SOUTH DAKOTA GRASSLAND COALITION

Grassroots

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Range 101: Plant Succession a History Lesson by Sandy Smart

I decided to create a new article series for the Grassroots newsletter "Range 101" with the intention of highlighting rangeland ecology and management concepts taught in the university for the benefit of our SDGC members and broader readership. One of the earliest concepts developed by our profession was the idea of plant succession, the orderly process of vegetation change overtime. Plant succession is not unique to the range discipline but was early adopted by workers in range management, as a useful framework to understand how abused rangeland in the western USA as a result from overgrazing in the late 1800s and early 1900s could be properly restored. In 1916, Fredrick Clements published his book entitled "*Plant Succession: an analysis of the development of vegetation*" that started this revolution in the range profession. Clements outlined a detailed explanation of how plant communities evolved from primitive annual communities (early seral stages) to a stable long-lived perennial community (called the 'climax'). He described a very predictable series of stages that a plant community went through starting from new soil in the case of primary succession or disturbed soil in secondary succession. At the same time a competing theory was being developed by Henry Gleason that later heavily critiqued Clements' theory. The range management profession adopted Clements' theory and was taught in early range management programs (read Tobey 1981 "Saving the Prairies" for a fascinating historical account). Then in 1949, a Soil Conservation Service worker named Edward Dyksterhuis published a journal article entitled "*Condition and management of rangeland based on quantitative ecology*". Dyksterhuis' paper was the foundation of quantifying range condition and continues to be used today in calculating the similarity index used by the NRCS to assess plant communities. The principle is that rangeland plants can be categorized into three groups depending on how they respond to heavy grazing pressure. This is where we get our increasers, decreasers, and invaders. Dyksterhuis developed a simple scheme to assign a certain percentage of each of these kinds of plants (increasers, decreasers, and invaders) that should exist in pristine, ungrazed areas. Government agencies adopted this approach and developed the concept of range sites (today called ecological sites) to catalog what the potential historic 'climax' plant community would look like in the absence of grazing. Contributions made by Clements and Dyksterhuis were immensely important to the development of the range management profession. Later researchers studied the effects of range condition on livestock production, wildlife habitat, and conservation. Theories of vegetation dynamics continue to evolve, but the range science profession has been profoundly influenced by the early work of Clements and Dyksterhuis.

Eastern Red Cedar a Future Pest? by Garnet Perman

It's coming. Don't think it's not. The "Green Glacier" is on the move from the south. Volunteer trees are rare in South Dakota. When we do encounter one in a draw or along a fence line, we rejoice over that lone survivor. Producers in Texas, Oklahoma, Kansas and Nebraska once felt the same way about the random cedar tree that sprouted in their pastures. Today, they are spending millions of dollars and many man hours trying to keep Eastern red cedar (Juniperus virginiana) from invading more of their rangeland. Large prairies have converted to cedar forest in each of the states to our south.

According to Dirac Twidwell, Assistant Professor and Range Ecologist with the University of Nebraska-Lincoln, if the historic pattern keeps up, we'll experience the same thing in SD before the century ends, as the southern border is already seeing an uptick in Eastern red cedar populations. Research shows it takes 40-60 years for a few volunteer cedars in a prairie ecosystem to convert to a cedar forest with a closed canopy of 60-85% tree cover. The main area of concern is along the 100th Meridian and east. Lower rainfall in the western Plains slows the progress of cedar creep, but they are not completely immune. Sandier soils are also less susceptible.

Human activity is entirely responsible for creating the conditions for this native tree to spread into a raging epidemic. Lightening driven grass fires and fires set by native peoples kept Eastern red cedar in check. Since the Great Plains were settled and fenced, fire has been suppressed. In addition, countless planted shelterbelts have utilized the hardy tree, providing more seed every year. Why should we be concerned? 1) Producers can lose up to 75% of the available grass in a given pasture if the progression to cedar forest is allowed. 2) Runoff increases and water infiltration is reduced because the grass beneath the trees dies and the trees themselves shed water. 3) The changed ecosystem affects grassland wildlife. While cedars can provide shelter for larger animals such as coyotes and deer, grassland birds, already in decline, lose more critical habitat. Turkeys abandon traditional roosts when cedar becomes dense underneath roost trees. 4) Because the tree contains such volatile oils, wildfires in cedar infested areas burn hotter and are harder and more dangerous to control. 5) In addition, the increased amount of pollen released in the spring creates a fair amount of human misery.

Eastern red cedar should be easy to control. They don't re-sprout from the root, but while individual producers can successfully control them on their land, every state with a cedar problem is losing the battle over the larger landscape. Chemical is not effective, but mechanical means and fire are. Young trees, less than 4 ft. tall are easy to deal with. They can simply be cut off below the bottom branches. In areas that use fire, Eastern red cedar is not a problem. While fire is effective, controlled burns require planning, luck and expense. Some Nebraska producers use a blow torch on individual trees when only a few small trees need to be eliminated. The key to fire use over a larger area is to make sure enough fuel is present to produce enough heat to kill the trees. Resting the pasture for a full season prior to the burn is suggested. Larger trees need hotter, drier conditions such as is often present in early spring to generate killing temperatures. Perhaps we should add a pruning shears to the toolbox and remember that prairie is by definition treeless!

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

SDSU Range Team Performs Well at SRM Meeting by Sandy Smart

The SDSU Range Judging Team participated in the Undergraduate Range Management Exam (URME) and Plant Identification competitions at the 69th Annual Society for Range Management meetings in Corpus Christi, TX Jan 31 – Feb 4. The URME Team placed 2nd out of 24 teams and the ID Team placed 7th out of 23 teams. Sam Haigh and Tyler Swan placed 3rd and 5th, respectively out of 180 contestants in URME.

2016 Range Club, Plant Identification and Undergraduate Range Management Exam Team (Photo L. Xu).
Left to right: Dr. Sandy Smart (RC Advisor), Ella Woroniecki (RC, ID, URME), Alex Mergen (RC, ID, URME), Seth Rozeboom (RC, URME), Andrea Beck (RC, ID, URME), Sam Haigh (RC, ID, URME), Andrea Collins (RC, ID, URME), Wyatt Johnson, (RC, URME), Cady Olson (RC, ID, URME), Jarret Spitzack (RC, URME), Tyler Swan (RC, ID, URME), Brant Douville (URME Coach), and Jonathan Champion (RC, ID, URME).

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

In addition to the student competitions, Cady Olson and Andrea Collins presented undergraduate research in the general poster session. Cady's poster entitled "Impacts of Spring Fire or Mowing on Smooth Bromegrass Bud Bank" was co-authored by Lan Xu and Sandy Smart. Andrea's poster entitled "Cattle Grazing Time On and Off Prairie Dog Towns" was co-authored by Jameson Brennen, Kenneth Olson, Janna Kincheloe, and Patricia Johnson. Graduate students, Hector Menendez, Kurt Chowanski, Jameson Brennen, and Jenifer Walker mentored by Roger Gates and Pat Johnson presented talks and posters from their research. Extension field specialist, Pete Bauman, and professors Sandy Smart and Lan Xu also presented research from their latest work.

The Green Side Up: Not all Grasslands Created Equal by Pete Bauman

Sometimes words that are close in meaning are used interchangeably with little consequence. Take for instance the words 'Haybine' or 'Bobcat'. A Haybine is really a New Holland brand mower-conditioner and a Bobcat is its own brand of skid-steer loader. Growing up in my neighborhood, everyone called any brand of mower-conditioner a Haybine and any brand of skid-steer a Bobcat. Taken a step further, I noticed that Southerners call every brand of soda pop a Coke. You can sit in a restaurant in South Carolina and the waitress will ask if you'd like a Coke. If you say 'sure', she'll respond with, 'OK, we've got Mountain Dew, orange, and root beer, what kind of Coke would you like?"…. These minor miscommunications rarely create many real problems and are often the source of good natured debate. I don't know anyone who ever actually tried to go to the Bobcat dealership to get parts for their Gehl skid-steer…they understood what was actually parked in the shed.

So why is terminology important for grasslands? As grassland managers we need to protect our home turf, pardon the pun. Part of that protection is helping others understand what is actually underfoot in terms of native or non-native grasslands and the stark differences in the ecological function of each.

In my January 2016 article, I described our native grassland inventory project. Both within and outside of the grass community, there is a lot of misunderstanding of what a 'native grassland' really is, and the term gets thrown around a bit loosely. Here in South Dakota where wildlife plantings and government-led conservation projects are common, folks tend to assume anything tall and brown is a native grassland…… so let's set the record straight with a few simple working definitions!!!

Native sod or native grassland vs. go-back grassland. In a perfect world native grasslands would support the full suite of native species including vegetation, mammals, birds, reptiles, insects, and soil biota. In reality, few have been managed well enough over time to have retained the full suite of biology, but many do retain a fairly intact and diverse native plant community. At the core, these are grasslands that have *never been farmed*. In South Dakota, these are often traditional pastures that occur in areas too rocky or steep to farm. It is important to note that just because a pasture is native, does not necessarily mean it's always *healthy*. In eastern South Dakota native grasslands may be heavily invaded with non-native grasses such as smooth bromegrass and Kentucky bluegrass. In the west they often contain non-native wheat grasses and cheat grasses. If an area still has scattered surface and sub-surface rocks its likely that it wasn't tilled in the past and is a native grassland.

I speak with a lot of ranchers who clearly understand what a native grassland is. However, I also speak with many who do not. Those that do not often make comments like, "yeah, its native, Dad farmed it back in the 70's for a few years but it was just too damn rocky, so he let it go and we now use it as pasture or wild hay ground". If the soil was turned over at any time in the past and the field was left to re-establish itself naturally or with enhancements the term '**go-back'** is more appropriate. Generally, if the sod was disrupted and farmed, there is little chance that the full plant community was able to re-establish itself.

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The Green Side Up Continued by Pete Bauman

Granted, if it was farmed a century ago, it may have healed to the point where the prior tillage is masked and difficult to determine. Generally speaking go-back grasslands will usually have only the most common native species along with non-native species such as smooth bromegrass, Kentucky bluegrass, or crested wheatgrass to name a few. Also, it was a common practice in the past to over-seed or inter-seed these areas with non-native grasses or various legumes such as alfalfas and clovers. Rock piles and traces of tillage such as shallow furrows can be a great way to determine if a grassland has been tilled in the past.

To confuse the issue a bit further, there is another major grassland type known as the '**grassland planting'**. Generally, grassland plantings can be described in four ways: High-diversity native grassland reconstructions, low-diversity native grassland plantings, diverse native grassland plantings, and non-native or mixed-species grassland plantings.

High-diversity native grassland reconstructions are just what they sound like. These are areas where the intent is to permanently re-establish as much plant diversity and ecological function as possible, including cool and warm season native grasses and flowering broadleaf plants. They can harbor as few as 30 and as many as 200 or more native plant species. These fields are generally intended for use as wildlife conservation areas and until fairly recently many excluded livestock in the management plan. However, in recent years conservation organizations have been experimenting with livestock integration as a management tool in these re-established grasslands. These grasslands focus on native species but they are not truly native grasslands because they are most often established on previously cropped ground. Over time, if managed well, they can be visually difficult to distinguish from a truly native grassland. Often the smoothness of the field and the lack of surface rocks can be an indicator that the area has been planted and is not truly native.

Low-diversity native grassland plantings are those where the intent is to establish a relatively temporary low-diversity native plant community that offers some wildlife cover and structure. Generally, old CRP fields that have 1-5 species of warm or cool season native grasses would fall into this category.

Diverse native grassland plantings are an emerging segment of the grassland matrix. These are plantings that are generally in-between the other categories. These fields are often intended to be at least semi-permanent and include a greater degree of diversity of native grasses and flowering plants. While not as diverse as a full native grassland reconstruction in regard to structure and function, these plantings offer more than just a few grasses and may have from 10 to 20 or more native species, including at least a few native flowering plants. These fields are often associated with some sort of state or federal program (such as CRP) and are generally established for wildlife habitat and pollinators.

Non-native or mixed grassland plantings. These are simply those areas planted into permanent or semi-permanent non-native grassy cover. They may be old CRP, pastures, hayfields, conservation plantings, or erosion control projects. They are simply areas that do not focus on native grassland species management.

Pasture vs. Prairie. This is one that always strikes me as odd. Many times in my career I've had to attempt an answer at the difference between pasture and prairie. I always associate the word 'prairie' with truly native grasslands, regardless of how and why they are managed. For instance, an area that has never been tilled and is now managed for wildlife with tall grasses and flowering plants is often referred to as a prairie.

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The Green Side Up Continued by Pete Bauman

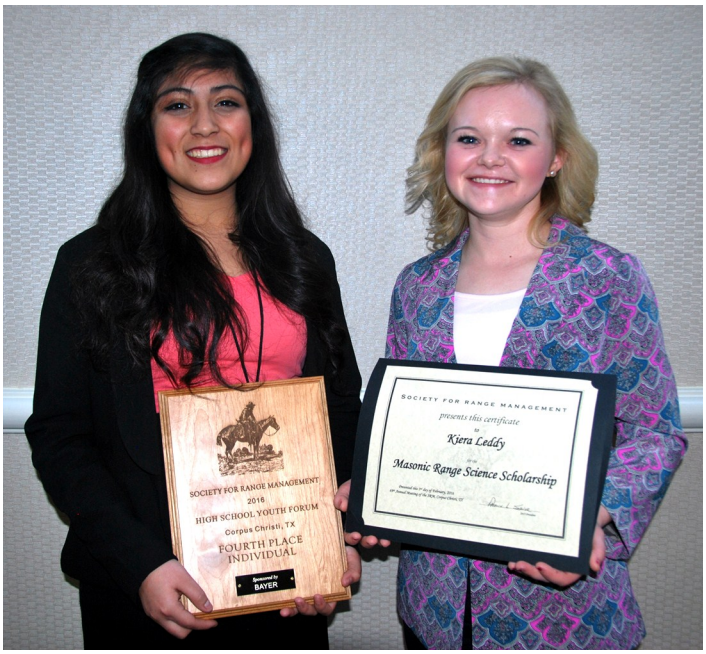
However, the same is true for a native pasture managed primarily for livestock. I think what drives the interpretation is the state the vegetation is in at any given time. If it's fenced and a cow is present, folks tend to call it a pasture. That said, there are plenty of excellent ranchers who take pride in managing their diverse prairies well with livestock, so I don't get too hung up on which term is used.

So whether you call it a prairie or a pasture, any native grassland deserves our attention as they are at most risk across the globe. Understanding where native grasslands are and their functions within the ranch operation are important considerations toward balancing conservation, profitability, and quality of life for people and wildlife.

Pete Bauman is an Extension Range Field Specialist in Watertown, SD.

SDSU Extension

South Dakota High School Youth Forum Shines Again by Sandy Smart



Milbank High School student Kimberly Alburto and SDSU Freshman Kiera Leddy honored at the SRM meeting in Corpus Christi, TX (Photo K. Leddy).

South Dakota made its mark at the annual meeting for the Society for Range Management (SRM) held in Corpus Christi, TX Jan 31-Feb 4. Kiera Leddy gave the 2016 High School Youth Forum (HSYF) address at the SRM Award Ceremony in front of over 500 people. Kiera spoke about the endangered grasslands of the Prairie Pothole Region of South Dakota, which she received first place last year at the 2015 SRM meeting in California. The South Dakota delegate for the 2016 HSYF was Kimberly Alburto from Milbank. Kimberly placed 4th in the competition with her oral presentation on the benefits of dung beetles. Each year the SD Section of SRM chooses the winner of the oral presentation contest held in conjunction with the annual Rangeland Days meeting in June. The winner advances to the annual SRM meeting representing the SD Section. We are very proud of Kimberly and Kiera!

Research Update: Ferruginous Hawks by Shubham Datta and Troy Grovenburg

Shubham Datta, Ph.D. Student holding a ferruginous hawk.

The prairies of the northern Great Plains have been deemed as one of the most threatened landscapes in today's world. The quickly vanishing native grasslands and the response of a grassland obligate species, like the ferruginous hawk, speaks volumes about the qualitative change that the current land-use has had on this species. Ferruginous hawks have lost half of their breeding range in the past few decades and it is likely due to grasssland conversion. Lokemoen and Duebbert conducted a study from 1973-74 in a 181 mile^2 area within the Missouri Coteau, west of Long Lake in McPherson County. In two years they identified 48 nesting pairs of raptors in their study area and 31 (~ 65%) of those pairs were ferruginous hawks; remaining raptor species were red-tailed hawk, Swainson's hawk, northern harrier, great horned owl, and burrowing owl. To follow up this study, we collected nesting raptor information from 2013 to 2015. Not only has the landscape changed pertaining to change in land-use, our findings clearly showed a major change in raptor community as well. Of the 337 active raptor nests identified in three years in McPherson County, only about 3% (n = 11) belonged to ferruginous hawks, 9 of which were within the 1973-74 study area; Swainson's hawk contributed approximately 34% (n = 116) and red-tailed hawk approximately 43% (n = 146) to the nesting community. A marked change in nesting behavior was also apparent. Ferruginous hawks are well known for their versatility in selecting nesting sites. Approximately 51% (n = 14) nests during the 1973-74 study were placed on the ground or on haystacks. In contrast, 100% of ferruginous hawk nests documented in our study were tree nests. This change in nesting behavior is a possible indicator of general increase in ground-based disturbance and a manifold increase in cropland coverage. In 1973-74, about 25% of the sampled study area was croplands while approximately 31% and 29% were native mixed-grass prairie and tame hay and pasture respectively. In comparison, about 52% of McPherson County is currently cropped and although 47% is deemed pastureland, only about 11% can be considered native prairie (see Pete Bauman's January article). Although available prairie was low, association of active ferruginous hawk nests to prairie were very high according to our study. No association was found between landscape features and nesting success, however, probability of nest survival was fairly low (65%) compared to other studies conducted in its range. Nestlings frequently fell from tree nests which affected nestling survival, and mortality due to diseases like West Nile virus (n = 5 confirmed; n = 6 suspected) and *E. coli* septicemia (bacteria in the blood) curtailed production and also were identified stressors on nesting. Although the possibility of a population level impact of these diseases is speculation at this point, further investigation is warranted. Decline in nesting ferruginous hawk numbers in the area, modification of the raptor community, and change in nesting behavior are all indicative of human-mediated impacts of habitat modification and loss. A raptor like the ferruginous hawk which relies on open prairie for foraging and is sensitive to anthropogenic disturbance seems to be under considerable threat from the habitat destruction which still continues with expansion of croplands and ground-based anthropogenic disturbance emanating from increased human presence.

Shubham Datta is a Ph.D. student and Troy Grovenburg is an assistant professor in the Department of Natural Resource Management at SDSU.

SOUTH DAKOTA GRASSLAND COALITION

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Calendar of Events

Event	Date	Location	Contact Person	Phone
South Dakota Soil Health Coalition 2016 Spring Soil Health Series	March 17	Ipswich	NRCS	605-426-6951, ext 3
South Dakota Soil Health Coalition 2016 Spring Soil Health Series	March 18	Sioux Falls	NRCS	605-330-4515, ext 3
Ag Day Washington Pavilion	March 19	Sioux Falls	Sandy Smart	605-688-4017
Annual Bird Tour	June 10-11	Ft. Pierre	Judge Jessop	605-280-0127
Rangeland and Soils Days	June 21-22	Wall	Lesa Stephens	605-279-2451, ext 3
Happy Cow Bus Tour	July 29	Clear Lake/Brookings	Pete Bauman	605-880-6542

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