

A Century of Vegetation Change at Nine-Mile Prairie: Snapshots from 1928 and 2012

by David Wedin, School of Natural Resources, UNL

In the summer of 1928, University of Nebraska Ph.D. student T.L. Steiger laid out 40 one square meter plots on a gently sloping ridge approximately nine miles northwest of downtown Lincoln (thus, the eventual name of Nine-Mile Prairie). Surrounding Steiger were 800 acres of treeless, unbroken prairie used for haying and grazing by the Flader and McManaman families. These 40 plots were part of Steiger's meticulous study of the area's soils, botany and ecology published in 1930 in the journal *Ecology*. Steiger, originally from Switzerland, was advised by John Weaver, the Nebraska ecologist who would later be known as the "father of grassland ecology." This area was an early research location for Weaver and his academic advisor, Frederic Clements, who developed the ecological theory of succession and climax vegetation. The writings of Clements and Weaver emphasized the stability of natural ecosystems unperturbed by humans, where "climax" vegetation achieved an equilibrium with climate.

Today, Clements' theory of climax vegetation is widely rejected. Neither Steiger nor Weaver realized that Steiger's data were just one snapshot of a system that began changing with the loss of bison and wildfires 60 years before and would see dramatic change within a few years as the 1930s drought fell on the region. Over the next 80 years, this prairie would become fragmented as farms were sold and fields were plowed. In 1950, the land was taken by the federal government for a Cold War nuclear air base. The area 200 yards east of Steiger's plots would become a nuclear weapons bunker facility, which was later transferred to the Lincoln Airport Authority in the 1970s. The 235-acre tract containing Steiger's plots would become Nine-Mile Prairie (9MP), managed by the University of Nebraska for research and teaching. The next 80 years would also see accelerating environmental

change with introduced plants, increasing atmospheric carbon dioxide, warmer winters, and airborne inputs of nitrogen as agriculture intensified.



Dave Wedin (right) holds a lab session for his introductory ecology class at Nine-Mile Prairie in August, 2015.

In 2011-2012, I, along with botanist Alicia Admiraal and student intern Jordan Marquis, revisited the area where Steiger had worked in 1928. We laid out 40 one square meter plots, noting the identity and abundance of plant species in each plot. The methods allowed us to estimate frequency (what percentage of the plots did a species occur in), and cover (what percentage of the area within plots was covered by each species) with methods comparable to those used by Steiger.

In addition, we sampled another area at 9MP and two nearby areas that were managed with annual haying. The two 9MP areas were both burned the spring before they were measured, and had been managed with prescribed fire on a three-year rotation since 1979. The two hayed areas, as far as we know, had never received herbicides or fertilizer, and had been hayed annually since the early 1900s. Steiger noted that his study area had been annually hayed for at least 25 years before his study in 1928. Thus, our study provides two glimpses (1928 and 2012) of a prairie on a trajectory of change since the 1870s that was managed uniformly most of the 20th century, but around 1980 split into areas managed by fire and haying.

The prairie Steiger saw in 1928 had many of the same species observed in 2012, but playing different roles. The abundant species were, in decreasing order, leadplant, little bluestem, sideoats grama, big bluestem, junegrass, prairie dropseed, Kentucky bluegrass, and blue grama. Weaver's papers noted that little bluestem was hit hard by the 1930s drought; it never again achieved dominance in this landscape. Little bluestem dropped from an average of 25% cover and 100% frequency

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FROM THE DIRECTOR

There are many different kinds of grasses and each serves our society in its own way. Their uses include production of a large percentage of our food supply, forage for livestock, turf for homes, parks, sports and other purposes, wildlife shelter, fuel, landscaping and general aesthetics. Fall is a wonderful time of the year to reflect on grasses, especially prairie and turfgrasses. The Center for Grassland Studies has two undergraduate majors related to grasses: Grazing Livestock Systems (GLS) and PGA Golf Management (PGM).

Students in the GLS major not only learn how to identify and manage prairie grasses utilized by grazing livestock, but also about the grass/animal interaction. The GLS curriculum integrates courses in forage/range science, animal science, and agricultural economics to help them understand the business aspects of the production system. Students may also take courses that address managing grasslands for multiple purposes such as grazing livestock, wildlife habitat and soil conservation.

Golf is played on some of the best groomed, aesthetically pleasing and most valuable properties in the world. Golf courses compete for player appeal on the basis of condition of the turf and how well it is groomed. Young men and women training to be professionals in the golf business certainly need a good understanding of turfgrasses and how they are grown and managed. In addition to taking turfgrass science courses, PGM students take courses in business, social and life sciences, hospitality and restaurant management, and all aspects of golf including equipment, club fitting and repair, merchandising, teaching the sport, rules governing the game, etc. They must also pass all requirements of the PGA of America. The UNL PGA Golf Management program is one of 18 PGA-accredited programs in the country. After graduating with a B.S. in PGA Golf Management, passing a background check and being employed in the golf industry, students are eligible for Class A Membership in the PGA of America.

We're proud to feature two recent alumni – one from each major – on pages 10 and 11 of this newsletter.

Fall is a time when the warm-season prairie grasses exhibit their brilliant colors. Also, early fall is the best time to seed most turfgrasses, especially in northern climates. The turf industry got its big expansion from the rapid growth of golf courses and the maintenance needs for their operation. There are approximately 40 million acres of turfgrass in the United States today, constituting a 40 billion dollar industry annually. Turfgrasses are possibly the most undervalued of all grasses. This is true even though these grasses are highly useful and prominently visible throughout the year. Turfgrass is undervalued at least in part because there is not normally a marketable product harvested from this group of grasses; for this reason it is difficult to place a monetary value on the product unless it is used for rent or sod production.

Turfgrasses are widely used for home lawns, parks, playgrounds, sport fields, golf courses, cemeteries, roadside stabilization and other landscape purposes. Therefore, as one views the future, it would seem that population increases, housing expansion and construction of new manufacturing facilities will lead to a growth in this industry.

M. A. Massengale

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in 1928 to less than 2% cover and only 30% frequency in our 2012 burned plots. In hayed plots it has survived with about 5% cover. Junegrass, a common cool-season grass in 1928, is now rare at 9MP, hanging on with 1-2% cover in our hayed plots. Blue grama, a short warm-season grass, was common on ridges in 1928, expanded dramatically during the 1930s drought, but is gone from both burned and hayed areas today. Surprisingly, Kentucky bluegrass, the only non-native species found in the 1928 plots, had essentially the same frequency and cover as it has today. Although bluegrass has expanded sharply in the Dakotas in recent decades, its role in Nebraska's prairie as a ubiquitous understory species appears to have changed little in over a century.

Steiger's data paint a picture of a shorter, midgrass prairie with a reduced role of big bluestem and almost no indiangrass and switchgrass compared to the uplands at 9MP today. Shorter vegetation allows more species, particularly flowers, to pack into a square meter. In 1928, the number of species per square meter averaged 17 in contrast to an average of 12.7 species per square meter in our 2011-2012 9MP plots. The shorter vegetation of our hayed plots maintained an average of 15.5 species per square meter, but that higher diversity reflects a mixture of native species and non-native species. Whereas Steiger's plots contained 98% native species, our 9MP plots had 89% native species (80% in the hayed plots). The most important non-native addition to the flora was smooth brome grass, which occurs in 89% of our burned plots and 100% of our hayed plots. Native species that have increased dramatically since 1928 in our 9MP plots include stiff sunflower, switchgrass, tall thistle, western ragweed and smooth sumac.

Steiger's 1930 paper included a complete flora of the area (345 species, reanalyzed by Kaul and Rolfsmeier in 1987), but Steiger's data on the composition of vegetation reflect a much smaller area. In his 40 upland plots, he observed a total of 41 species. Have we lost any of those species since 1928? Of Steiger's 41 species, 16 species were not found in our 2012 plots in the same area. However, 10 of the 16 species were found in walk-through surveys of the roughly two-acre study. Three of the 16 were found in the adjacent hayed field, but not in our 9MP surveys. Several spring-flowering grasses, sedges and flowers, some quite rare today, are more common in hayed areas around 9MP than in the prairie itself. It is humbling to realize that our neighbors unintentionally

protect some native plants better in their hay fields than we do with prescribed fire management at 9MP. Finally, only three of the 41 species in Steiger's plots, including blue grama, were not found in our recent surveys.

Michael Forsberg's famous 2001 photograph "October in the Tallgrass" represents Nine-Mile Prairie for many. What Steiger saw in 1928 was very different. He saw a shorter upland prairie dominated by little bluestem and sideoats grama, with increased big bluestem as one moved down the slopes. While other tall species including indiangrass, switch grass, stiff sunflower and smooth sumac were uncommon, Steiger could look down and see 30% more species on average per square meter. Surprisingly, Kentucky bluegrass, considered invasive by many, was an important cool-season species along with junegrass, porcupine grass, and spring flowers such as ground plum and wild onion. Today, you are more likely to find junegrass, ground plum and wild onion in neighbors' hay fields than at 9MP. Smooth brome grass was not yet part of the flora in 1928, but is, like Kentucky bluegrass, ubiquitous today.

We continue to move away from Steiger's 1928 prairie and the presettlement tallgrass prairie of the mid-1800s. Does our inability to preserve and restore the presumed "climax" or "virgin" prairies of the past indicate a failure in prairie conservation, or have these grasslands always been on a trajectory of change, a trajectory accelerating in the 21st century? In fact, most of the native plant species found a century ago are still at 9MP, although, like little bluestem, playing different roles and sharing the stage with new players such as bluegrass and brome grass. Although we have less diversity per square meter in today's taller, more productive prairie, we find that diverse grassland management in the landscape, such as haying versus prescribed fire, enhances different components of our biodiversity. Nine-Mile Prairie will still be a diverse, resilient grassland in another 80 years, but it will continue to change. It will look different than it did in 1928, or than it does today.

Author's Note: Research at Nine-Mile Prairie is supported by the Center for Grassland Studies and the Silk Purse Fund.

CGS Associates

At the annual meeting of the American Society of Animal Science in July, **Don Adams** received this year's Animal Industry Service Award for distinguishing himself in the beef cattle industry with his research and extension practices regarding grazing nutrition and management systems.

Stephen Baenziger was awarded the 2015 National Association of Plant Breeders lifetime achievement award, which is presented to one person each year and recognizes an individual who has given distinguished long-term service to the plant breeding discipline in areas such as breeding/genetics research and publication, education, extension outreach, and regional, national and/or international leadership.

Participants Continue to Find Value in Annual Nebraska Grazing Conference

Thought provoking. Interesting. Informative. Educational. Useful. Pertinent. Timely. Well balanced. These are words that show up every year, including this year, on the evaluations of the Nebraska Grazing Conference, which began in 2001. The 2015 conference, attended by 180 participants, was held August 11-12 in Kearney. Additional perennial words on the evaluation forms are excellent, outstanding, awesome, super... you get the idea.

Files from the 2012-2015 conference proceedings are online at the conference website, nebraskagrazingconference.unl.edu. Hard copy of some past conferences can be ordered (see the site for details).

The 2016 conference will be back in Kearney on August 9-10. If you have not attended previous conferences but would like to be on the mailing list to receive notice of the next conference, simply send your name and address to the CGS office. Details of the 2016 program will be posted on the conference website as they become available.

The Nebraska Grazing Conference has several sponsors including this year's conference underwriters: Central Life Sciences, Farm Credit Services of America, Merial, Nebraska Game and Parks Commission, Nebraska Grazing Lands Coalition and the UNL Center for Grassland Studies.



With a \$17,000 line of credit, young rancher Sage Askin from Wyoming established Askin Land & Livestock in 2012, and in 2013 ran 2,000 yearling steers on 26,000 acres. He described how he was able to continue to build the company that now runs units of cattle and sheep on multiple ranches as well as the grazing methods he uses for sustainable production. He encourages young producers to take advantage of opportunities that are out there.



Economic losses associated with horn flies are estimated at more than \$1 billion annually in the U.S., according to David Boxler, UNL Extension livestock entomologist. He described three types of flies and methods to control them in grazing livestock.



Opening remarks of the conference were provided by Greg Ibach, Director of the Nebraska Department of Agriculture.

UNL rangeland ecologist Dirac Twidwell discussed ecosystem benefits from fire and future consequences of not utilizing burning. He was followed by a panel of Nebraska producers who described the physical and economic results of prescribed burns on their grasslands: (from left) Michael Clarke, Berwyn; Russ Bloom, Scotia; Scott Stout, Curtis.



Jerry Glaser from Spalding and Nancy Peterson from Gordon told how they use annual forages and cover crops in their operations.



Representatives from industry, government, university and other organizations visited with NGC participants in the exhibit hall, which this year contained 25 booths.



UNL agricultural economist, Jay Parsons, discussed various methods for controlling risk in grazing-based production systems.



Board certified in large animal internal medicine, Tony Knight, formerly with Colorado State University and now living in Tucson, AZ, gave two detailed presentations: one on poisonous native range plants and the other on livestock poisoning associated with cultivated crops.



Livestock grazing distribution is influenced by physical (water locations, topography and shelter) and biological (quantity, quality and distribution of vegetation) factors on the landscape. Mitch Stephenson, UNL range and forage Extension specialist, discussed management options for improving livestock distribution.



The topic of the presentation by Certified Wildland Fire Ecologist, Derek Scasta, with the University of Wyoming, was prescribed fire effects and benefits for cattle.



Every year this conference features the previous year's winner of the Leopold Conservation Award for Nebraska. The 2014 recipient was the Pelster Family, represented by Duane Pelster. A question/answer period followed the showing of a video that highlighted the management practices on the Sandhills ranch near Ericson.



Daren Redfearn, a forage/crop residue specialist at UNL, spoke on incorporating annual forages into crop-forage-livestock systems.



Making a return appearance to entertain the audience at the evening banquet was cowboy poet, R.P. Smith.

Performance and Economics of Supplementing Yearlings on Smooth Bromegrass Pastures

by Cody Welchons, Terry Klopfenstein, and Andrea Watson, Department of Animal Science, UNL

Historically, one of the most common ways of managing yearlings over the summer in eastern Nebraska is allowing them to graze smooth bromegrass pasture. Smooth bromegrass is a cool-season forage that has high protein levels early in the growing season when the forage is still in the vegetative state. As the summer progresses, protein levels fall as the forage matures. As temperatures begin to decrease at the end of the summer, there is a period of regrowth when protein levels once again increase. While smooth bromegrass has crude protein (CP) levels that can be as high as 18% early on in its growth stage, the rumen undegradable protein (RUP) content of the forage is not adequate to meet metabolizable protein requirements of growing steers. Supplementing growing animals grazing smooth bromegrass pastures with an RUP source, such as distillers grains plus solubles (DGS), provides both energy and protein and increases average daily gain (ADG) compared to unsupplemented cattle. An additional benefit to supplementation of cattle while on pasture is the ability to increase stocking rate due to substitution of supplement for forage. Another method of increasing stocking rate is the use of nitrogen fertilizer (in the form of urea). Nitrogen increases forage production, but does not impact forage quality, which has been shown by similar ADG of cattle grazing fertilized and unfertilized pasture.

A 10-year study was conducted from 2005-2014 at the University of Nebraska-Lincoln's Agricultural Research and Development Center near Mead, NE, to evaluate the effect of three management strategies for yearling steers grazing smooth bromegrass during the summer. Treatments consisted of bromegrass pastures fertilized with 80 lb N/acre (FERT), unfertilized pastures stocked with cattle that received DGS at 0.6% of body weight (SUPP), and unfertilized pastures stocked with cattle that received no supplement (CON). Over the 10-year period, 450 yearling steers with an average initial weight of 708 lb, grazed smooth bromegrass for an average of 152 days from late April through September. Each year, 45 steer calves were assigned to one of three treatments, with three replications per treatment each year. The FERT and SUPP pastures were stocked at 4 animal unit months (AUM)/acre to account for the added forage due to fertilization and the substitution of supplement for forage. Control pastures were stocked at 2.8 AUM/acre, or 69% of the other two treatments.

Steers on CON and FERT treatments gained similarly throughout the grazing season (1.69 lb/day; Table 1); however, fertilized pastures had greater gain per acre due to increased stocking rate. Steers supplemented with DGS at 0.6% of body weight (BW) had a 0.68 lb/day increase in ADG (2.37 lb/day) compared to CON and FERT steers. This increase in ADG of SUPP steers throughout the grazing season led to greater ending BW compared to nonsupplemented steers (1063 vs. 963 lb, respectively). Additionally, the SUPP treatment had increased production per unit of land relative to FERT. While SUPP and FERT steers were stocked at the same rate, the increase in ADG

of SUPP steers led to 371 lb gain/acre over the 152-day grazing season compared to 289 lb gain/acre for FERT steers over the same time period.

During the last decade there has been a large increase in ethanol production, which led to greater demand for grain. This caused a sustained, until recently, increase in grain prices. The increase in grain prices factored into the conversion of 1.3 million acres of pasture to cropland in the North Central region of the U.S. Due to decreased availability of pasture land, cash rent of grazing land in Nebraska has increased steadily during the same time period. The profitability of these management strategies greatly depends on the price of land rent, N fertilizer, and DGS. Distillers grains are traditionally priced relative to corn. Price of DGS (and corn) is in constant flux due to changes in both domestic and international demand. In recent years DGS have been priced anywhere from 85 to 130% the price of corn.

Utilizing cattle performance numbers from the 10-year data set, nine economic scenarios were compared using fluctuating DGS prices. Corn was priced at \$3, 4, or 5/bu, with DGS priced at 95, 105, or 115% the price of corn. When corn was \$3/bu, DGS prices were \$118, 131, and 143/ton dry matter (DM) respectively for 95, 105, and 115% of corn. At \$4/bu the DGS prices increased to \$158, 174, and 191/ton DM and \$197, 218, and 239/ton DM with \$5/bu corn. A cost of \$430/ton for urea plus an application fee of \$4/acre was used. Land rent was held constant at \$31/AUM (Table 2).

Over the grazing season, FERT and SUPP steers were more profitable than CON. When comparing CON and FERT, FERT steers generated a net return of \$15.67/animal greater than CON, indicating that at these prices fertilizer costs are offset by the decrease in land rent due to increased stocking rate. As the price of corn increased from \$3 to 5/bu, profit of SUPP steers relative to CON steers decreased; however, even at \$5/bu corn and DGS priced at 115% of corn, SUPP steers still had a \$19.57/animal profit potential compared to CON (Table 3). At the lowest price of DGS in this evaluation, SUPP had a net return of \$70.99/animal greater than CON. Across all DGS prices at \$3 and 4/bu corn, SUPP steers had greater profitability than FERT steers. When corn price increased to \$5/bu and DGS were priced at 105 or 115% the price of corn, SUPP was no longer more profitable than FERT, but both treatments were still more profitable than CON. Overall, for every \$1/bu increase in corn price, SUPP profit decreased by \$18.62/animal. For every 10% increase in DGS price relative to corn, profit of SUPP decreased by \$5.32, 7.09, and 8.87 per animal for \$3, 4, and 5/bu corn, respectively.

In order for it to be more profitable to utilize a lower stocking rate (CON treatment), urea cost would have to increase to greater than \$596/ton. At this point, the increase in stocking rate no longer offsets the land rent cost of \$31/AUM. Conversely, with fertilizer cost held at \$430/ton of urea, land rent would need to decrease to \$22.50/AUM for the N fertilizer cost to no longer be offset.

Supplementing DGS to yearling calves backgrounded on

smooth brome grass provides additional protein and energy, which leads to increased gain. In order to capture the profit potential of this management strategy, it is important to take advantage of the ability to increase stocking rate. In most scenarios, with current prices of land rent, fertilizer and DGS, it is more beneficial to supplement calves while grazing in order to realize maximum

weights when selling cattle at the end of the grazing season.

Editor's Note: Welchons is a graduate student, Klopfenstein is professor emeritus, and Watson is a research assistant professor in the Department of Animal Science.

Table 1. Performance of yearling steers grazing smooth brome grass pastures.

	Treatments ¹			SEM	P-Value
	CON	FERT	SUPP		
Initial BW, lb	709	708	706	15.2	0.47
Ending BW, lb	963 ^b	963 ^b	1063 ^a	15.1	<0.01
ADG, lb/day	1.68 ^b	1.70 ^b	2.37 ^a	0.09	<0.01

^{a,b} From the P-values, means with differing superscripts are different ($P < 0.05$).

¹ Treatments consisted of nonfertilized paddocks (CON), paddocks fertilized with 80 lb N/acre (FERT), and nonfertilized paddocks grazed by steers supplemented with DGS at 0.6% of BW daily.

Table 2. Economic analysis of input costs.

Initial steer cost	\$210.00/cwt
Final grazing value	\$180.64/cwt, 963 lb; \$10/cwt slide
Fertilizer	\$430/ton urea plus \$4/acre application fee
Land cash rent	\$31/AUM

Table 3. Profitability of yearling steers under differing summer management strategies with different corn and DGS prices.

Scenario		Treatments ¹			SEM	P-Value
		CON	FERT	SUPP		
\$3/bu corn, DGS at 95%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$70.99 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$163.69		
\$3/bu corn, DGS at 105%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$65.67 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$164.19		
\$3/bu corn, DGS at 115%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$60.35 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$164.69		
\$4/bu corn, DGS at 95%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$54.14 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$165.28		
\$4/bu corn, DGS at 105%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$47.05 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$165.94		
\$4/bu corn, DGS at 115%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$39.96 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$166.61		
\$5/bu corn, DGS at 95%	Profit ²	\$0.00 ^c	\$15.67 ^b	\$37.30 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$166.86		
\$5/bu corn, DGS at 105%	Profit ²	\$0.00 ^b	\$15.67 ^a	\$28.43 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$167.70		
\$5/bu corn, DGS at 115%	Profit ²	\$0.00 ^b	\$15.67 ^a	\$19.57 ^a	26.02	< 0.01
	Breakeven ³	\$180.37	\$178.74	\$168.53		

^{a,b,c} From the P-values, means within a row with differing superscripts are different ($P < 0.05$).

¹ Treatments consisted of nonfertilized paddocks (CON), paddocks fertilized with 80 lb N/acre (FERT), and nonfertilized paddocks grazed by steers supplemented with DGS at 0.6% of BW daily.

² \$/animal

³ \$/cwt, ending wt

Amenity Grasses in the Landscape

by Katie Kreuser, Department of Agronomy and Horticulture, UNL

Common turfgrasses such as Kentucky bluegrass and tall fescue create beautiful, deep-green lawns, but it is the grasses that have long composed our prairies that help bring variation in color, texture, height, form, and seasonal interest to our landscapes. Their adaptability to a range of soil conditions, resistance to many diseases and pests, relatively low need for water, and their companionship to many garden annuals and perennials make them excellent candidates for low-maintenance landscapes. Their variations in height and color, often dependent on the amount of sunlight the plant receives, provide opportunities for screening, bordering and specimen plantings.

Many species are effective in erosion control, and others that prefer their feet to be wet find the perfect niche in rain gardens. Many are native to our short or tallgrass prairies in Nebraska, and other species are naturalized from Europe and Asia. Most ornamental grasses need little or minimal amounts of water, no fertilization, and one yearly cutback in late winter to make room for new growth. Over-fertilizing is discouraged, since the plants may grow too quickly, causing them to fall over.

Zone hardiness of many grasses allows them to be long lasting here in Nebraska. The following table includes species established at the John Seaton Anderson Turfgrass Research Facility and in the Backyard Farmer Turf Garden located on UNL's East Campus, and other highlighted cultivar options. In order to find these selections, it is suggested that you check with your local garden nurseries for availability. In eastern Nebraska there are many great sources for a variety of ornamental grasses, including many of the suggestions below. When making ornamental grass selections for landscapes, pay close attention to the moisture level of soils and the amount of sunlight throughout the day. Most examples here tolerate moist to dry soils, and require full to partial sun for best growth and flowering results.

Editor's Note: Kreuser is a research technologist in the Department of Agronomy and Horticulture.

Grass Species	Growth Habit	Growing Conditions	Maintenance	Special Features
Switchgrass, <i>Panicum virgatum</i>	3-4'; Upright clumps	Hardy to zone 3; drought tolerant; spreads readily in moist soils	Cut back in late winter; water often in establishment period; divide every few years	Green clumps with airy seed heads
Sideoats grama, <i>Bouteloua curtipendula</i>	1-2'; Bunching	Hardy to zone 4;	Cut back in late winter; water often in establishment period; divide every few years	Seeds fall to one side of stem in late summer
Western wheatgrass, <i>Agropyron smithii</i>	15-30"; Cool season, sod forming grass	Hardy to zone 4; Grows well in wet bottomlands and upper heavy soils	Generally low maintenance; stands may require some weed mgmt	Wheat-like seed heads are erect; blue green in color with prominent veins on the leaves
Showy switchgrass, <i>Panicum virgatum</i> 'Squaw'	3.5' tall; Upright clumps	Hardy to zone 4; drought tolerant	Cut back in late winter; water often in establishment period; divide every few years	Showy, pink blooms; wider stems; beautiful fall color
Red October big bluestem, <i>Andropogon gerardii</i> 'Red October'	6' tall; Upright clumps	Hardy to zone 3; tough; drought tolerant, deer resistant; plant in well-drained soil; full sun	Cut back in late winter; do not fertilize; water often in establishment period; divide every few years	Leaves are green with red highlights in the spring and darken to a deep burgundy in the fall
Dwarf prairie dropseed, <i>Sporobolus heterolepis</i> 'Tara'	30" tall; Bunching	Hardy to zone 3; full sun to light shade	Cut back in late winter; water often in establishment period; divide every few years	Produces airy, pink inflorescences and orange-red leaves in the fall

Grass Species	Growth Habit	Growing Conditions	Maintenance	Special Features
Blonde ambition blue grama, <i>Bouteloua gracilis</i> 'Blonde ambition'	2-3' h x 3' w; Bunching	Hardy to zone 4; adaptable to most soil types; drought tolerant; pest resistant; full sun	Cut back in late winter; water often in establishment period; divide every few years	Chartreuse seed heads wave like flags in the wind and remain through winter; blue-green stems; excelled in green roof trials
Feather reed grass <i>Calamagrostis x acutiflora</i> 'Karl Foerster'	5-8' tall; Upright clumps	Hardy to zone 3; adaptable to moist and dry soils; prefers full sun	Cut back in late winter; water often in establishment period; divide every few years	Showy, wheat-like; flower spikes emerge green and become tan as winter approaches; non-native
Indian grass 'Bluebird' <i>Sorghastrum nutans</i>	3-5'; Upright clumps	Hardy to zone 4; prefers moist conditions but can withstand dryer areas; full sun	Cut back in late winter; water often in establishment period; divide every few years	Tallgrass prairie native; blue-gray foliage that turns yellow-orange in the fall; produces tan-yellow seed heads
Little bluestem 'the Blues' <i>Schizachyrium scoparium</i> 'the Blues'	2-4'; Upright clumps; deciduous	Hardy to zone 2; drought tolerant; does not grow well in wet conditions; full to partial sun	Cut back in late winter; water often in establishment period; divide every few years	Blue-green foliage that turns bronze-orange in the fall; great for massing or as a border plant
Skyracer Purple Moor Grass <i>Molina caerulea</i> subsp. <i>arundinacea</i> 'Skyracer'	6-8'; Narrow, arching clumps	Hardy to zone 4; tolerant of wet conditions; full to partial sun	Cut back in late winter; water often in establishment period; divide every few years	Blue-green blades with tiny purplish flowers above; Fall foliage turns golden with coppery seed heads; excellent for mass or specimen planting, screening
Flamegrass <i>Miscanthus sinensis</i> 'Purpurascens'	3-4'; Upright	Hardy to zone 4; tolerant of full shade and moist conditions	Cut back in late winter; water often in establishment period; slow spreading, divide when desired	Silvery white plumes bloom in late summer; green foliage turns reddish gold in the fall



Big bluestem, a native of the tallgrass prairie, has 3-pronged seed heads that resemble the foot of a turkey, thus giving the grass its nickname "turkey foot." This tall plant provides excellent height and fall color interest in a landscape.



Blonde ambition blue grama is a great selection for eastern Nebraska. This cultivar stands 2-3' tall and has flag-like seed heads that wave in the wind. This plant is strong through the winter; it stands right back up to show off seed heads after snow is brushed off.

Grazing Livestock Systems Alumnus Still Thinks Outside the Box

Editor's Note: As a sophomore, Patrick Heerten from Springview, NE, was featured in the Fall 2011 issue of the Grazing Livestock Systems (GLS) newsletter, the Blade. One of his favorite expressions was "thinking outside of the box." He was always seeking new experiences and perspectives. That ever-present desire to learn new things and interact with innovators led to his participation in the UNL Engler Agribusiness Entrepreneurship and Beef Industry Scholars programs, and the Nebraska Ranch Practicum. It is also why he did job shadowings and internships in other states and on ranches that did things differently than his home place. "I know what it's like to calve in March, so I wanted to intern where they calve in May or incorporate mob grazing." He took the initiative to contact John Maddux of Maddux Cattle Company, where he conducted his official GLS internship March-August, 2013, allowing him to be involved with the calving and breeding aspects. Patrick graduated in May 2014, and among other things, is a member of the Ranchers Advisory Board for UNL's Barta Brothers Ranch. GLS advisor Walter Schacht, who conducts research at the ranch, said Patrick's perspectives will be valuable in guiding the research and education programs at BBR. We asked Patrick to update us on his activities.

After graduation I went to work for a drylot cow/calf operation near Kearney, NE. This provided further beef industry experience from a unique standpoint. It was good to gather new ideas to bring home to the family operation as well as to receive valuable life experiences in a setting with a new set of challenges.

I returned home to the family farm and ranch in December 2014 to head up day-to-day cattle operations. It has been a very exciting time since returning for more reasons than just record high cattle prices. We have been blessed with some tremendous opportunities on the cattle side of the operation recently. Between trading real estate to consolidate rangeland into a block adjoining the family home place and leasing a neighboring ranch, things have not slowed down at all since I returned. We are currently focusing on growing our cow herd internally from retaining replacement heifers and also working to establish a separate terminal cross herd in which calves will be marketed into an all-natural program.

After returning home some exciting things have been happening in my personal life as well. I got married this past June and have been busy remodeling a house with my wife, Sydney. I could not have asked for a smoother move and transition into the area for Sydney, as a position became available at Keya Paha County Schools in Springview where she now teaches 5th and 6th grades.

I have been continuing my education by participating in area ranching for profitability extension meetings, attending open house events at the UNL Gudmundsen Sandhills Lab, and being involved in several area ranch advisory consortia. I firmly believe that industry group involvement is a tremendous way to network with others in my field as well as learn about issues facing the beef industry. I plan on becoming involved/more involved with the Nebraska Grazing Lands Coalition, Nebraska Prescribed Fire Council, and Nebraska Cattlemen. I continue to look for opportunities to better myself as a beef industry professional and

to be a good advocate for agriculture.

I would like to offer some advice to current and future college students. I had a little bit different strategy about my education than some do. I vowed to complete two majors and two minors in four years. While I am not saying this is a bad route, I wish I would have taken a slightly lighter course load each semester and focused more on being involved with student groups and activities pertaining to the beef industry and range management. Programs such as Nebraska Ranch Practicum, Nebraska Grazing Conference and Nebraska Range Shortcourse are extracurricular activities that are building blocks for success. Nebraska Beef Industry Scholars and Range Management Club offer ways to network with other students and professionals in the beef industry. For me, involvement in programs and organizations like these greatly enhanced classroom learning. I would also recommend that students take as many internships as possible, whether they are required or not. It is very easy for individuals in agriculture to believe that they are needed at home during the summer months. While every scenario is different, I am here to tell you that the family operation will survive, and by being gone that extra summer or two on an educational experience, you will benefit your operation more in the long run. The practical experience and the ability to look at things from a different perspective are wonderful ways to increase your knowledge and prepare you to be a leader in your field.



Patrick Heerten repairs fence on his family ranch near Springview, NE.

A Year in the Life of a PGA Golf Management Alumnus as His Club Prepares to Host Ryder Cup: Part 1

Editor's Note: Nick Sage from Bloomington, MN, graduated from the UNL PGA Golf Management Program in December 2013. He is now the Assistant Golf Professional at Hazeltine National Golf Club in Chaska, MN, site of the 2016 Ryder Cup matches. We thought it would be fun to follow Nick through the year as Hazeltine prepares to host this prestigious international event. Below is his first installment.

My name is Nick Sage and I am a Class A PGA Professional at Hazeltine National Golf Club in Chaska, MN. My time at Nebraska was memorable for more than Husker football; I was fortunate to be a Teaching Assistant for two years, serve as the PGA Golf Management Student Club President, and represent the Nebraska program at the annual PGA Golf Management University Program Leadership Session in Port St. Lucie, FL. I was also able to intern at four of the top 100 golf facilities in the country: Interlachen Country Club in Edina, MN; Hazeltine National; Pebble Beach Golf Links in Pebble Beach, CA; and Aronimink Golf Club in Newtown Square, PA. After I graduated, I spent a winter in Florida at Jupiter Hills Club, after which I was lucky enough to be hired back by Hazeltine, where I have been ever since.

Hazeltine National Golf Club opened for play in 1962. It was founded by former USGA President, Totton P. Heffelfinger and famed golf course architect, Robert Trent Jones. Heffelfinger wanted to build a golf course suitable for national championships and hired Jones to design the golf course. Hazeltine National has a very rich history of hosting national championships and the membership supports that mission. It has been the site of: 1966 and 1977 U.S. Women's Open, 1970 and 1991 U.S. Open, 1983 U.S. Senior Open, 1994 USGA Mid-Amateur Championship, 1999 NCAA Championships, 2001 USGA State Team Championship, 2006 U.S. Amateur Championship, and the 2002 and 2009 PGA Championship. After Hazeltine hosts the 2016 Ryder Cup matches, only one other golf course in the country will have hosted every major USGA and PGA championship, and that is Pinehurst #2.

In spite of that rich history, Hazeltine did not have a room dedicated to telling its story. The upcoming Ryder Cup provided the incentive to change that. The previous championships held at Hazeltine have been big, but nothing will compare to the exposure provided by this international event. The Super Bowl has about 100 million television viewers; the Ryder Cup has about 800 million viewers worldwide. The Ryder Cup will likely be the biggest event the state of Minnesota will ever host. So, in the winter of 2014, I was given the task of organizing an archive room, which is now known as the Hazeltine National Golf Club Heritage Collection. I logged more than 400 hours archiving, scanning and preserving Hazeltine's finest memorabilia. The Hazeltine Heritage Collection has had many visitors in its short existence including Mark Roling of NBC Sports, Davis Love III, 2016 U.S. Ryder Cup captain, Darren Clarke, 2016 European Ryder Cup Captain, and Tony Jacklin, 1970 U.S. Open Champion as well as one of the most successful European Ryder Cup players and captains ever to play. Organizing the Heritage Collection is one of the highlights in my short career in the golf business. (See photos accompanying this article that were taken in the Heritage Collection room.)

During the last weekend in September, the PGA of America, which runs the Ryder Cup, hosted its "Year-Out" celebration. Both captains as well as the entire PGA of America staff and European Ryder Cup staff were at Hazeltine. There were several press conferences and interviews with both captains. The weekend was capped off with a night in downtown Minneapolis called "Ryder Cup: Year Out, a Night with the Captains." Both captains were on stage with Golf Channel personality David Feherty who interviewed both captains, providing a preview of what is to come next year at Hazeltine.

The UNL PGA Golf Management Program prepared me to be an asset to a club like Hazeltine National Golf Club as it gets ready to host the biggest golf event in the world. It is an honor to be part of a club that prides itself on its rich history.

Nick Sage with Tony Jacklin, former European Ryder Cup captain who, Sage commented, "essentially changed the game for the European team in the 80s."



Nick Sage and Mark Roling, broadcaster for golf tournaments on NBC and referred to as "Mr. Ryder Cup."



Nick Sage is interviewed by European Tour Productions.



New Book Looks at Lessons from Great Plains' Small Places

The recent oil boom in western North Dakota has focused the media spotlight on a place often passed by. Dakota before the oil boom was, like so much human settlement on the Great Plains, a place slowly eroding with time. But its earlier era of small-town life may still have much to teach people.

"Natives of a Dry Place: Stories of Dakota before the Oil Boom," written by Richard Edwards and published by the South Dakota State Historical Society Press, focuses on people who lived in the little prairie town of Stanley, North Dakota.

The book, out Sept. 25, tells stories of ordinary folks who learned to get on with life despite the harsh climate of their homeland. They lived before wall-to-wall carpeting and central air conditioning, before paved roads and four-wheel-drive vehicles, before wheat combines had 40-foot grain heads and air-conditioned cabs, before television and the Internet. On occasion they showed extraordinary courage, love, purpose, pluck, humor and determination, and they developed a distinctive culture.

One story follows 21-year-old "Swede" Edwards as he descends 140 feet into a dry well, only 18-inches wide, to recover the crumpled body of Thomas Scrivner. Another tells of two young lovers, Irene and Arne, whose lives were devastated by their careless and disastrous early decisions; miraculously, 30 years later they were granted a "do-over." Other stories profile two brothers—the town doctor and dentist— and the latter's extraordinary wife, Stanley's widely admired cultural impresario.

These people's life stories and values are now fading from view, as is so much of small-town Great Plains culture. In Stanley's case, it became collateral damage of the oil boom. In the face of great change

to the region, it becomes even more important to remember these achievements of the past.

"As a child, I thought of my town—as most children probably do—as just an ordinary place. ..." Edwards said. "Yet I have come to think that there were exceptional things in the lives of its people and especially in the values and virtues they believed in and aspired to."

Edwards is a professor of economics, director of the Center for Great Plains Studies and former senior vice chancellor for academic affairs at the University of Nebraska-Lincoln. Edwards received his doctorate from Harvard University. Before coming to UNL, he served as chair of the economics department at the University of Massachusetts-Amherst and dean of arts and sciences at the University of Kentucky.

In recent years, Edwards' research has focused on the history of homesteading and on efforts to preserve Great Plains grasslands and biodiversity through ecotourism. The latter work seeks to create market incentives for private landowners to conserve as well as link habitat conservation to the economic prosperity in nearby human communities.

For more information on the book, visit <http://www.nativesofadryplace.com>.

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