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- **President-Elect**: Cody J. Hatzenbuhler
- **Past President**: Lance Loken
- **Secretary-Treasurer**: Larry Cihacek
- **Council Representatives**: Beth Burdolski, Tanni Nanna

**Committee Chairs:**

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- **Environmental Education**: **Marko Davinic**
- **Historian**: Fred Aziz
- **Legislative**: Lance Loken
- **Membership**: Dr. Larry Cihacek
- **Newsletter**: Cody J. Hatz.
- **Nominations**: Amy Schlepp
- **Publicity**: Cody J. Hatz.
- **Scholarship**: Mark Anderson
- **Webmaster**: Cody J. Hatz.
- **Student Chapter**: Vacant

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**The Flickertail**

**Spring/Summer 2017**

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**We're on the Web! ==>** [www.ndswcs.org](http://www.ndswcs.org)
When you drive around in the winter and spring, do you notice all the dirt lying on top of the snow in the ditches? That’s SNIRT….SNOW-DIRT. It’s erosion happening where you can visually see the movement and deposit of the soil. They have found soils we have in ND down in the southern U.S. due to our high winds and tillage practices. The amount of sediment you see varies by method of fall tillage mainly. Winters with little snow cover (like this winter), conventional tillage, and windy winters, all lead to a higher amount of SNIRT. That is top-soil that contains organic matter, nutrients and minerals, which take many years to re-establish. In the spring melt it gets washed away and it ends up as sediment in your coulees, ditches and road ditches. Any small amount of crop residue or cover crop will greatly decrease this movement of dirt out of the field.

Reducing or eliminating tillage (or plowing) not only improves soil health but can save energy. First try to eliminate the fall tillage, which will help reduce SNIRT.

Utilize a cover crop to enhance crop diversity by adding crop types which are missing in the cash crop rotation (cool-season grass, cool-season broadleaf, warm-season grass, warm-season broadleaf).

Check field conditions for multiple years of crop residue on the soil surface (an indicator of imbalance in the Carbon-Nitrogen Ratio). Plant residue with a lower C: N ratio will break down faster than plant residue with a high C: N ratio.

Get a soil test completed on all fields so you know what is out there. If you plan on seeding a cover crop, consider harvesting the cover crops with proper grazing, leaving at least 50% of the available biomass on the field. We call it the “take half, leave half approach”.

Utilize cover crops or leave crop residue standing in a manner that provides sufficient ground cover to prevent erosion.

Healthy soils should be “active” with live roots for as long as possible. Contrary to conventional thought, healthy soil should not lie “fallow” from time to time (that is, to lie bare without growing plants). Having plants grow all the time to capture energy, feed microbial populations and reduce soil erosion helps improve soil health, which can also increase your yield.
GOOD BUGS
FARMING WITH BENEFICIAL INSECTS FOR PEST CONTROL: CONSERVATION BIOCONTROL SHORT COURSE

Learn a science-based strategy that seeks to integrate beneficial insects for natural pest control!

Due to limited spaces pre-registration is required by August 11, 2017.

Registration Forms are available at: www.ndswcs.org

Cost: Registration is $30 per person by August 1st, Late Registration is $40 per person.

Registrants will receive the Xerces Society’s Pollinator Conservation Toolkit which includes Xerces’s book, Farming with Beneficial Insects as well as habitat management guidelines and relevant USDA-NRCS and extension publications.

Lunch is included.

About the course
Learn about supporting beneficial insects that provide pest control in this full-day short course. Conservation biological control is a science-based pest management strategy that seeks to encourage beneficial insects back into cropping systems for natural pest control, ultimately rewarding farmers with economically-viable pest management systems. Join Eric Mader, Pollinator Program Co-Director at the Xerces Society, as he overviews conservation biological control and beneficial predators and parasitoids that attack insect pests. Participants will learn how common farm practices can impact beneficial insects and how to assess and create farm habitat for beneficial insects.

AUGUST 22, 2017
NDSU North Central Research Extension Center
Minot, ND

Contact/Questions:
Lena Bohm 701-756-6351
lena.bohm@nd.usda.gov

Travis Prochaska 701-857-7677
Travis.prochaska@ndsu.edu

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**GOOD BUGS**

NDSU North Central Research Extension Center  
south of Minot, ND  
August 22, 2017

### Farming with Beneficial Insects for Pest Control: Conservation  
Biocontrol Short Course

<table>
<thead>
<tr>
<th>Registration due August 1, 2017</th>
<th>Registration includes: Xerces Society’s Pollinator Conservation Toolkit which includes Xerces Book, Farming with Beneficial Insects as well as habitat management guidelines, relevant USDA-NRCS and NDSU Extension publications, and lunch.</th>
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<td>Registration begins at 8:00 am. Program starts at 9:00 am and runs to 4:30 pm. There is a field component in the afternoon, so dress accordingly.</td>
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<td>Late Registration: $40.00</td>
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<th>E-mail address (REQUIRED)</th>
<th>Special Accommodations Needed?</th>
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</tr>
</tbody>
</table>

All registrations are to be made payable to NDSWCs. Registrations and Contributions can be mailed to:

**NDSWCS**  
c/o Larry Cihacek  
655 Birch Lane  
Moorhead, MN 56560

![CCA Credit Approved](image)
71st Soil & Water Conservation Society - National Awards

Lance Loken
* Commendation Award

Hal Weiser
* Harold & Kay Scholl Excellence in Conservation Award

Larry Cihacek
* Conservation Research Award

North Dakota Chapter
* 2016 – Outstanding Award
SWCS Membership Form

Instructions: Please complete, print, and return with payment to SWCS, 945 SW Ankeny Rd, Ankeny, IA 50023.

Name ____________________________

Company/Organization ____________________________

Home Business Street Address ____________________________

City ____________________________ State/Province _______ ZIP/Postal _______

Phone ____________________________

Email ____________________________

Membership Level Please select how you would like to receive the Journal of Soil and Water Conservation.

- $275.00 President’s Club Online Print*
- $180.00 Leader Online Print*
- $115.00 Conservationist Online Print*
- $40.00 Student - Students automatically receive the online version of the Journal of Soil and Water Conservation. Students, please provide your anticipated graduation month and year: __________

Additional Options:

- $40.00 I would like BOTH the Print and Online access to the Journal of Soil and Water Conservation.
- $30.00 *International Postage (if receiving printed Journal, outside the United States)

Additional Contribution to support program development and advocacy:

- $25.00
- $50.00
- $100.00
- Other ____________________________

Total: ____________________________ All memberships are for 12 months from date of payment.

Payment Options

- I want to pay by check. I will include a check for the above amount, payable to SWCS, in US funds on a US Bank.

- Please charge the above total amount to my:
  - Visa
  - Mastercard
  - American Express

Account #: ____________________________ Exp Date __________ Verification number __________

Signature: ____________________________

Return this form with your payment to the address listed above.

Questions about membership? Call membership services 515-289-2331 ext 118 or email memberservices@swcs.org
In 1982, an average of 7.3 TONS of topsoil washed or blew away from every acre of cultivated cropland in the U.S. By 2003, the rate of soil erosion had dropped to 4.7 TONS per acre. Farmers and ranchers, with assistance from other agencies, reduced the Nation’s annual soil loss from 3.1 billion tons in 1982 to 1.8 billion tons in 2001. That is enough topsoil saved in just 1 year to fill a convoy of dump trucks, 137 wide, stretching from Los Angeles to New York. Can you say WOW?!?!

Controlling erosion ensures that the land will be productive for a long time. It also reduces the amount of soil, pesticides, fertilizers and other substances that pollute the nation’s water sources. The above fun fact goes along directly with the ND SWCS’s mission, which is “to foster the science and art of natural resource conservation.” Our work targets conservation of soil, water, and related natural resources on working land - the land used to produce food, fiber, fuel and other services that improve the quality of life for people. Members of the ND SWCS work to discover, develop, implement, and constantly improve ways to use land that sustains its productive capacity and enhances the environment at the same time.

Be on the lookout for our upcoming workshops and technical meetings in 2017, one is listed in this newsletter and be sure to check out our website for more!

“Essentially, all life depends upon the soil ... There can be no life without soil and no soil without life; they have evolved together.” --- Charles E. Kellogg, USDA Yearbook of Agriculture, 1938
## Haney Soil Health Analysis Report

**Report Date:** 26 Apr 2017  
**Work Order #:** 201711-00379  
**Account #:** 040515  
**Purchase Order Number:**  
**Date Received:** 14 Apr 2017

**Sample ID:** 1406  
**Lab Number:** 17-V418

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Value</th>
<th>Calculation</th>
</tr>
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<tbody>
<tr>
<td>1:1 Soil pH</td>
<td>7.4</td>
<td>ICAP Aluminum, ppm Al</td>
</tr>
<tr>
<td>1:1 Soluble Salts, mmho/cm</td>
<td>0.26</td>
<td>ICAP Iron, ppm Fe</td>
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<tr>
<td>Excess Lime Rating, Organic Matter, %LOI</td>
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<tr>
<td>WDRF Buffer pH</td>
<td>3.2</td>
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<tr>
<td>Solvita CO2 Burst</td>
<td>7.2</td>
<td>Organic C:Organic N</td>
</tr>
<tr>
<td>Solvita CO2-C, ppm C</td>
<td>68.7</td>
<td>Nitrogen Mineralization, ppm N</td>
</tr>
<tr>
<td>Water Extract</td>
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<td>Organic Nitrogen Release, ppm N</td>
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<tr>
<td>Total Nitrogen, ppm N</td>
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<td>Organic Nitrogen Reserve, ppm N</td>
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<tr>
<td>Organic Nitrogen, ppm N</td>
<td>19.9</td>
<td>Phosphorus Mineralization, ppm P</td>
</tr>
<tr>
<td>Total Organic Carbon, ppm N</td>
<td>224</td>
<td>Organic Phos Reserve, nm P</td>
</tr>
<tr>
<td>H3A Extract</td>
<td></td>
<td>Phos Saturation Al/Fe, %</td>
</tr>
<tr>
<td>Nitrate, ppm NO3-N</td>
<td>4.4</td>
<td>Phosphorus Saturation Ca, %</td>
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<tr>
<td>Ammonium, ppm NH4-N</td>
<td>2.5</td>
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</tr>
<tr>
<td>Inorganic Nitrogen, ppm N</td>
<td>6.9</td>
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<tr>
<td>Inorganic (FIA)Phosphorus, ppm P</td>
<td>11.8</td>
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<tr>
<td>Total (ICAP) Phosphorus, ppm P</td>
<td>18</td>
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</tr>
<tr>
<td>Organic Phosphorus, ppm P</td>
<td>5.8</td>
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</tr>
<tr>
<td>ICAP Potassium, ppm K</td>
<td>103</td>
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</tr>
<tr>
<td>ICAP Calcium, ppm Ca</td>
<td>975</td>
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### Soil Health

- **Soil Health Calculation:** 10.3  
- **Cover Crop Suggestion:** 50% Legume 50% Grass

### Nutrient Quantity Available for Next Crop

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Available Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen, lbs N/A</td>
<td>53.5</td>
</tr>
<tr>
<td>Phosphorus, lbs P205/A</td>
<td>46.8</td>
</tr>
<tr>
<td>Potassium, lbs K2O/A</td>
<td>124</td>
</tr>
<tr>
<td>Nutrient Value, $/A</td>
<td>114.44 N Savings, $/A</td>
</tr>
</tbody>
</table>

### Nitrogen Savings by Using the Haney Test

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Evaluation, lbs N/A</td>
<td>8.8</td>
</tr>
<tr>
<td>Haney Test N Evaluation, lb N/A</td>
<td>53.5</td>
</tr>
<tr>
<td>Nitrogen Difference, lbs N/A</td>
<td>44.7</td>
</tr>
<tr>
<td>114.44 N Savings, $/A</td>
<td>28.58</td>
</tr>
</tbody>
</table>
Haney And True Balance Understanding the Haney TEST !!

TRUE BALANCE LLC
PO BOX 133
Rugby, ND 58358

TRUE BALANCE ANALYSIS OF HANEY SOIL HEALTH REPORT

True Balance LLC  
Spring Season 2017  
Agronomist: Cody Hatzenbuhler  
Email: Cody.Hatzenbuhler@truebnd.com  
Phone: (701) 391-1995

Sample Id: 1406  
Date Received: 04/06/2017  
Customer:  
Field:

Solvita CO2 Burst  
68.7 ppm C

Solvita CO2 Burst value of 69 ppm C indicates MODERATE-HIGH mineralization potential biomass. This is a very good value and we would want this value to stay in this range or increase over time. This field shows good state of biological activity and adequate organic matter level (you OM is 3%).

Soil Health Calculation  
10.3

Haney Soil Health Calculation value of 10.3 indicates MODERATE-LOW overall health of your soil. We would want this value to stay above 7 and increase over time [max value is 50]. We will keep track of your Soil Health Number and gauge the effects of your management practices over the years.

NOTES:

Overall, Haney test indicates that this field is in acceptable condition, but will require improvements. Organic C:N Ratio of 1:1 is good and indicates that N and P will not get tied up by microorganisms as they became available [let’s keep this number between 8:1 and 15:1]. Currently you have 34 lb/acre of N available with approximately 20lb/acre of N that will not be available for this season. We would want to gradually increase organic matter and microbial activity indicated by Solvita.

Prepared by: Marko Dainic  
Lab Manager  
True Balance LLC  
markodainic@truebnd.com  
(806) 407-6497
Protecting our water...

MANURE STORAGE

By Jim Collins, Jr, Environmental Scientist, North Dakota Department of Health

North Dakota winters are tough on animals and people, making livestock poses additional challenges when it comes to manure clean-up and storage.

Spreading manure on cropland can be an economical method for disposal and an excellent source of nutrients for crops. However, proper manure storage is important in preventing pollution from entering surface and ground waters.

In 2007, the North Dakota Department of Health (NDDoH) published guidelines for proper manure stockpiling and storage.

Duration
There are two time periods for storing manure and specific requirements apply to each.

Short-term Stockpiles
Manure is not to be stored for more than nine months. The size of the stockpile is limited to the amount of nutrients needed for the crop to be grown in a field.

Permanent Stockpiles
Manure is stockpiled for more than nine months. It must be stored in a containment structure that prevents runoff to surface waters and leaching to ground waters.

Location
In general, manure stockpiles may not be located:
* in gravel pits or excavated areas
* along streams or lakes
* within a floodplain
* within 50 feet of a private well or 100 feet of a public water supply well

Specifically, short-term stockpiles may not be placed in the same location each year. Vegetation must be established for one full growing season before the location can be used again. Short-term stockpiles may not be located:
* within 100 feet of any down-gradient surface water or conduit to surface water
* on slopes of greater than 6 percent
* on slopes from 2 to 6 percent unless clean water diversions and erosion control practices are installed

* on land where the soil texture is more coarse than sandy loam to a depth of 5 inches (Natural Resources Conservation Service)
* on soils where the depth to the seasonal high water table is less than 2 feet

As previously stated, permanent stockpiles must be stored within a containment area. Prior to the development of a permanent location, a soil investigation must be completed that is specific to the size and location of the permanent stockpile.

Practices to prevent runoff to surface waters include clean-water diversions and containment dikes.

Leaching of pollutants is prevented using natural soils, constructed earthen pads, manufactured liners, or structures. Please consult the guidelines for specifications regarding each method.

Agricultural Use
Increasingly, manure is being utilized as a replacement for commercial fertilizers and as an amendment to build soil health. Manure is stockpiled in fields until it is applied, many times after fall harvest. The problem is stockpiles are typically placed on the headlands next to road ditches. Runoff from precipitation events may carry nutrients into the ditch and eventually end up in surface water.

If you are a grower that is using or is going to use manure, following proper storage practices is strongly encouraged. Maintain a vegetative buffer strip around the stockpile. Avoid stockpiling manure within 100 feet of any down-gradient surface water or conduit to surface water, aka road ditches. Spread the manure at agronomic rates and incorporate as soon as possible. Implementing these practices will help keep the valuable nutrients in the field and out of streams, rivers and lakes.

For more information about proper manure storage, please contact the NDDoH - Division of Water Quality at 701-328-5210.
The Impacts of Wind Erosion

Wind erosion is a serious problem in many parts of the world. While it is worse in arid and semiarid regions, much of the agriculturally utilized land on Earth is susceptible to degradation by wind erosion. The Great Plains, an area vital for much of the agriculture in the United States, is an area that is especially at risk.

Wind erosion is a major problem on about 75 million acres of land in the United States. Approximately 5 million acres are moderately to severely damaged each year (USDA-ARS). Wind erosion physically removes the most fertile portion of the soil from the field. Some soil from damaged land enters suspension and becomes part of the atmospheric dust load. Dust obscures visibility and pollutes the air and water, causes automobile accidents, fouls machinery, and poses a threat to animal and human health. Wind erosion is a threat to the sustainability of the land as well as the quality of life for rural and urban communities.

Types of Particle Movement by Wind

*Salation* is the movement of particles by a series of short bounces along the surface of the ground, and dislodging additional particles with each impact. The bouncing particles range in size from 0.1 to 0.5 mm, and usually remain within 30 cm of the surface. Depending on conditions, this process accounts for 50 to 90% of the total movement of soil by wind.

*Suspension* is the movement of fine particles (less than 0.1 mm in size) parallel to the surface and upward into the atmosphere by strong winds. These particles can be carried high into the atmosphere, returning to earth only when the wind subsides or they are carried downward with precipitation. Suspended particles can travel hundreds of miles.

*Surface Creep* is the rolling and sliding of larger soil particles along the ground surface. The movement of these particles is aided by the bouncing impacts of salting particles. Soil creep can move particles ranging from 0.5 to 1 mm in diameter, and accounts for 5 to 25% of total soil movement by wind.

Methods to Reduce Wind Erosion

Tillage contributes to the degradation of soil by wind erosion. Each tillage operation that disturbs the soil structure reduces surface residue quantity and dries the soil, making the soil more susceptible to wind erosion. Conservation tillage methods, such as no-till, help reduce wind erosion by leaving crop residues on the soil surface and reduce soil pulverization, which occurs when soils are tilled.

A protective cover of vegetation on the surface is the simplest and surest way to reduce wind erosion. These can be living vegetation, such as windbreaks or cover crops, or crop residues which are also an effective cover. Both crop residues and growing vegetation reduce wind speed at the soil surface and prevent much of the wind force from contacting soil particles. Vegetative matter on the surface also traps moving soil particles. The amount of crop residue required to lessen wind erosion varies with residue type, height, position relative to wind direction, and soil type.

*USDA is an equal opportunity provider and employer.*
Soil health results from complex relationships between the soil, the plants that grow on the soil and the microorganisms that live in the soil. Based on nearly 47 years of studying soil, soil organic matter (SOM) is the key to soil and crop productivity. It doesn’t take a rocket scientist (or soil scientist) to see that the soils in an area that have the highest SOM generally promote the best yields.

Soil organic matter derives from decomposition of residues from dead plants and animals that live on or in the soil. These residues contain nutrients that are essential to the plants and animals that live on or in the soil. This is a part of the natural nutrient cycling in our environment. Probably the most transient plant nutrient and the one that is utilized in the greatest quantities in nitrogen (N). Nitrogen is essential to plants and most living organisms because it is the key building block for amino acids and proteins that are involved in many metabolic processes in living things. Most N in soils (about 95-97%) is contained as carbon (C) bound N substances in SOM and the SOM is the main storage pool of N in soils. This N is not available to plants unless it is in the mineral or inorganic forms of ammonium ($\text{NH}_4^+$) on nitrate ($\text{NO}_3^-$). Soil microbes play an essential role in mineralizing the N in the SOM by using both C and N as nutrient sources for their activities. By using the SOM and an energy and nutrient source, they release the N for availability for plant use. Legumes in the crop mix grown on soils can improve the N content of the SOM by fixing gaseous N from the atmosphere and incorporating into their tissues which eventually become plant residues that decompose in the soil.

Recently I have been conducting research with Doug Landblom, NDSU Dickinson Research Extension Center beef cattle specialist comparing the effects of a 5-year mixed crop rotation on hard red spring wheat with continuous spring wheat. The crop rotation includes cover crops, winter triticale and hairy vetch, barley and field pea, sunflower and corn in addition to the spring wheat. All crops are grown in a continuous no-till culture to illustrate the effect of crop (plant) diversity on maintaining...
SOM and N availability. All crops except the wheat and sunflower are grazed by cattle at different points of the growing season. Three years of soil sampling to a depth of 24 inches at regular intervals throughout the growing season in the wheat crops shows enhanced N cycling in the 5-year crop rotation. However, both the rotational wheat and continuous wheat can have as much as 120 to 200 lbs. mineral N (NH4+ + NO3-) in the 24 inch profile at specific points during the growing season. Sampling in root exclusion plots confirms the high levels of N cycling occurring in the field and the N levels in the rotational wheat are consistently higher than in the continuous wheat. This illustrates that conserving crop residues and thereby SOM, has positive effects on N availability to crops.

Fertilizer has been applied to the spring wheat based on standard NDSU soil test procedures and recommendations. During the first 5-year cycle of the study, fertilizer rates have decreased while wheat yields have trended upward for both wheat treatments. However, fertilizer N usage in the rotational wheat has declined more rapidly than in the continuous wheat. We will continue to follow this study for several more years to evaluate the long-term impacts that these practices will have on further improving soil health.

Soil organic matter has numerous other effects on soil health and quality factors including soil aggregation, soil aeration, improved water infiltration and erosion resistance, increased nutrient holding capacity and cycling of nutrients in addition to N. In turn, all of these factors favor greater activity of soil microbes and enhance nutrient cycling. Improving SOM by increasing return of plant residues or decreasing SOM loss by tillage and erosion move us toward better soil health and soil productivity.
We’re on the Web!
www.ndswcs.org

Farming for Sustainability
Back to the Roots
Going Back to the Roots of SOIL HEALTH

November 21, 2017
National Soil Health Conference
Bismarck State College
National Energy Center of Excellence (NECE)
1500 Edward Ave
Bismarck, ND 58506
Email for Questions: elizabeth.burdolski@gmail.com

SAVE THE DATE !!

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North Dakota Soil & Water Conservation Society
&
Professional Soil Classifiers of North Dakota

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