NORTH DAKOTA CHAPTER
SOIL AND WATER CONSERVATION SOCIETY

THE FLICKERTAIL

May 2014 Volume 24, Issue 2

May 2014 Volume 24, Issue 2

NORTH DAKOTA CHAPTER
SOIL AND WATER
CONSERVATION SOCIETY
Resources for the Future

THE FLICKERTAIL

Chapter Officials:

President
Lance Loken

President-Elect
Amanda Brandt

Past President
Michelle Jezeski

Secretary-Treasurer
Susan Samson-Liebig

Council Representatives
Cody J. Hatzenbuhler
Joanie Rau

Committee Chairs:

Awards: Michelle Jezeski
Environmental Education: **
**Lena Bohm
Fundraising: Joanie Rau
Historian: Fred Aziz
Legislative: *Lance Loken*
Membership: Dr. Larry Cihacek
Newsletter: Cody J. Hatzenbuhler
Nominations: *Amy Erickson*
Publicity: Amy Erickson
Scholarship: Mark Anderson
Webmaster: Jon Stika
Student Chapter: Vacant

The Flickertail May 2014	Page # 1

We're on the Web! ==> www.ndswcs.org

Message from the Chapter President
Lance Loken

Hello again. This coming month is exciting. The officers and directors of the North Dakota Chapter of the Soil and Water Conservation Society have been hectically busy coordinating for our upcoming conference in Medora – "Finding Environmental Synergy in the Oil Patch".

This conference continues the mission of our group in education. The purpose of the conference is to provide attendees with some exposure to what is happening in the oil patch related to spills and releases, the responses taken, and the remediation and reclamation activities, as well as conservation in oil country.

The Forest Service will be making a presentation on activities on their lands, and they have a lot going on with well drilling and production. David Glatt, the Chief of the North Dakota Department of Health, will be speaking on the regulatory programs in oil production and transportation and related activities. The NDDH has been dealing with not only crude oil and salt-water releases, but with naturally occurring radioactive material (NORM), illicit dumping of salt-water and septic wastes, and landfills. Kyle Hartel with the NRCS will be speaking on *Impacts of Energy Development on Soil & Water Conservation*. Tom DeSutter from the NDSU Soils Department will be speaking on soil salinity. I will also be speaking on how my company, Western Plains Consulting, has been dealing with impacts in the oil patch.

We are pleased to announce that our luncheon speaker is Mr. Clay Jenkinson, Director of the Dakota Institute, noted author, our weekly friend on National Public Radio where he performs as our President, Thomas Jefferson, and local columnist here in Bismarck.

We also have a field trip planned for the second day, which will include visiting actual locations where releases have occurred. Explanations will be given on what happened, what was done in response, and activities related to the reclamation of the incidents.

The Conference is planned for June 10th and 11th, 2014. The first day will be the presentations, and will be at the Roughrider Hotel in Medora. The 2nd day will be the field trip. A block of rooms is available at the Badlands Motel. You can call the Theodore Roosevelt Medora Foundation at 701-623-4444. We look forward to seeing you there!

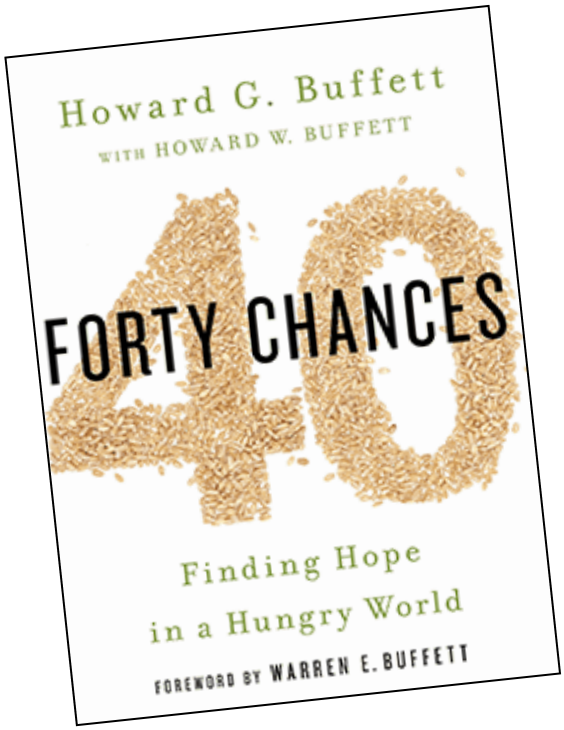
Lance Loken
Chapter President

A Book to Read
40 chances-Finding hope in a H*ungry World*
By: Mark and Susan Liebig

Imagine having an epiphany that you had only forty opportunities to achieve a lasting impact during your lifetime. How would you respond? Would you change how you allocate your time? Would you change how you spend your discretionary income?

This epiphany is the basis for 'Forty Chances: Finding Hope in a Hungry World' by farmer, philanthropist and author Howard G. Buffett (son of billionaire Warren Buffett). Recognizing that most farmers get about 40 growing seasons in a lifetime to get farming 'right', Buffet shares a collection of 40 stories documenting how his foundation is working to address global hunger through investment in agricultural projects throughout the world. Additional context for the stories link to his foundation's charge, which is to disperse all funds (approximately $3 billion, currently) by 2045 to support self-sustaining solutions (and thereby adopting a strategy to put the foundation out of business). This approach to distributing the philanthropic fortune underscores Buffett's firm belief that there is no time to waste in solving the urgent need to significantly increase food production over the next 30 years.

The book is an enjoyable journey reviewing the many projects funded by the Howard G. Buffett Foundation. In the spirit of humble Midwestern values, Buffett shares his failures along with his successes, while outlining critical near-term challenges in need of greater attention. Moreover, it's heartening to see that his foundation doesn't focus on small, solvable problems that would easily show positive (but most likely temporary) outcomes. Instead, he tackles exceptionally difficult issues and then applies resources over the long-term to achieve sustainable solutions.



Conservation agriculture is a consistent theme throughout the book, reflecting Buffett's belief – based on years of experience as a farmer – that an emphasis on soil health is essential for creating a more sustainable agriculture. This belief is emphasized by his son (Howard W. Buffett, who also farms and is a trustee of the foundation) who contributes four of the 40 chapters.

If you're interested how one philanthropist is 'doing good' to help solve agricultural problems throughout the world, this book is highly recommended.

69th SWCS International Annual Conference

MAKING WAVES IN CONSERVATION

Our Life on Land & its Impact on Water

LOMBARD, IL • JUL 27–30, 2014

SOIL AND WATER CONSERVATION SOCIETY

North Dakota SWCS
2014 Annual Meeting

The Link Between Soil & Plant/Animal/Human Health

Best Western Plus Seven Seas Hotel
Mandan, North Dakota 58554
November 4&5, 2014

Finding Environmental Synergy in the North Dakota Oil Field

2014 Soil and Water Conference & Field Trip

Rough Rider Hotel & Conference Center
Medora, North Dakota
June 10 & 11, 2014

Guest Speakers

Dr. Abbey Wick, NDSU: Moderator

Welcome by Theodore Roosevelt

Lance Loken, WPC: *Dealing with Oil Field Impacts*

Kyle Hartel, USDA-NRCS: *Impacts of Energy Development on Soil & Water Conservation*

Dr. Tom DeSutter, NDSU: *Chemistry of Sodium-Affected Soils*

Carmen Waldo, Forest Service: *Impacts & Reclamation on Forest Service Land*

David Glatt, ND Dept. of Health Environmental Section Chief: *Overview of NDDH Regulatory Programs Related to the Oil Industry*

Oil Industry Representative: *Perspectives of Natural Resources Conservation and Reclamation from an Oil/Energy Company*

Mr. Clay Jenkinson, Scholar and Director of the Dakota Institute:
Keynote Luncheon Speaker

Field Trip

Visit agricultural and forested field sites showing reclamation of soils and natural resources impacted by energy development - Seeing science applied on the ground

Salinity Management: What's Your Number?

Chandra Heglund (Graduate Student in Soil Health, NDSU), Abbey Wick (Soil Health Specialist, NDSU) and Lee Briese (Centrol Ag Consulting)

Soluble salts found along ditches, around wetlands and in variable spots across a field require active management. However, before active management can begin, you need to "get your number". By this, we mean sampling both highly productive and low-yield areas within a field to first determine if salinity is your problem and then to identify the level of soluble salts impacting specific locations within the field.

The first step to "getting your number" is to locate places in your field that currently or historically have had poor yields, moderately impacted yields and also very productive area. The poor yield areas may have some indication of salts with either a white crust on the surface or are in a location across the landscape where salinity is anticipated. You will sample each area separately, do not composite the samples. You will then send the samples off to a soil testing lab and request soluble salts (aka electrical conductivity, EC). This way, you can compare numbers across soil tests to know what a "good" number is versus a "bad" number. Once you know your number, you can pick a management approach.

Here are some management suggestions – you can find more detailed information on crop tolerances and management approaches in Dave Franzen's Circular (SF 1087) available through the NDSU Extension Service. In general, anything less than 2 mmhos/cm is going to be managed as you see fit. That being said, if the number is approaching 2, you need to be aware that a salinity problem may be developing and you should consider an alternative management approach in that part of the field before it becomes a full blown problem. If the EC is between 2 and 4, you can replace salt sensitive crops (corn and soybean) that you may have in rotation with those that are more salt tolerant (wheat, barley, sunflower, sugar beet).

The management goal here is to drive the water table down and keep the water down by reducing surface evaporation. You need to have something growing to do this. Sometimes you may need to plant two salt tolerant species back to back in rotation, such as barley on barley. When using barley, consider including a cover crop post-harvest to double up on water use and provide additional shading on the surface to reduce evaporation. Another approach in these areas where your EC is between 2 and 4 mmhos/cm is to maintain surface residue by avoiding tillage.

Producers have been able to improve yields on saline headlands by avoiding tillage entirely and planting directly into the soil plus residue. Applying one or all of the management approaches will help keep salinity from spreading and potentially reduce soluble salt levels in the surface soils over time.

When you are dealing with a severe salinity issue (EC greater than 4 mmhos/cm) management options become more limited, difficult and costly. Again water management is the key; however, salt-tolerant crop and forage options are limited. Consider using a salt tolerant perennial grass species to limit the spread of soluble salts and eliminate input costs for a salt-affected area. Tile drainage is another tool to manage the water table and thus salinity, but this option is costly and may not work for all soil types.

If you choose tile drainage as your management approach, maximize your investment by building soil health over the tile lines. This includes using practices that improve aggregation and thus water movement through the soil (also called infiltration).

Managing salinity starts with getting your number – it is much easier to select a management approach or seek advice on management approaches when you have a number. Regardless of the site specific level, the rule of thumb is simple: manage the water and you manage the salts.

Replacing Tillage with Biology

By: Jon Stika

Why do people till the soil? If you ask those who do, answers might include; to loosen up compacted soil, control weeds, manage soil moisture and temperature, or to allow planting equipment to place seed in the soil. The negative impacts of tillage on soil health are well known. Tillage destroys soil aggregates and the biologic glues that hold aggregates together, causing the soil to collapse into a state of compaction and dysfunction.

When tillage temporarily opens the soil, it allows carbon dioxide to escape in a burst similar to opening a can of soda. Tillage also excessively aerates the soil, stimulating copiotrophic bacteria to awaken and devour organic carbon like teenagers devour pizza. The majority of the organic carbon that copiotrophic bacteria consume is lost from the soil as carbon dioxide. Thus, tillage results in *aerobic erosion* where soil carbon is lost by directly venting carbon dioxide from the soil to the atmosphere. This is followed by additional carbon being respired by bacteria as carbon dioxide. In this way, the soil erodes without a single particle of sand, silt or clay leaving the field. Aerobic erosion degrades the most vital part of the soil; the organic part.

A strand of beneficial soil fungi

How well does tillage perform the tasks we expect it to do? Tillage does indeed loosen up compacted soil, but at the same time destroys aggregates and soil organic matter, causing the soil to collapse into a state of compaction over and over again. Tillage does control weeds by mechanically disrupting them, but at the same time plants new weed seeds to assure another crop of weeds to follow. Tillage also destroys the residue layer on top of the soil where most weed-seed-eating insects live. Tillage may temporarily dry out a wet soil by aerating it and exposing it to solar radiation, but ultimately it causes the soil to collapse and compact so it will stay wetter, longer. So, how can we remedy soil compaction, control weeds and manage soil moisture and temperature without degrading the soil with tillage? The answer is to do so biologically, not mechanically. The approach must use the solar energy that occurs today instead of ancient solar energy (fossil fuels).

During the summer, much of the U.S. is covered with solar panels (the leaves of growing plants) converting solar energy into an assortment of carbohydrates. It is these carbohydrates that feed the life in and above the soil, including us. If the life in the soil has a suitable habitat (stable soil aggregates), a supply of food (sugars from plant root exudates and the residues of plants themselves) and water (that infiltrates the soil within and between stable soil aggregates), it will perform all the functions we expect a healthy soil to perform.

In a typical growing season, a plant's root system will exude about twice the weight of its root system in sugar to feed the soil! Plants supply the soil microorganisms with this energy because the microorganisms provide nutrients, water and protection to the roots. Bacteria, protozoa and nematodes cycle plant nutrients; fungi decompose tough plant residues and help the plants acquire water, phosphorus and nitrogen. The density and diversity of organisms living along the plant root (rhizosphere) provides protection to the plant from infection by disease-causing organisms. When there is a balance of organisms in the soil, disease-causing organisms are kept in check.

How can plants and soil microorganisms effectively replace tillage? There are many species of plants that have large, aggressive root systems that can drill numerous holes of various sizes to create pores in the soil to address soil compaction. Radish, turnip, sweet clover, alfalfa, sunflower, safflower, sugar beet and other plants have large taproots that make large pores deep into the soil. The pores these plant roots create are only effective if they are left undisturbed and remain continuous to the soil surface. Tillage shears off such pores and drastically reduces their effectiveness.

Weed scientists and herbicide dealers will agree that the most effective way to control weeds is to grow a healthy crop. Crops grown in healthy soil will outpace weeds if given an advantage by killing the first flush of weeds with a pre-plant herbicide application or a rolled cover crop. If the desired crop is the next set of plants to emerge and grow, the weeds will be at a major disadvantage. If the soil is left undisturbed, weed seeds will no longer be planted where they can germinate. If the soil is continuously cropped with a diversity of plant species, weed pressure will decline to the point where herbicides may not be necessary, as there will be very few weeds left to control.

A fungal-feeding soil nematode

As soil health increases, soil aggregate stability will increase and so will water infiltration and permeability. In this way, water moves into and through the soil instead of ponding or running off the soil. Water ponding or running off the soil is not a problem, but a symptom of water not infiltrating and permeating the soil. If there is a desire to reduce the amount of residue on the soil surface to increase soil warming in the spring, this can be accomplished by manipulating the carbon : nitrogen ratio of the crop residues in and on the soil. Including low Carbon: Nitrogen crops (such as legumes) in a crop rotation (or cover crop) can speed residue decomposition if practiced to an extreme, it can also leave the soil bare. High C: N ratio crop residues such as wheat or corn can be decomposed more rapidly by planting a low C: N ratio crop (or cover crop mixture) such as legumes, radish, turnip, beets, etc.

Planting crops into existing crop residues are no longer an issue with currently available drills and planters that are designed to plant into such residues. There is a wide selection of new and used no-till drills and planters available today that can plant virtually any crop seed into any type of crop residue.

With the availability of no-till drills, herbicides, crop rollers and a wide variety of plant species available for use in cover crop mixtures, tillage can be replaced with biology in virtually any cropping system. With some innovation and experimentation, many producers are increasing production while reducing input costs by setting a goal of improving soil health on their farms.

NORTH DAKOTA CHAPTER

SOIL AND WATER CONSERVATION SOCIETY

We're on the Web!
www.ndswcs.org

History of North Dakota

Most settlers came to North Dakota for free or inexpensive land and the chance to farm. Between 1879 and 1886 over 100,000 immigrants entered northern Dakota territory. The second massive movement into the state was between 1898 and 1915 when more than 250,000 people came into the state. While some of the earliest settlers came by ox-drawn wagons, stagecoaches, or steamboats, the vast majority came on the railroad. Both the Northern Pacific and Great Northern railroads advertised Dakota in Europe, promoting people to take the railroad to North Dakota and farm the rich land there.

Most new settlers grew wheat, but did not have large farms. They either bought their land from the railroad or they homesteaded federal land. Homesteading involved living on and improving 160 acres of land for a number of years, after which the settlers got the land for free. They could receive an additional 160 acres of land by planting and maintaining trees on the prairie.

Large-scale farming occurred in eastern North Dakota from about 1875 to 1890, when investors from the eastern United States purchased huge tracts of rich Red River Valley land. Much of it was acquired from the Northern Pacific Railway and operated as large farms growing "No. 1 Hard" wheat. These farms ranged in size from 3,000 to 65,000 acres. The farms earned such tremendous profits that they became known across the United States as bonanza farms. On September 6, 1878, even President Rutherford B. Hayes visited the bonanza farm of Oliver Dalrymple near Casselton, North Dakota.

ARTICLES NEEDED!

Submit to

hatzco2@gmail.com

Subscribe to Flickertail please reply to : hatzco2@gmail.com