



Grassroots

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Soil Health on Rangelands by Sandy Smart

Soil health is picking up notoriety not only in farm and ranch circles, but it's starting to hit the mainstream. Just recently, the New York Times did a feature article about Gabe Brown (http://www.nytimes.com/2015/03/10/science/farmers-put-down-the-plow-for-more-productive-soil.html?smid=fb-share&_r=0). The South Dakota Grassland Coalition (SDGC) is taking soil health seriously. The newly formed subcommittee chaired by Doug Sieck, will work closely with Stan Boltz (NRCS), and SDSU Extension to host seven soil health workshops this summer.

As part of my new duties as the South Dakota Sustainable Agriculture Research and Education (SARE) coordinator (see January Newsletter), I will be focusing on soil health initiatives on cropland and rangeland. I wanted to introduce the concept of soil health and discuss ways to monitor ecosystem processes that improve soil health through a series of newsletter articles.



Soil (Courtesy of USDA-NRCS).

I think the best way to think about soil health is actually from a holistic viewpoint. This holistic framework offers the "Big Picture" of how the ecosystem works. The NRCS has already developed a comprehensive monitoring guide for Rangeland Health which can be found at this website (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1043944.pdf). This is a very useful guide to help you monitor your rangeland. Charlie Orchard (Land EKG Inc.) developed monitoring protocols based on ecological processes. I borrowed ideas from both Charlie Orchard and the NRCS and incorporated them into Figure 1 (see page 2).

You will notice that the ecosystem processes (energy flow, biotic state, water cycling, and nutrient cycling) are very similar to Holistic Resource Management concepts outlined by Allan Savory. As Allan stated in his lecture at SDSU in September 2014 (<https://www.youtube.com/watch?v=kvpeLFrk5io&feature=youtu.be>) lands are very complex and cannot be managed, but rather we can manage the processes that affect the outcomes of these processes. It is in a holistic context (social, environment, and economic) that I wish to address the monitoring guidelines of the ecosystem processes to build toward improving soil health.

Soil Health Continued on page 2

Soil Health Continued

by Sandy Smart

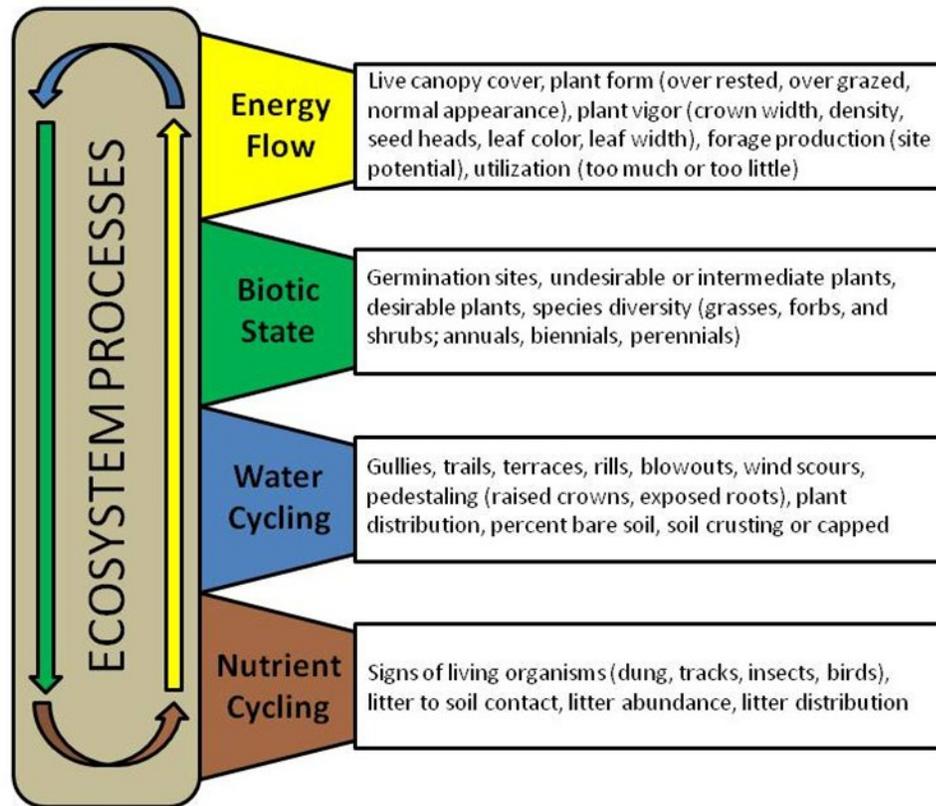


Figure 1. Color coded monitoring indicators of nutrient cycling, water cycling, the biotic state, and energy flow that are involved in ecosystem processes (modified after Pyke et al. 2002; Pellant et al. 2005; Orchard 2013).

Over the next several issues of the Grassroots Newsletter I will explore the impact of energy flow, biotic state, water cycling, and nutrient cycling on soil health. I will talk about management strategies to assist these processes so that they can be optimized or maximized. I will go over the monitoring techniques and discuss what these indicators mean. One should always keep in mind the holistic context as you work to manage these processes. You should test your management decisions against your Quality of Life, Forms of Production, and Future Resource Base goal statements. These three form the holistic context and should be familiar terms to those who have had holistic management training. Ultimately, good soil health should be an outcome of your holistic goal and is just as important as good healthy rangeland and livestock production. Soil is the foundation of everything that happens on our rangelands. Without good soil health, everything else is likely to suffer.

Sandy Smart is a Rangeland Management Extension Specialist and Professor in the Department of Natural Resource Management at SDSU. He coordinates the USDA-SARE program for South Dakota.

New Grassland Faculty Hire at SDSU by Sandy Smart

Josh received his BS degree at the University of Utah in Biology, with emphases in Plant Biology and Ecology. He worked in Dr. Ehleringer's lab where he became interested in physiological ecology of arid and semi-arid systems. Josh received his PhD in Biology at the University of New Mexico. There he studied ecophysiology of riparian cottonwood, examining the importance of local precipitation and groundwater to this species. Afterward, Josh held post-doc positions at Utah State University and USDA-ARS where he became interested in annual grass invasion into perennial dominated systems and how grass invasion has altered ecosystem processes. More recently, Josh joined a team at the Univ. of Alaska-Anchorage, expanding his work into arctic and boreal systems and more explicitly toward climate change and its consequences for plant and animal ecology. His current project in Alaska, funded by the National Science Foundation, examines how changing the timing of green-up and grazing by geese influences carbon and nitrogen cycling.



Josh Leffler, new Grassland Ecologist,

Josh joins the Department of Natural Resource Management, bolstering its range and ecology faculty teaching and research capacity. Josh will teach an undergraduate range course called "Wildland Ecosystems" and graduate courses in Physiological Ecology, Ecosystem Ecology, and Climate Change. When I asked him about his teaching passions Josh responded, "Teaching is all about showing students new things and possibilities. Undergraduates come to the University with a very narrow world view. Its our job to show them what is out there. There are few things more rewarding than observing how excited students can become when they see something or have an experience they never expected."

I also asked Josh "what are your research passions?" Josh said, "I want to understand how climate change and land use influence plant function and ecosystem processes. I hope that my research will help managers make sound decisions for sustainable management, specifically decisions that will promote ecological and economic sustainability of northern plains grasslands."

Lastly, I asked Josh to explain what makes him excited about working in South Dakota? Josh said, "My experience is primarily on the other side of the Rockies. Its different there - precipitation comes in the winter, not summer and consequently its shrubs and trees, not grasses that dominate the landscape. Because South Dakota is a different ecosystem, the problems of the west are often assets here. In the west, we're concerned about fire. The ecosystems are not resilient to fire and fire often causes invasion by annual grasses such as cheatgrass. In the west, we worry about excessive grazing. While the landscape is grazed, it did not evolve with large grazers and grazing can easily remove the grass/forb component of the ecosystem. Here in South Dakota - fire and grazing are assets. The system evolved with both and both are necessary to maintain grasslands. The challenges here are maintaining existing native prairie, restoring areas that can be restored, and making it environmentally and economically productive to do so."

Ranching by the Numbers by Garnet Perman

Taxes are soon due. Calving and the beginning of the growing season are upon us. Most people understand what is necessary for tax purposes, but what other numbers help with grazing, herd, and financial management decisions? Grassland Coalition members Dale Paulson, Jeff Smeenck and Larry Wagner shared some of their recordkeeping choices.

While seed stock producers have many records to maintain, commercial cattle records can be tailored to the individual operation. In the interest of maintaining an easy calving herd, Wagner sells anything with a birthweight over 85 pounds. He figures efficiency by looking at pounds produced per acre instead of weaning weights. Neither Paulson nor Smeenck keep track of birth or weaning weights. Paulson tracks calf date of birth. Late calving cows leave the herd. Temple Grandin's idea of a personal premises audit for various aspects of handling cattle inspired Paulson to start recording which animals receive veterinary attention and what was administered. Not only is it proactive in terms of animal rights issues, but a financial premium can be realized if an animal can be sold as all natural. "It's what the consumer wants," he said.

Smeenck has a bull lease arrangement that lets him concentrate on managing his irrigated farm land instead of genetics. He leases bulls from a breeder, who then buys back Smeenck's calves at a contracted price. The breeder retains ownership until slaughter and receives the carcass data back. Smeenck tracks his pasture production by keeping record of acres in each pasture, number of animals, and turn in and pull out dates. His local NRCS then plugs that data into a computer program. Smeenck aims to keep his pastures at 50-60% of use. He also has GPS sites for range line point intercepts, plant height, density, ground cover, and diversity that he checks every other year.

In terms of grazing management, Paulson and Wagner are enrolled in the Conservation Stewardship Program which requires more intensive record keeping. They both clip grass to measure production in every paddock they move into. Paulson uses the information to track improvements in carrying capacity and pest management progress. Like Smeenck, Wagner uses GPS to mark long term monitoring sites and tracks over time. Wagner says knowing the production of each grazing area helps determine the best season of use, which, in turn, informs his yearly grazing plan. Paulson and Smeenck use animal units in figuring stocking rates, while Wagner figures animal days.

Wagner also keeps track of practices designed to save money, such as the feed production value of swath grazing. He figures he needs enough grass to equal 3% of a cow's body weight. He's also started to do more soil sampling. Former farmer and retired Wells Fargo Ag lender, Keith Goehring of Volga said, "Many people don't know their break evens." Farmers and rancher should include their own labor and overall investment in the farm in figuring break even points for every enterprise in the operation. Goehring recommends that a budget projection be made early in the year and expenses and income compared quarterly so adjustments can be made. The SD Center for Farm/Ranch Management at Mitchell Technical Institute, the University of Minnesota Center for Farm Financial Management help producers with financial management. Dave Pratt's Ranching for Profit School, SDSU Extension, and the writings of Burke Teichert are all good sources of information.

Garnet Perman is a freelance writer and ranches with her husband, Lyle, near Lowry, SD

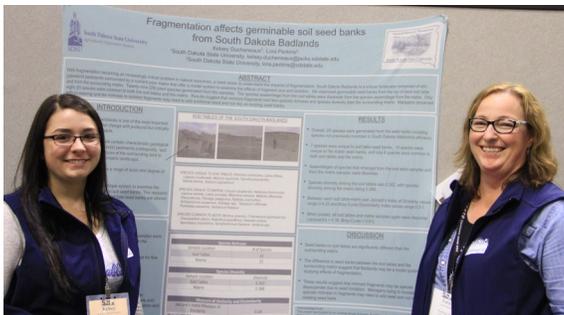
Collegiate Participation at the 2015 SRM Meetings by Sandy Smart

The Undergraduate Range Management Exam (URME) and Plant ID competitions were held at the 68th Annual Society for Range Management meetings in Sacramento, CA Jan 31st - Feb 6th. The URME Team placed 2nd out of 24 teams and the Plant ID team placed 8th out of 23 teams. Tyler Swan tied for 2nd individual out of 159 contestants in URME.

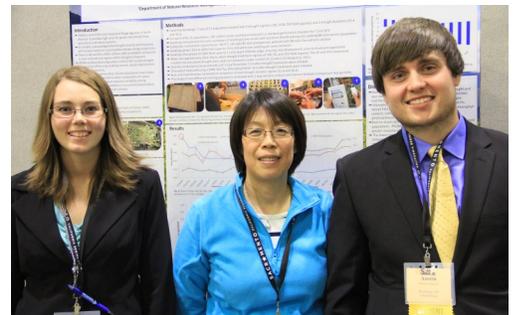


Pictured left to right are: Dr. Sandy Smart (RC Advisor), Dr. Gary Larson (ID Coach), Joe Bennett (ID, URME Coach), Alex Mergen (RC, ID, URME), Tyler Swan (RC, ID, URME), Andrew Steffen (RC, URME), Kelsey Ducheneaux (RC, URME), Sam Haigh (RC, ID, URME), Cady Olson (RC, ID, URME), Wyatt Johnson, (RC, URME) Ella Woroniecki (RC, URME, ID), Dr. Lora Perkins (URME Coach), and Jacob Maca (URME).

RC = Range Club, ID = Range Plant Identification, URME = Undergraduate Range Management Exam



Student Kelsey Ducheneaux and Dr. Lora Perkins (Left) and students Denise Olson and Austin Hansen with Dr. Lan Xu (right) presented undergraduate research projects.



SD High School Youth Forum Places 1st by Sandy Smart and Krecia Leddy



Kiera and SRM President, Jenny Pluhar at 2015 SRM Meeting in Sacramento, CA.

Kiera Leddy, Milbank High School senior, recently attended the High School Youth Forum (HSYF) of the Society for Range Management professional meeting Jan 31 - Feb 5th in Sacramento, California. Kiera was one of twenty-four delegates from across the nation and Canada to participate in the 6-8 minute technical paper presentation competition.

Leddy received first place in the competition with her presentation entitled “The Change on the Rangeland”. Leddy received her award from Jenny Pluhar (pictured left), SRM President. During the forum Leddy participated in a professional interaction dinner, a field tour of the University of California – Davis campus and research farms, attended a workshop, and participated in the delegate business meeting.

Kiera described in her talk the recent grassland losses due to conversion to cropland that was documented by SDSU scientists. She described with passion how this loss impacts the ranching industry, wildlife, tourism, and water quality. Kiera stressed the need for education and to tell our story. She mentioned that we need to support groups such as SRM and SDGC.

As the top paper winner Leddy will attend next year’s meeting in Corpus Christi, Texas to help with the Forum and present her paper to the general membership of the Society. Kiera traveled with her mom, Krecia (pictured right). Krecia is District Conservationist for NRCS in Ortonville, MN.

The South Dakota Section of SRM helped support Kiera to Sacramento and will support her again as she attends next year’s conference in Texas. We are very proud of Kiera telling South Dakota’s story at the HSYF. These experiences are great leadership training for our youth.



Kiera and proud mom, Krecia Leddy, pose after her receiving 1st Place in the HSYF Public Speaking Contest

Grasslands on a Comeback by Rick Smith

So you're all excited about the price of cattle, you saved back more heifers or bought a bunch of cows and all you need is a little more pasture. Problem is you can't find any grass to rent or it's even too high for today's prices. Now you're wishing you hadn't plowed up that chunk of pasture when corn was \$8 and beans \$15. Some are advocating you keep cows year around in a feedlot, under a roof or provide summer feed to a small pasture lot. You can do expensive things when profit margins are wide. But, unlike a futures contract that expires at some date, that building and equipment along with harvesting expense just keeps losing value or costing more as profit levels retreat. Need a recent example? Think corn or fractured crude oil. Maybe it's time to do the unthinkable and invest those dollars in developing a new pasture that will increase in value and contribute instead of decreasing livestock profit margins.

Where to start is evaluating what grass resources you have available and determining what is missing for full season grazing. Talk to someone that is fully engaged in the production of South Dakota grazing forages and knows the benefits, limitations, and adaptability of species and varieties. You can do better than a major seed company's "pasture mix 4" or something your local co-op just happens to have on hand.

Next is selecting the best acreage, which will lend itself to managing a grazing program for your livestock. Don't pick a place that may be difficult to access or limits control of grazing, just because it has your poorest soil for farming or has a natural wetland for drinking. The better the soil, the less acres you need for grass production and today's clean versatile water delivery systems are quick payback investments. Refrain from developing a summer pasture along public waters or a flowing stream. Downstream users are watching.

When it comes to actually planting the pasture a lot will depend on if you are participating in a cost share program or going it alone. I'm going to assume that you desire or will be required to establish a diverse mix of grasses and some component of legumes or forbs. This is where most cost shared pasture and CRP plantings fail to deliver by requiring planting all at once with low seed rates. I've yet to see a stand of grass planted too thick, so don't ever skimp on seed volumes and just because you may only get cost share for a certain low rate, that shouldn't stop you from upping the rate on your own. Further, just because someone else is paying for your seed don't skip ground preparation and critical seed placement. But more problematic in cost share plantings is the all at once planting of grasses and legumes or forbs. Grass seedlings need lots of light and not much, if any, competition from shade producing, moisture robbing broadleaf weeds. Without the legumes and forbs present, at least you have an option of selective herbicide use to control the broadleaf weeds until the grass is established. Clipping instead of herbicides is an act in futility against most broadleaf weeds, trying to save the legumes and smothering the grass seedlings.

Place your emphasis on establishing a good pasture quickly and not on a few dollars of cost share. Once the grass is established, weeds controlled, and you have started to utilize it for grazing, then you can inter-seed the legumes. With timed rest rotation grazing, the legumes can become fully established in the grassland. Time has value and with the right seed, good seed rates and the best weed control, a pasture can be ready for full grazing the year following planting and benefit from nitrogen producing legumes by the third year. Yes, easier said than done.

Rick Smith is a beef cattle and sheep producer and former watershed coordinator in Hamlin County. norunoff@gmail.com



Sandy Smart
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Calendar of Events

Event	Date	Location	Contact Person	Phone
Youth Range Camp	June 3-5	Sturgis	Tate Lantz	605-690-8049
Professional's Range Camp	June 3-5	Sturgis	David Ollila	605-394-1722
Bird Tour	June 5-6	Marvin	Judge Jessop	605-280-0127
Rangeland Days	June 23-24	Chamberlain	Tina DeHaai	605-734-5593 ext 3

Please remit any comments, suggestions, or topics deemed necessary for further review to: Sandy Smart, SDSU Box 2170, Brookings, SD 57007, alexander.smart@sdstate.edu, (605) 688-4017