SOUTH DAKOTA GRASSLAND COALITION

Grassroots

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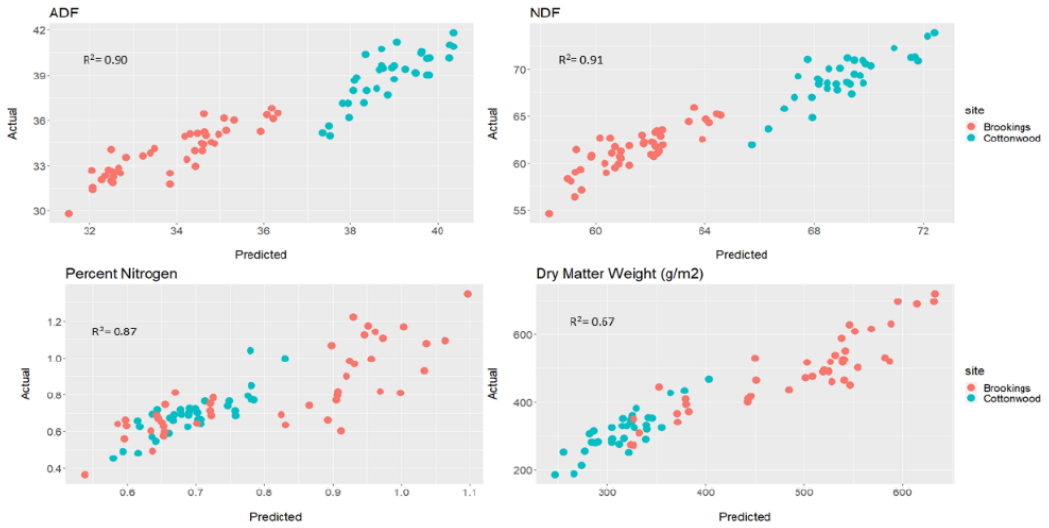
INSIDE THIS ISSUE:

Precision Agriculture Range Project Seeks Producer Participation

By Sandy Smart

A group of scientists from SDSU are starting a new precision agriculture range project using remote sensing, machine learning, ground collected vegetation samples, and web app development to build a user friendly phone or computer website application to measure in near real-time forage quality and quantity. In addition, the project will have the ability to make predictions using forecasted climate data for drought preparation. The scientists include Drs. Jamie Brennan, project leader, Krista Ehlert, Josh Leffler, Hossein Moradi, and Sandy Smart. Our team has collected preliminary data from the SDSU Cottonwood Field Station near Philip and at the SDSU Cow-Calf Unit in Brookings (see figure below). Hand clipped samples were collected every two



Forage quality and quantity predictions using Random Forest algorithm for two sites in South Dakota using metrics derived from Google Earth Engine and Planet Imagery APIs.

weeks in the summer of 2020 at both sites. According to our modeling efforts, we were able to verify that we could estimate forage quality (Acid Detergent Fiber, ADF; Neutral Detergent Fiber, NDF; Crude protein, CP) and forage quantity (Dry Matter Weight) quite effectively (predicted vs actual in each graph above).

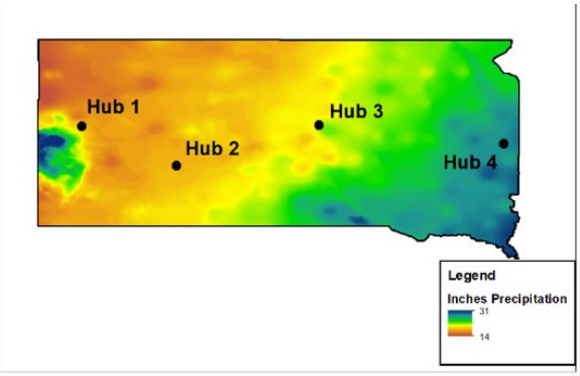
Our next step is to expand our data collection efforts across South Dakota. We chose four intensive data collection sites (hubs) which we intend to collect hand clipped samples every two weeks during the growing season from five areas and two different plant community types. Around each hub we would like to find two additional ranches

Precision Agriculture Range Project Continued on Page 2

Precision Agriculture Range Project Continued by Sandy Smart

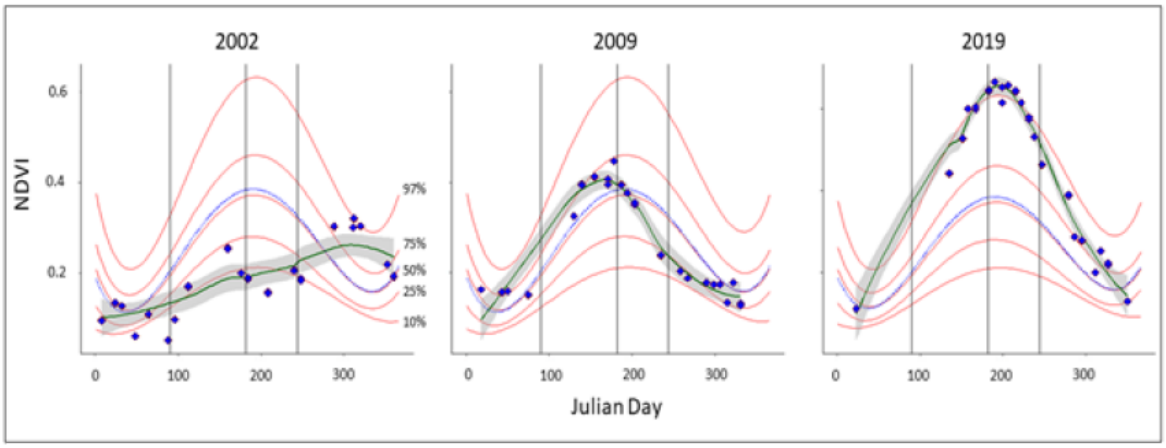
to help expand our model prediction efforts by feeding real ground-truth data once a month during the growing season (see figure to the right).

The uniqueness of our approach is that we intend develop customized prediction models based on individual rancher derived data for that specific rancher rather than rely on a universal model with data that may not adequately represent your location.



Location of the four hub study sites in South Dakota. Two of the sites (Brookings and Cottonwood) are SDSU research facilities; the other two are working ranches run by producers. Each hub site will be affiliated with two additional satellite working ranches. All sites exist along the gradient from over 600 mm (23.6 inches) to fewer than 400 mm (15.7 inches) of annual precipitation from east to west in South Dakota. *Source PRISM mean annual precipitation 1981-2010.*

In addition, we are very fortunate to have long-term data to help us develop growing season forage quantity predictions. The figure below shows the greenness index (NDVI) for three very different years (drought, average, and wet). Julian day 1 corresponds to January 1st. You can see that NDVI in 2002 started



Season-long growth curves of a pasture at the Cottonwood Field Station for 2002 (drought year), 2009 (average year), and 2019 (wet year). Models were created from the entire Landsat NDVI data collection (1984-present) using Google Earth Engine. The red lines represent different quantile (10%, 25%, 50%, 75%, and 97%) growth curves while the blue line represents the mean growth curve for the entire dataset. The dataset can be used to compare the current year's NDVI trajectory against historical growth curves to estimate departure from the mean or median.

out with a flatter path compared with 2009 and 2019. This kind of graph allows us to make predictions of forage quantity depending on the steepness of the NDVI curve.

The research and Extension team is excited about the impact that this tool, when fully developed and tested, will have. If you would like to participate as a satellite ranch please contact one of the members of the team. We would love to visit with you about this exciting project.

Partner Update: Audubon Great Plains by Josh Lefers

Upland sandpiper (Photo by Josh Lefers).

The National Audubon Society protects birds and the places they need, today and tomorrow, through science, advocacy, and on-the-ground conservation. Audubon Great Plains is the regional office of the National Audubon Society, delivering conservation programs in North Dakota, South Dakota, and Nebraska. Within Audubon Great Plains, our staff focuses on communications and outreach, public policy, and on-the ground conservation support through our working lands and bird-friendly community programs.

Audubon Great Plains manages two nature centers in Nebraska, the Spring Creek Prairie and Rowe Sanctuary, as well as two migratory bird sanctuaries in North Dakota, the Edward M. Brigham III Alkali Lake Sanctuary, and the Frederick L. Wicks Prairie Sanctuary. All of our sanctuaries focus on providing habitat for migrating and nesting birds through working lands habitat management and partnerships. Spring Creek Prairie is located a few miles out of Lincoln, Nebraska, and protects the native and restored tall grass prairie on the property as well as providing educational and recreational opportunities for the community. Rowe Sanctuary near Kearney protects a portion of the North Platte River that is used by hundreds of thousands of staging Sandhill Cranes each year during their migration north. This spring spectacle draws tens of thousands of visitors each year to watch the migrating flocks and the birds' elaborate courtship displays. In North Dakota, the Edward M. Brigham III Alkali Lake Sanctuary near Jamestown has native grassland as well as areas under various stages of prairie restoration, and the Frederick L. Wicks Sanctuary near Minot is a beautiful example of a highly diverse native prairie.

For the good of the Grassland Coalition audience, I'll focus now on working lands programming. Working lands is a strategic priority for the National Audubon Society, with the central grasslands identified as one of the four key areas where collaborating with stakeholders and landowners is key to protecting birds and the places they need.

Audubon Great Plains working lands programs were initiated to resist grassland degradation and conversion across the Great Plains. The importance of intact and healthy grasslands to wildlife, climate, and people cannot be overstated and has been clearly identified in multiple publications. A key part of our working lands programs are our range ecologists, technical professionals that provide key management guidance to producers through Audubon's working lands programs. Our main programs in the Dakotas include Audubon Conservation Ranching, the Prairie Management Toolbox, and the Conservation Forage Program.

The Audubon Conservation Ranching (ACR) Initiative is a National Audubon Society working lands program that provides a conservation certification to beef and bison products from enrolled ranches. Audubon range ecologists provide technical assistance through creation of a habitat management plan for each ranch enrolled, which outlines management necessary to create, improve, and maintain habitat over the next three years. Follow up bird, vegetation, and soil monitoring can provide feedback on management actions, and provide a basis for future habitat planning. Ranches must comply with protocols that cover habitat management, environmental sustainability, and animal welfare.

The Prairie Management Toolbox provides financial and technical assistance to producers to support habitat management and improvement for birds and pollinators on working lands. With Audubon's assistance, producers implement conservation-minded practices to improve grassland diversity and structure for wildlife and pollinators. Supported practices includes prairie restoration, invasive species removal (woody species focus),

Audubon Great Plains Continued on Page 6

Who Is Going to Guard the Sheep? by Garnet Perman

As more producers consider multi species grazing, one of the questions to be answered concerns predator control. The most efficient method of keeping predators away from small livestock such as sheep is to employ guardian animals. Dogs, lamas and donkeys or a combination thereof are all in use in SD.

Dave Ollila, Newell, SD has used both lamas and donkeys for 25 years. Because he does intensive grazing in small pastures of about 40 acres, he finds that a single donkey or lama is sufficient. “Two of the same species become a herd,” he said. They may pay more attention to each other than to the animals they guard. He prefers to use gelded animals as intact males can be too aggressive or they may get out in search of a mate.

The Ollila’s livestock guardian donkey. (Photo courtesy of Dave Ollila).

Dan and Sharon Anderson, Meadow, SD, are also long time sheep producers. They have used all three guardian animals. Running dogs and lamas together has worked well for them. A pro of using donkeys or lamas is that they eat what the sheep eat, no need to buy any extra food. They are easier to keep in a fence than dogs. Donkeys tend to be relatively long lived, 10-15 years. They are relatively easy to maintain from a health standpoint. Donkeys’ feet need to be trimmed every 3-4 months. They need to be watched more carefully if they consume grain. Donkeys are naturally aggressive with canines, including guard or other farm dogs.

Lamas are winter hardy but need to be sheared occasionally with no easily available market for the wool. Worming may be necessary, especially if they are kept on continuous pasture. Finding a lama can be difficult. One needs to watch the sale barns. Hobby farms may be a source but tend to price their lamas higher than the sale barn. They can be very aggressive, biting and spitting whoever or whatever gets close. They need to be penned separately when working sheep.

Dogs work well in larger pastures. Anderson likes the Akbash breed as they will kill predators rather than chase them away. They stay with the sheep rather than roam looking for predators. They are also more athletic than Pyrenees.

For Dallas and Tammy Basil, Union Center, dogs provide the best protection for young lambs against eagles or hawks. Their pastures run anywhere from a half section to a whole section with a move to new pasture every 3 weeks or so. They prefer Great Pyrenees. Many of theirs have been crossed with another breed such as Akbash, Anatolian or Kommodor. The Anatolian/Kommodor cross tends to be more aggressive. They use two dogs for 500 ewes.

The hardest part of having dogs as livestock guardians is balancing human interaction with their job as guardians. In order to be effective guard animals, they can’t be tame enough to want to follow people home. They also can’t be so unsocialized that they won’t come into corrals with the sheep or be difficult to handle when veterinary treatment is needed. In Basils’ experience Pyrenees are easier to handle. They prefer females or neutered males because they stay with the sheep better.

All three producers emphasized that any guardian animal needs a trial period as not every animal is suited for the job. Pasture size, grazing management plans, type and size of operation and predator threats all need to be considered when choosing a guardian.

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

Should You Make Hay or Buy It? by Dan Rasmussen

Winter feeding costs are typically the single greatest line-item cost in most cow-calf budgets. A few years ago, Jim Gerrish, a well known range consultant from Patterson, Idaho, wrote an article* on how to calculate the cost of producing one ton of hay on your ranch or farm. Jim found his clients cost of production ranged from $70 to $140 per ton (2013) if all production costs were calculated.

In the article, Jim explains, "The obvious costs of making hay are the seed, fertilizer, equipment, and fuel for which we see an actual invoice. If we're paying hired labor, we see the cost in their paycheck. If we are both management and labor for our farm, we usually don't pay ourselves a decent wage. Most hay producers know there is something called equipment depreciation, but few actually put it into their accounting when figuring the cost of making hay. On non-farming operations, equipment depreciation may be one of your highest costs. If you let someone else make your hay, you eliminate that cost".

Jim goes on, "There is another whole set of costs to hay making we ignore. Those are the opportunity costs of land and labor. What else could you be doing with your hay fields if they weren't being made into hay". "What could you and/or your employees be doing if you weren't making hay? Building or moving fence and water systems? Better managing the livestock you have? Handle more livestock? Spend more time on marketing? Making hay on your own land costs you far more than you might imagine. It costs you your time!"

Mr. Gerrish created a "Hay Cost Calculator" to help his clients determine if they are better off producing their own hay or buying hay from a neighbor. You can plug your own numbers into this sample Spreadsheet and see what a ton of hay is costing you to produce.

HAY PRODUCTION COSTS:						
Acres of hay		400	acres			
Expected yield:		3	Ton/acre			
Number of harvests		2				
Weight of bales		1200	lb/bale			
Total hay produced		1200	Tons			
Bales / acre		5				
						Cost/acre
Fertilizer		cost/lb	Removal	Apply?		$65.43
	N	$0.50	150	0	$0.00	
	P	$0.45	36	1	$16.20	
	K	$0.67	135	0.5	$45.23	
Spreading cost		$4.00		1	$4.00	
Swathing			$18.00	/A		$36.00
Raking			$4.00	/A		$8.00
Large round bale			$10.00	/bale	1	$50.00
Large round bale handling			$3.00	/bale	1	$15.00
Equipment depreciation				/acre		$ 41.61
Establishment				/acre		$43.50
Irrigation cost				/acre		$ 40.00
				Cost/acre		$299.54
				Cost/Ton		$99.85
				Cost/Bale		$59.91
				Cost/lb		$0.050

Hay Cost Calculator by Jim Gerrish. From his book, "Kick the Hay Habit-A practical Guide to Year Round Grazing".** Jim explains, "You should be able to come up with all the information needed to fill in the necessary spaces to determine your own cost of producing hay from your ranch. The values for harvesting are based on typical custom rates (from 2013). With fuel prices increasing again, custom rates are likely heading upward as will fertilizer, equipment, and all inputs made from iron or oil".

It is important to include some cost for fertilizer even if you don`t apply it. Each time you remove a hay crop from the field you are removing nutrients from the soil. Over time, this will greatly diminish soil health. Poor soil health equals decreased production and profit/acre.

The majority of hayfields in west river South Dakota have very poor soil health as a result of removing the organic matter, for a 100 years in some cases. These fields often show signs of soil erosion because organic matter is so low rain water runs off taking topsoil with it. During the 2021-22 drought, production on these hayfields was very low.

Hay Continued on Page 6

Audubon Great Plains Continued by Josh Lefers

prescribed fire, and grazing infrastructure installation. The range ecologist creates a habitat management plan to guide project management for the duration of the project.

The Conservation Forage Program (CFP) is a North Dakota program led by Audubon, which provides financial assistance to producers on working lands to restore prairie on marginal crop lands. Landowners receive transition payments for the first three years of enrollment to cover the costs of foregone income, in addition to cost share for native seed mixes and grazing infrastructure. After the initial establishment, producers are encouraged to incorporate the restored prairie into a grazing or haying system, to provide income to the ranch, as well as needed management to sustain the grass planting. Range ecologists work with producers to develop a restoration plan to guide management during the project life, and a term agreement will keep the land in grassland for at least 10 years.

Our range ecologists also take part in facilitating, leading, planning, and executing workshops on a variety of topics related to grasslands and grassland management in the Great Plains. Our range ecologists have helped with SDGC schools and workshops, and partnered with SDGC to provide additional workshops to members and non-member ranchers. Audubon Great Plains finds great value in partnering with the Coalition, as the peer-to-peer learning facilitated by a producer-led organization provides a strong basis for improving resources for birds, herds, and communities.

Josh Lefers serves as a Working Lands Program Manager for Audubon Dakota

Hay Continued by Dan Rasmussen

Grazing hayfields allows you to leave standing forage which turns into ground cover on the soil and helps feed the soil microbes. If you choose to cut hay, feeding the hay back on the field is one way of keeping the nutrients in the soil. When you buy someone else's hay, you're also buying their fertility.

In summary, the profitability of making hay on your ranch comes down to running all the numbers and calculating your cost per ton. Then using this information to determine if making hay is the right decision for your operation.

* Why you should be out of the Hay Business
By Jim Gerrish, American Grazing Lands Services, LLC, Patterson, Idaho
** Kick the Hay Habit-A practical Guide to Year Round Grazing
By Jim Gerrish

Dan is a third-generation cattle rancher living in south central South Dakota. Dan is the manager/range consultant for the Grazing School Follow-Up Range Consulting Program. Find more information on SDGC Grazing Schools at sdgrass.gov.

C O RN E R - *News from the SD Section of the Society for Range Management*

Remembering Kent Baumberger by Jeff Vander Wilt

Kent Baumberger

It is with great sorrow we mourn the passing of one of our fellow range conservationists. Kent attended South Dakota State University. Kent was an active member of the Range Club. He participated in the URME and Plant ID teams over the years. He was a great teammate and range conservationist.

After graduation from SDSU, Kent went to work for the Natural Resources Conservation Service. During his time with NRCS, Kent assisted with the regional range judging competitions as well as helping with Range Camp and Rangeland Days. Kent told several stories over the years about his time participating in Range Camp and Rangeland Days.

Kent's obituary is copied below. Kent will be missed. We hope he has found some greener pastures and is still working the range.

Kent William Baumberger, 48, of Miller, went to Jesus on Tuesday, January 10, 2023, at Avera McKennan Hospital in Sioux Falls, after an extensive illness.

Visitation will be 1:00 p.m. to 4:00 p.m., Sunday, January 29, 2023, followed by a 4:00 p.m. prayer service, all at Trinity Lutheran Church in Miller with Rev. Rhonda Wellsandt-Zell officiating. A private family burial will be at McIntosh City Cemetery, at a later date. In lieu of flowers, memorials can be directly to Hand County 4-H shooting sports, 415 W. 1st Ave #105, Miller, SD 57362 and SDSRM Range Endowment, Attn: Jeff Vanderwilt.25823 East Enemy Creek, Mitchell, SD 57301.

Kent was born on Sept. 22, 1974, at Philip, South Dakota to Rod and Sharon (Wagner) Baumberger. He graduated from Sturgis Brown High School and South Dakota State University with a Degree in Range Management. He grew up under the watchful eyes of his older brother and sister. He loved his animals, dogs (Brandy, Bandit, Jessie, Maggy, Doc and Buddy), his horses, and was happy when he was hunting.

Kent worked for Natural Resource Conservation Service for 26 years in Pierre, Webster, McIntosh, Timber Lake and Miller, South Dakota. He enjoyed providing technical assistance to farmers and ranchers and assisted them with applying conservation on the land. He was a member of Society for Range Management, SD Section Society for Range Management, Naja Shrine (lifetime member), Naja Cowboys, Yeldez Drovers, SD Grassland Coalition, Lemmon Masonic Lodge AF@AM (lifetime member), and Trinity Lutheran Church. He was very active in the Miller 4-H shooting sports (including BB Gun, Shotgun and archery) and Miller community youth activities.

As a youth he was active in 4-H, participating in local, state, and national range judging contests. He was a member of the 4-H team which placed first in the National Range and Pasture Contest in Oklahoma. He was also active in the SDSU Range Club and Plant Identification contest and participated in four National Plant Identification contests. He also assisted with instruction and participated in numerous South Dakota Range Camps, South Dakota Rangeland Days, and Ag Lenders Range School. Kent also enjoyed Team-penning with his dad, brother, and brother-in-law, winning numerous saddles and belt buckles. Kent was known to always have a smile on his face.

He loved following and attending all of his children's events. He was very proud of their accomplishments. Kent is survived by his children Faith and Pierce Baumberger of Miller, his proud parents, Rod and Sharon of Sturgis, sister Karla (Lee) and family of Lakewood, Colorado; brother Jeff (Lisa) and family of Billings, Montana, and many aunts, uncles, and cousins. He was preceded in death by his paternal and maternal grandparents. Reck Funeral Home of Miler has been entrusted with Kent's arrangements.

SOUTH DAKOTA GRASSLAND COALITION
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Calendar of Events

Event	Date	Location	Contact Person	Phone/email
Ag Day at Washington Pavilion	March 4	Sioux Falls	Judge Jessop	605-280-0127
Agency/Landowner Burn Training	Feb-March	Bonesteel	Sean Kelly	sean.kelly@sdstae.edu
Agency/Landowner Burn Training	April 10-14	Brandon	Pete Bauman	peter.bauman@sdstate.edu
Agency/Landowner Burn Training	April 17-21	Astoria	Pete Bauman	peter.bauman@sdstate.edu
Agency/Landowner Burn Training	May 15-19	Astoria	Pete Bauman	peter.bauman@sdstate.edu
National Land and Range Judging	May 4	Oklahoma City, OK	Sandy Smart	Alexander.smart@sdstate.edu

Please remit any comments, suggestions, or topics deemed necessary for further review to: Sandy Smart, SDSU Box 2207D, Brookings, SD 57007, alexander.smart@sdstate.edu, (605) 688-4940