

# Richland County Soil Conservation District

FALL 2022

## 2022 ACHIEVEMENT AWARD WINNER

The Richland County Soil and Conservation District is pleased to announce the winner of the 2022 Conservation Achievement Award - Toussaint Farm, Doug and Liz Toussaint. The Toussaint's farm is located south of Wahpeton ND.

Toussaint Farm started incorporating No-Till and Strip-Till conservation practices in 2013. They now have 9.5 acres of CRP, 800 acres No-Till cropland, 1,600 acres Strip-Till cropland, 145 acres of Pollinator Strips, 1,600 acres of cover crops and 3,100 acres enrolled in the NRCS CSP Program. Doug is most proud of the improvements that have taken place in his soils. The implementation of No-Till and Strip-Till has also brought positive changes to the farm's operation. Deep tillage has been taken out of the operation; doing this has cut input cost per acre for Doug & Liz, Toussaint Farm.

Congratulations to Doug & Liz Toussaint on their achievements!

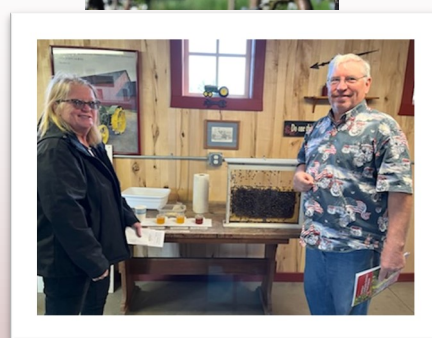


# BUZZ 'N WINE NIGHT



Our First Annual Buzz N Wine Pollinator Party was held on a breezy crisp Fall Day of September 28th at Crooked Lane Farms. Attendees visited stations of professionals including Pheasants Forever, Pollinator Trees– Keith Kinneberg and ND Forest Service Educational Outreach, NDSU Extension Master Gardeners and Pollinator Technician, Sperry Apiaries-Bees, David Hammond-Beekeeper and Honey, Mike Meyer-Produce, Lingens' Pumpkin Patch, Seed Bombs, and Pollinator Wine Tasting! With the important role that pollinators play for the production of healthy crops for food, fibers, edible oils, medicines, and more, we felt an educational event would be beneficial to our community. This was a fun way to learn about pollinators and their benefits.

Thank you to everyone that came to educate us all and to those that came to learn more about pollinators! Also, a big thank you to our prize sponsors: Agassiz Seeds, Millborn Seeds, Crooked Lane Farms and Simple Nutrition!





# 2022 First Annual Photography Contest



Thank you to everyone that participated in the First Annual Photography Contest! All entries were fantastic!

**1st Place-taken by Dianne Kriz in Wahpeton, ND. Bee at Lily. Look at all that pollen!**

**2nd Place-taken by Haley Klosterman in Wyndmere/Homestead Township, ND. Bee coming out of the Pumpkin Flower.**

**3rd Place- taken by Jon Quast just outside of Abercrombie. Butterfly on a Blazing Star (Liatris spp.)**

**Honorable Mention-taken by Kathy Bolme at Colfax, ND. Butterfly pollinating on an Allium Plant.**



1st Place



2nd Place



3rd Place



Honorable Mention





### Eco-Ed Days 2022

The 2022 Eco-Ed Field Days, for 7th graders, was held September 7th & 8th. The Richland County Soil Conservation District hosted the field day at the Bagg Bonanza Farm, Mooreton, ND. We had two days of fun-filled learning activities and being outdoors. The Eco-Ed field day is open to all Richland County School Districts, we had 7 schools participate this year (Fairmount, Colfax, Lidgerwood, Hankinson, Wyndmere, Circle of Nations and Wahpeton) with a total of 225 students in attendance.

Eco-Ed Days encompasses five learning areas: Prairie/Rangelands, Soils & Erosion, Water Quality, Wetlands and Woodlands. The students also were able to enjoy a special presentation put on by the Chahinkapa Zoo and participate in an Ecological Scavenger Hunt. The goal of this field day is for students to have a fun, interactive day learning about ecology and their environment. Along with encouraging good choices to make our water, air, plants and soils flourish not degrade. Before and after attending Eco-Ed Days the students take a test. This allows us to see how much they've learned. The student body with the highest average score, for the post-test, gets a pizza party. This year's winners of the pizza party were a group from the Circle of Nations School. We also give prizes to the Scavenger Hunt winners. Day 1 winning team was Laken, Jazzy, Ella, Brooke and Lucie from Wahpeton Middle School. Day 2 winning team was Caelyn Abel, Cody Dotzenrod, Julia Woodbury, Madeline Severance, and Luke Woltjer from Wyndmere Public School.

Submitted by: Billie Jo Hinders, District Clerk





## Notes from the District Technician Desk by Keith Kinneberg



“Times are changing so get with the changes”. I am lately hearing that from so many people. Yes, times are changing but I think of it more as seasons are changing. From it being a wet spring, to a dry summer and now who knows what fall will bring; however, I do know that some things do not change and that it is time to start getting ready for the season that I do not do well in. Trees that were planted in the last few years should be prepped for the winter months. Watering them just before the ground freezes is a good idea: as, watering will give them that extra moisture to keep from drying out. The dryer the ground the harder the freeze. Make sure the leaves on deciduous trees have fallen off first as that means the trees are going into the dormant stage. Another concern is protecting those young trees from damage done by rodents and deer. Tubes are available here at the SCD that you can purchase to place over those trees (what I call investments). We did do our fall tree survival check the last week of September to see how the trees that were planted this past spring survived and we ended up with a 76% overall rate. This is not bad considering the type of year it was. Tree maintenance is so important. We did see areas where weeds and not watering when needed became a problem and this led to some poor survival. Poor maintenance means poor survival. I was amazed however at the planting where excellent care was done and how well the trees are doing so thank you landowners for the hard work in protecting your investment. Just a reminder to those that had planting done that if you want to replace those that did not survive that it is at the expense of the owner and let the office know that you want to replace them. Just a reminder that we are taking handplant orders now and you can download our order form off the [richlandscd.com](http://richlandscd.com) website. It looks like it will be a busy spring with tree planting so let’s hope it comes early. Hopefully times will change for the better.



## PRICE LIST FOR 2022-2023

Regular Stock-	\$40.00 -in bundle of 25's
Singles-Regular Stock	\$2.00 (minimum of 10 trees per species)
Taller stock (2'-3')	\$3.00 (over 3') \$4.00
Potted (spruce or pine)	\$10.00 (1 Gal. containers)
Handplanted by staff-	\$4.00 per tree (includes labor and tree)

Prices on special order trees will vary according to species and cost of purchasing from nursery.

### Machine Planting:

\$40.00 per 100 feet (includes trees and labor)

Minimum of \$400 will be charged regardless.

### Tubes and Stakes:

4 foot (vented style): \$4.50 each \$6.00 w/stake \$1.50 for stake.

Application of tubes by staff- \$2.00 plus cost of tube and stake.

### Fabric Weed Control:

Applied by SCD— .60 cents per foot (includes cost of fabric)

Fabric purchased by producer- .50 cents per foot

\$150.00 per 500' roll

Staples purchased- .05 cents per staple

### Grass Seeding:

\$25.00 an acre- with minimum charge of \$300

### Rototilling:

\$75.00 per hour – with minimum charge of \$250

(Tilling will be used for tree planting contracts and grass seeding areas and not for garden use. Other uses may be available if approved by Bd of Directors)

# Hand Plant Tree Order Form

(Please read bottom information before filling out order)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Street: \_\_\_\_\_

Phone#: \_\_\_\_\_

City: \_\_\_\_\_

Minimum of 10 trees per species

QTY      SHRUBS

- \_\_\_\_\_ Buffaloberry
- \_\_\_\_\_ Caragana
- \_\_\_\_\_ Nanking Cherry
- \_\_\_\_\_ Sand Cherry
- \_\_\_\_\_ Common Chokecherry
- \_\_\_\_\_ Viburnum Nannyberry
- \_\_\_\_\_ Shubert Chokecherry
- \_\_\_\_\_ American Cranberry
- \_\_\_\_\_ Golden Currant
- \_\_\_\_\_ Juneberry
- \_\_\_\_\_ Redosier Dogwood
- \_\_\_\_\_ Common Lilac
- \_\_\_\_\_ Villosa (late) Lilac
- \_\_\_\_\_ Amur Maple
- \_\_\_\_\_ Plum

QTY      TALL HEIGHT TREES

- \_\_\_\_\_ Silver Maple +
- \_\_\_\_\_ Laurel Leaf Willow
- \_\_\_\_\_ Northern Hackberry +
- \_\_\_\_\_ American Linden +
- \_\_\_\_\_ Hybrid Poplar
- \_\_\_\_\_ Native Cottonwood (seed bearing)
- \_\_\_\_\_ Native Male Cottonwood (seedless)
- \_\_\_\_\_ Siouland Cottonwood
- \_\_\_\_\_ Black Walnut +
- \_\_\_\_\_ Golden Willow
- \_\_\_\_\_ Bur Oak – (container grown)
- \_\_\_\_\_ Princeton Elm (priced annual)
- \_\_\_\_\_ Quaking Aspen
- \_\_\_\_\_ \_\_\_\_\_
- \_\_\_\_\_ \_\_\_\_\_

QTY      MEDIUM HEIGHT TREES

- \_\_\_\_\_ Apricot
- \_\_\_\_\_ Red Splendor Crabapple
- \_\_\_\_\_ Midwest Crabapple
- \_\_\_\_\_ Siberian Crabapple
- \_\_\_\_\_ Ussurian Pear
- \_\_\_\_\_ Black Cherry
- \_\_\_\_\_ Sugar Maple
- \_\_\_\_\_ Maple Freeman
- \_\_\_\_\_ Little Leaf Linden +

QTY      CONIFERS

- \_\_\_\_\_ Colorado Blue Spruce (BR or Potted)
- \_\_\_\_\_ Black Hills Spruce (BR or Potted)
- \_\_\_\_\_ Ponderosa Pine (BR or Potted)
- \_\_\_\_\_ Scotch Pine (BR or Potted)
- \_\_\_\_\_ Eastern Red Cedar (Bare root only)
- \_\_\_\_\_ Rocky Mountain Juniper (Bare Root only)
- \_\_\_\_\_ Meyer Spruce (BR or Potted)

**Circle BR if you want conifers in Bare Root**

**Circle Potted if you want conifers in 1 Gal. pot**

\_\_\_\_\_ Please check if you are a farmer or rancher- Trees are NOT subject to sales tax.

All trees are subject to availability from the nursery sources. Regular stock trees are 12-18" tall and are \$2.00 per tree or \$40.00 per bundle of 25 trees and payable at time of pickup. Potted 1 Gallon trees are \$10.00. **Orders \$100.00 and over will require a 50% down payment due by February 15<sup>th</sup> 2022.** Prices are subject to change. + indicates that variety may be purchased as taller stock. Please indicate above if you want taller trees. 2-3 ft are \$3 each and over 3ft are \$4. Please call if you want a certain variety not listed to check on availability. 1-701-642-5997 Ext. 3 Mail to: Richland SCD 1687 Bypass Rd Wahpeton, ND 58075

# TREE DESCRIPTIONS FOR SPRING 2023 LIST

Mature Height	Species	Description	Salinity Tolerance	Drought Tolerance	Water Tolerance	Edible Fruit	Comments
6'-14'	<b>Buffaloberry</b>	Shrub-Lg.	Good	Fair	Poor	Yes	Silver leaf, thorns, fruit for jelly
6'-14'	<b>Caragana</b>	Shrub-Lg.	Fair	Fair	Poor	No	Bright yellow May flowers
6'-10'	<b>Cherry, Nanking</b>	Shrub-Med.	Fair	Fair	Poor	Yes	Fast growing, short lived, pink flowers
3'-6'	<b>Cherry, Sand</b>	Shrub-Sm.	Fair	Fair	Poor	Yes	White flowers-fruit makes good jelly
3'-6'	<b>Chokeberry, Black</b>	Shrub-Sm.	Fair	Good	Good	Yes	Green foliage turns red/purple in fall
12'-25'	<b>Chokecherry, Common</b>	Shrub-Lg.	Fair	Fair	Good	Yes	Fruit used in jams, jellies, wines Seeds, branches, and leaves are toxic
4'-8'	<b>Cotoneaster</b>	Shrub-Med	Poor	Poor	Fair	Wildlife	Pink flowers, berries not edible
15'	<b>Cranberry, High-bush</b>	Shrub-Lg.	Poor	Fair	Fair	Yes	White flowers, moist well-drained sites
3'-6'	<b>Currant, Golden</b>	Shrub-Sm.	Fair	Fair	Poor	Yes	Yellow flowers, red leaves in fall
7'-10'	<b>Dogwood, Redosier</b>	Shrub-Med.	Fair	Fair	Good	Wildlife	White flowers and red bark
6'-12'	<b>Elderberry</b>	Shrub-Lg.	Poor	Fair	Fair	Yes	Native, white flowers, full sun
10'-15'	<b>Euonymus Winterberry</b>	Shrub-Lg.	Poor	Poor	Fair	No	Pink fruit is toxic if eaten Pink leaves in fall; Not very cold-hardy
8'-12'	<b>False Indigo</b>	Shrub-Med.	Good	Poor	Good	No	Fibrous deep roots good for river banks
	<b>Honeysuckle, Freedom</b>	Shrub-Med.	Good	Fair	Fair	Wildlife	Adaptable to a wide variety of soils
6'-15'	<b>Juneberry</b>	Shrub-Lg.	Fair	Fair	Poor	Yes	Native, berries for canning and baking
8'-12'	<b>Lilac, Common</b>	Shrub-Lg.	Fair	Fair	Poor	No	Suckers, fragrant purple flowers
6'-10'	<b>Lilac, Late</b>	Shrub-Med.	Fair	Fair	Poor	No	No suckers, later blooming
3'-5'	<b>Rose, Woods</b>	Shrub-Sm.	Fair	Fair	Fair	Yes	Pink flowers, small thorns
10'-15'	<b>Seaberry/Sea-Buckthorn</b>	Shrub-Med.	Good	Good	Good	Yes	Fair number of thorns Berries have many different uses
5'-9'	<b>Silverberry</b>	Shrub-Med.	Good	Good	Good	Wildlife	Silver green foliage, suckers profusely
5'-15'	<b>Sumac, Smooth</b>	Shrub-Lg.	Good	Fair	Fair	Yes	Brilliant red leaves and berries in fall
5'-10'	<b>Willow, Sandbar</b>	Shrub-Med.	Poor	Poor	Good	No	Suckering, fast growing, riparian use
10'-15'	<b>Apricot, Hardy</b>	Small Tree	Poor	Poor	Fair	Yes	Fruit is good for making jam
15'-20'	<b>Crabapple, Red Splendor</b>	Small Tree	Poor	Fair	Poor	Yes	Pink flowers, green to red foliage, wildlife food
15'-25'	<b>Crabapple, Siberian</b>	Small Tree	Poor	Fair	Poor	Yes	White Flowers, fruit stays on all winter
15'-20'	<b>Hawthorn, Arnold</b>	Small Tree	Good	Fair	Fair	Yes	White flowers, red fruit, thorny stems
15'-20'	<b>Maple, Amur</b>	Small Tree	Poor	Fair	Poor	No	Red foliage in the fall
15'-25'	<b>Olive, Russian</b>	Small Tree	Good	Good	Fair	Wildlife	Silvery leaves with thorns
15'-25'	<b>Pear, Ussurian</b>	Small Tree	Poor	Fair	Poor	Yes	White flowers, small fruit
8'-10'	<b>Plum, Native</b>	Small Tree	Poor	Fair	Poor	Yes	White flowers, suckering
15'-20'	<b>Willow, Flame</b>	Small Tree	Fair	Poor-Fair	Good	No	Orange/Red branches all year

**The trees above are conservation grade, 6"-24" bare root stock and are eligible for the bundle sale at \$30.00/ bundle (1 bundle= 25 trees).**

*Proper site preparation and maintenance is the best insurance of tree survival.*

**All conservation trees are sold with no guarantee or warranty.**



**TREE DESCRIPTIONS FOR SPRING 2023 LIST**

Mature Height	Species	Description	Salinity Tolerance	Drought Tolerance	Water Tolerance	Edible Fruit	Comments
25'-60'	<b>Aspen, Quaking</b>	Med.-Tall	Fair	Poor	Good	No	Browsed by deer; Yellow fall leaves
30'-60'	<b>Birch, Paper</b>	Med.-Tall	Fair	Poor	Good	No	Needs well drained soils
30'-50'	<b>Boxelder</b>	Medium	Fair	Good	Fair	No	Fast growth on clay or heavy soil
20'-40'	<b>Buckeye, Ohio</b>	Medium	Fair	Poor	Fair	Wildlife	Broad canopy, good fall colors
100'	<b>Cottonwood, Native</b>	Tall	Fair	Fair	Good	No	Large fast growing, long lived (cotton)
	<b>Cottonwood, Male</b>	Tall	Fair	Fair	Good	No	Same as cottonwood without cotton
100'	<b>Cottonwood, Siouxland</b>	Tall	Fair	Fair	Good	No	Fast growing, hybrid, without seed, shorter lived (25-30 years)
25'-50'	<b>Elm, Siberian</b>	Medium	Good	Good	Fair	No	Fast growing, produces a lot of seed
35'-65'	<b>Green Ash</b>	Med.-Tall	Good	Good	Fair	No	Host for the Emerald Ash Borer.
40'-60'	<b>Hackberry</b>	Med.-Tall	Fair	Fair	Fair	No	Slower growing, good for wildlife
50'-70'	<b>Linden, American</b>	Large	Poor	Poor	Good	No	Shade tolerant, moist, well-drained soil
35'-45'	<b>Linden, Little leaf</b>	Medium	Poor	Poor	Good	No	Dense leaves, good canopy
40'-60'	<b>Maple, Freeman</b>	Med.-Tall	Poor	Poor	Fair	No	Soil specific, needs iron, red fall color
40'-65'	<b>Maple, Silver</b>	Med.-Tall	Poor	Poor	Fair	No	Fast growing, leaves have silver underside
	<b>Maple, Red</b>	Med.-Tall	Poor	Poor	Fair	No	Fast growing with red flowers in the Spring and different shades in Fall.
40'-70'	<b>Oak, Bur</b>	Med.-Tall	Fair	Fair	Fair	Wildlife	Native, long lived, produces acorns
	<b>Oak, Bur-Gambel</b>	Medium	Fair	Good	Fair	Wildlife	Hybrid between Bur & Gambel Oaks
40'-60'	<b>Poplar, Hybrid</b>	Tall	Fair	Fair	Fair	No	Early acorn producer (3-6 years old) Rapid growth, lives 20-30 years
20'-30'	<b>Walnut, Black</b>	Med.-Tall	Poor	Fair	Fair	Wildlife	Needs shelter from wind to establish
40'-60'	<b>Willow, Golden</b>	Med.-Tall	Fair	Poor-Fair	Good	No	Good winter color, hanging branches
25'-40'	<b>Willow, Laurel</b>	Small-Med.	Poor	Poor-Fair	Good	No	Dark, glossy leaves
<b>Conifers/Evergreens</b>							
30'-45'	<b>Cedar, Eastern Red</b>	Medium	Fair	Fair	Fair	No	Good wildlife cover, browns in winter
30'-60'	<b>Larch, Siberian</b>	Med. - Tall	Fair	Fair	Good	No	Deciduous conifer; yellow fall color
12'-15'	<b>Juniper, Rocky Mtn.</b>	Small	Fair	Good	Poor	No	Good for wildlife planting
50'-70'	<b>Pine, Ponderosa</b>	Tall	Fair-Poor	Good	Fair	No	Fast growing conifer with long needles
25'-50'	<b>Pine, Scotch</b>	Medium	Poor	Good	Poor	No	Fast growing conifer, narrow needles
30'-60'	<b>Spruce, Black Hills</b>	Med. - Tall	Poor	Good	Poor	No	Dense needled evergreen Needles
30'-60'	<b>Spruce, Colorado Blue</b>	Med. - Tall	Poor	Good	Poor	No	can be dark green to blue
40'	<b>Spruce, Meyers</b>	Med. - Tall		Good		No	More resistant to pests & disease

**The trees above are conservation grade, 6"-24" bare root stock and are eligible for the bundle sale at \$30.00/ bundle (1 bundle= 25 trees). Minimum quantity per variety is 10 and sold for \$2.00 each Princeton Elm \$5.00 each**

**Princeton Elms cost more per tree with a min. purchase of 10 per variety**

60'-80'	<b>Elm, Princeton</b>	Tall	Good	Good	Good	No	Resistant to Dutch Elm Disease
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## 319 Antelope Creek Watershed News

By Jennifer Klostreich



It was another productive year for our watershed project. I was able to water sample 7 sites, 5 on the Antelope Creek including both North and South Branch, along with 2 sites on the Wild Rice River. July was the last time I was able to sample on the Antelope Creek due to little to no flow of water. The water is sent to North Dakota Department of Environmental Quality (NDDEQ) for analysis in Bismarck. This information is what has been used in the past to assess if we have had improvements in our water quality, or further need for projects in our county.

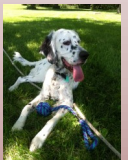
I am just wrapping up our 319 grant - Phase V. That should close by the end of this year and then I will be completing the final report for that grant, it will be submitted for approval Dec 31, 2022. Good news, we already have Phase VI funds in house since July. Give me a call if you think of a water quality project you want to address in 2023! Office - 701-642-5997 ext. 3

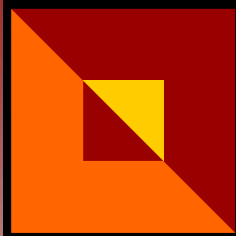


## Welcome the New District Conservationist!

Jon Quast

I would like to take this opportunity to introduce myself. My name is Jon Quast, I am the new NRCS District Conservationist at the Wahpeton Field Office. I am very excited to be working in a county that has such a diverse mix of cropland, pasture, and rangeland. I grew up on the eastern edge of MN south of the Twin Cities and received a Bachelor of Science in Wildlife & Fisheries with a minor in Range from South Dakota State University and did Master of Science degree work at North Dakota State University. In 2014 I started with NRCS as a Soil Conservation Technician in Lac qui Parle County (Madison, MN) for 2 years, then transferred to Traverse County (Wheaton, MN) as the Soil Conservationist. After Traverse County in 2017 I became the Soil Conservationist then District Conservationist in the Breckenridge Field Office (Wilkin Co.) where I worked with cover crops, no-till/strip-till operations, CRP and pollinator plantings, grazing systems, erosion control structures and stream restorations. I live in Wahpeton with my wife, 2 young children, and a marshmallow of a hunting dog, Hawkeye an 11-year-old English Setter. My hobbies include hunting, fishing, primitive camping and coaching high school and college trapshooting. I also spend time officiating high school athletics. I look forward to meeting you in the future and assisting you with your conservation needs.





# Soil Health Goal Setting

**Jon Quast**

**NRCS District Conservationist**

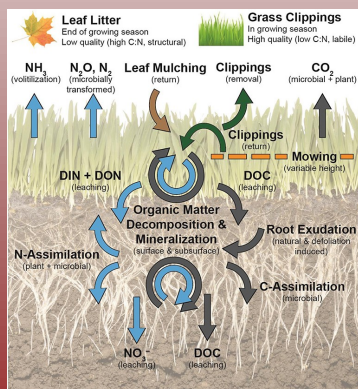
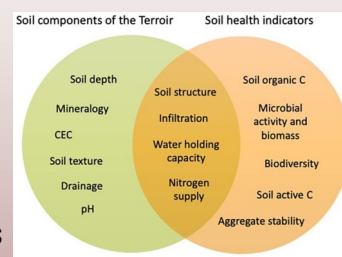
The “regeneration” in regenerative agriculture refers to the transformations that take place when soil is managed as a living ecosystem. For example, a soil that is undisturbed and has more continuous living roots will begin to show improvements in structure, as organic residues from plants and microbes glue mineral particles together into aggregates. Well-structured soils feature a wide range of micro-habitats and, consequently, can support a greater diversity of soil organisms. These organisms’ life cycles improve conditions for plant growth (e.g., aeration by earthworms and enhanced nutrient availability due to microbial decomposition of organic matter), leading to further improvements in soil structure and biological activity.



Given that these transformations can be gradual and different management strategies can be used to achieve desired changes, a question worth asking early in the regenerative agriculture journey is: How far can these transformations go? Or, in other words, how much healthier can a soil get? To explain how to answer this question, we’ll look at how we quantify both current and potential soil health.

The concept of soil health refers to a soil’s ability to perform the multiple jobs it is expected to do, including providing crops with water and nutrients, reducing runoff and erosion, and storing atmospheric carbon fixed by plants through photosynthesis. These different functions depend on soil physical, chemical, and biological properties, so assessing soil health is a fundamentally multifaceted task.

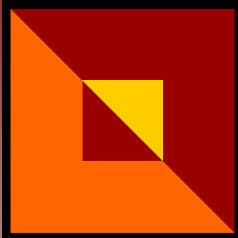
Soil scientists often measure soil health indicators to make a comprehensive assessment of soil functioning. Understanding how much organic matter is present in the soil is particularly important, as organic matter plays a central role in multiple soil functions. Organic carbon measurements provide a direct indicator of organic matter content because organic matter is >50% carbon by weight. Measuring soil organic carbon content also makes it possible to estimate organic carbon storage per unit area if bulk density, sample depth, and rock content are also known. Aggregate stability, or the ability of soil aggregates to withstand applied disruptive forces, is a reliable metric for soil structure and resistance to erosion. Additional insights into soil structure can be gained by measuring soil water-holding capacity, saturated hydraulic conductivity, and compressive strength. The biological dimensions of soil health can be assessed using proxies for microbial activity, including enzyme activities, permanganate-oxidizable carbon (“active carbon”), and respiration during laboratory incubation (“potential carbon mineralization”). When evaluated together, soil health indicators give a snapshot of soil health status



for integrated assessment of management outcomes. Diagnosing specific soil properties limiting crop growth may require additional measurements.

Interpretation of each soil health indicator requires defining what values are ideal. Soils can exhibit different ranges of indicator values depending on site characteristics, including precipitation, temperature, soil types, and topographic position. An organic carbon concentration of 1.5% may be very high for a soil on a sandy hilltop, but relatively low for a neighboring soil in a clay-rich depression, both under the same management. Differences in inherent properties (i.e., texture and topographic position) give these soils different capacities to store organic carbon.



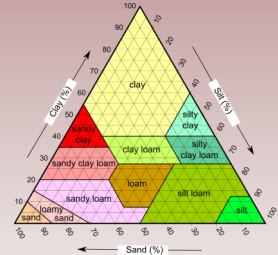


# Soil Health Goal Setting Continued

Jon Quast

NRCS DC

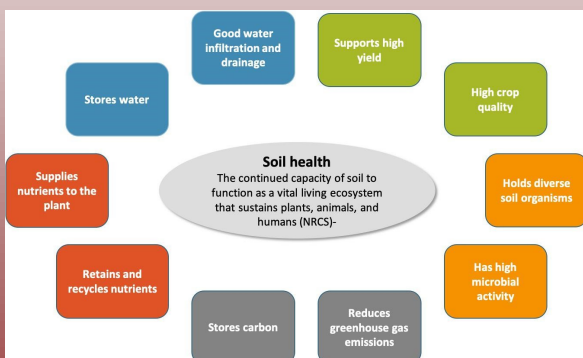
How can we determine different soils' potential soil health? First, we need to clarify what we mean by "different soils." Soils are incredibly diverse due to processes that occur over hundreds to thousands of years; if no two snowflakes are identical, then certainly no two soils are. However, soils can be grouped based on natural variation in the properties that are most relevant to soil health, including texture (i.e., sand, silt, and clay content), drainage, and mineralogy. Spatial trends in these properties can be evaluated using publicly available data (e.g., USDA National Cooperative Soil Survey maps) in conjunction with in-field interpretation. These properties allow us to group soils based on potential soil health, so that soil health indicators measured on one soil can be interpreted using data for soils with similar inherent properties and site characteristics. Grouping soils according to the inherent properties relevant to soil health makes it possible to link soil health indicator values to differences in management, rather than natural variation across sampling locations.



The potential soil health of each group of soils can be established by measuring soil health indicators under management conditions that exemplify the soil health principles, including minimal soil disturbance, continuous living roots, and physical protection of the soil surface. In many landscapes, perennial vegetation may provide the best reference for the capabilities of a soil health group after long-term implementation of the soil health principles. Soil health indicator values under optimal management for soil health are referred to as Soil Health Targets. Soils under row crops are not expected to achieve 100% of target values, as some degree of disturbance is unavoidable in crop production. However, standardizing soil health measurements relative to Soil Health Targets provides a consistent basis for comparing soils with different inherent properties.

Once you've measured your current soil health and compared it to what your soil is capable of, you have the data you need to set achievable goals for management outcomes. Integrated assessment of physical, chemical, and biological soil health indicators, relative to Soil Health Targets, can point to the management changes that will most likely lead to the greatest improvements in soil functioning. For example, if aggregate stability is high but biological activity (e.g., active carbon or carbon mineralization) is low, disturbance may be minimized enough to develop soil structure, but greater organic matter inputs may be necessary to stimulate the soil microbial community. The experiences of farmers with similar soils and the advice of trusted local advisors are invaluable resources for developing the specific management strategies that will move you towards your Soil Health Targets.

Credit: Soil Health Institute



Physical	Chemical	Biological
Texture	pH	Carbon mineralization
Wet aggregate stability	Phosphorus	Nitrogen mineralization
Water holding capacity	Potassium	Crop Yield
Bulk density	Base Saturation,	<i>Permanganate oxidizable carbon</i>
Penetration resistance	Electrical Conductivity	<i>Soil Protein Index</i>
Erosion rating	Cation exchange capacity	<i>Phosphatase</i>
Infiltration rates	Total organic carbon	<i>β-glucosidase</i>
	Total nitrogen	<i>N-acetyl-β-D-glucosaminidase phosphatase;</i>
		<i>Arylsulfatase</i>
		<i>Phospholipid Fatty Acids</i>
		<i>Ester-Linked Fatty Acid Methyl Esters</i>
		<i>Genomics</i>

*Soil Stability Index*

*Reflectance*

All programs and services are offered on a non-discriminatory basis, without regard to race, color, national origin, religion, sex, age or handicap.



**Board Members:**

**Dave Muehler**  
**Kelly Klosterman**  
**Mike Haverland**  
**Chris Walberg**  
**Carson Klosterman**

**OFFICE STAFF:**

Jennifer Klostreich - **Watershed Coordinator**  
Keith Kinneberg - **District Technician**  
Billie Jo Hinders - **District Clerk**  
Jon Quast - **NRCS District Conservationist**  
Tanner Tougas - **NRCS Soil Conservationist**  
Dianne Kriz - **NRCS Contractor**  
James Winther - **NDASCD Farm Bill Specialist**

**OFFICE HOURS:**

8am - 4:30pm Monday-Friday  
701-642-5997 Ext. 3



**TENTATIVE BOARD MTG**

**SCHEDULE**

**November 8th**  
**December 13th**  
**January 10th**  
**February 14th**  
**March 14th**  
**April 11th**



Richland County Soil Conservation District  
1687 Bypass Rd.  
Wahpeton, ND 58075

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