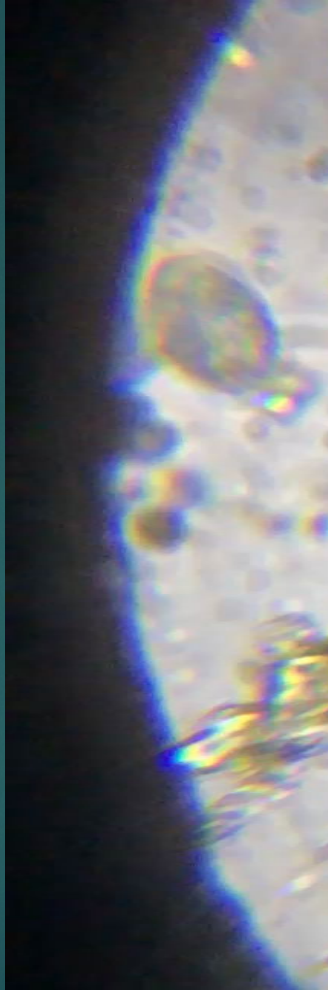
Source: Gotaas, *Composting*, 1956, p. 92

Sources: Gotaas, Harold B. (1956). *Composting - Sanitary Disposal and Reclamation of Organic Wastes* (p.44). World

Cover Crop Chart

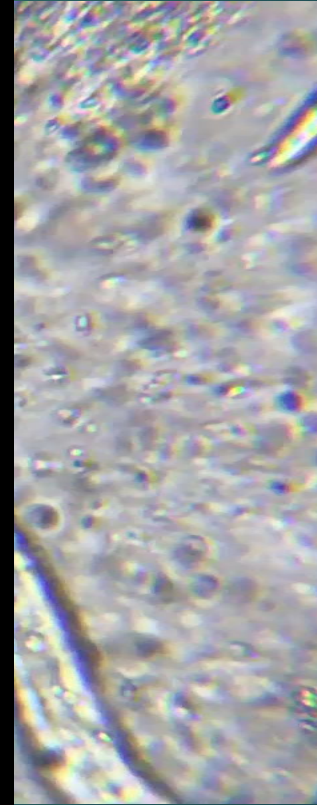
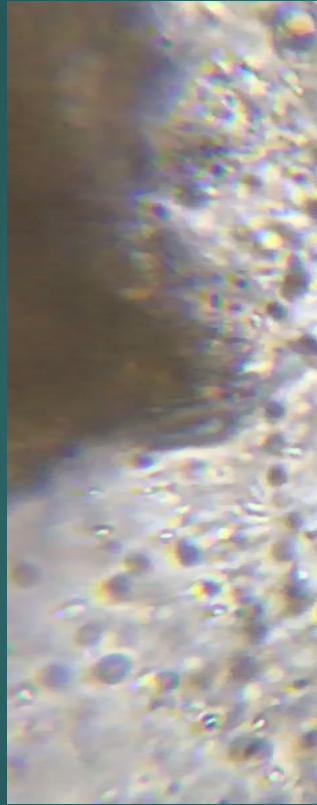
GROWTH CYCLE	PLANT ARCHITECTURE	RELATIVE WATER USE
A = Annual	Y = Upright	● = Low
B = Biennial	* = Upright-Spreading	●● = Medium
P = Perennial	≡ = Prostrate	●●● = High

--COOL--			--BROADLEAF--						--WARM--		
--GRASS--		LEGUME								--GRASS--	
A ● Y ANNUAL FESCUE										A ● Y BROWNTOP MILLET	
A ● Y BARLEY									A ● Y AMARANTH	A ● Y FOXTAIL MILLET	
A ●● Y OAT	A/B ● Y CAMELINA	A/P ● Y MUSTARD	A ● ≡* BALANSA CLOVER	A ● * CHICKPEA	A/P ● Y MEDIC	A ● * COWPEA	A ● * CLUSTER BEAN	A ●● Y BUCKWHEAT	A ●● Y PEARL MILLET		
A ● Y SPELT	A ● Y PHACELIA	A/B ●● Y CANOLA	A ●● Y BERSEEM CLOVER	A ● Y PEA	A ● Y LUPIN	A/P ● ≡* LABLAB	A/P ● * JACK BEAN	A ●● Y QUINOA	A ●● Y PROSO MILLET		
A ●● Y WHEAT	A ●● Y FLAX	A ●●● Y RADISH	A ●● * CRIMSON CLOVER	A ● * LENTIL	A ●● Y FABA BEAN	A/P ● Y FENUGREEK	A ● * VELVET BEAN	P ●● Y CHICORY	A ●● Y GRAIN SORGHUM		
A ●●● Y CEREAL RYE	A ●● Y KALE	B ●●● Y TURNIP	B/P ●● Y RED CLOVER	A/P ●● ≡* LESPEDEZA	A/B ●● Y SWEET CLOVER	A/P ● * PIGEONPEA	A ●● * MUNG BEAN	A ●●● Y CUCURBITA	A ●●● Y SUDAN GRASS		
A ●●● Y TRITICALE	A ●● Y SPINACH	B ●●● Y BEET	P ●● ≡* WHITE CLOVER	P ●● ≡* BIRDSFOOT TREFOIL	P ●●● Y ALFALFA	A ●● Y PARTRIDGE PEA	A ●● * SOYBEAN	A ●●● Y SAFFLOWER	A ●● Y TEFF		
P ● Y SALINE TOLERANT	A/B ●●● Y CHARD	A/B ●●● Y CARROT	P ●● ≡* KURA CLOVER	A/B ●● ≡* VETCH	P ●●● Y SAINFOIN	A ●● Y SUNNHEMP	A/P ●●● Y PEANUT	A ●●● Y SUNFLOWER	A ●●● Y CORN		



No-Till Cover

zing





Eat the best
leave the rest!

Leave a legacy of good soil management



Quote:

“Whether you think that you can, or that you can't,
you are usually right.” ~Henry Ford

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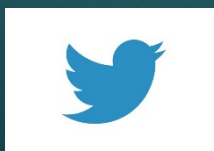


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