By Gary Frasier

Frasier's Philosophy

It has been said that the youth of today are the future of tomorrow. This is a true perspective with respect to the future of the Society for Range Management and the range science profession.

Over 50 years ago a group of individuals got together and decided there needed to be a professional society dedicated to the proper management of our natural resources. Many of these individuals were employed by "the government." They knew that it was necessary to document the status of the resources, formulate plans to effectively manage the resources, and to instill a level of credibility with the landowners. The Society of Range Management was born. It became a recognizable entity in the proper management of the natural resources. People were proud to be able to say they were members of SRM.

As with all things, times are changing. Membership in SRM is declining in spite of various efforts to increase numbers. The number of our founding members of the range management profession is declining. Many of our most knowledgeable natural resource managers are retiring. Many range management instructors and professors at our universities and colleges are retiring and not being replaced. Colleges and universities are incorporating or combining "range management curriculum" with other groups. "Range manager" is not a prestigious title for a job. Yet the need for managing our natural resources in a sustainable manner continues. Is the range profession dead? Will the rangelands be allowed to go through a "transition" to a less productive "state"? Who will insure that our natural resources are maintained in a sustainable manner?

I do not believe the future is all that bleak. There is hope coming over the horizon. I see it in our youth. They are the salvation for proper management of the natural resources. I have been privileged in the past 20-plus years to see and participate in the SRM High School Youth Forum program that is held each year at the SRM Annual Meeting. I found this year's presentations at Vancouver to be especially encouraging. Every presentation by these high school students showed a deep concern for the status of our natural resources and a commitment to preserving proper natural resource management. As we have done for several years, we are publishing in this issue the top five winners of the contest in Vancouver. Read the papers. You will understand why I have hope for the future.

Also in this issue is an article that provides information on how each of us might reach more young people by going to high schools in our area and talking to the students about range management. We have an article on how we can use camps to introduce young people to proper range management.

Let us not give up on "range management." Our young students need the basics of plant physiology, hydrology, animal science, soils, and other subjects. But more importantly they need the "range management" courses to learn how to put it all together. With these tools they can carry on the proper management of our natural resources. An aggressive effort by the present range management leaders will provide the opportunity for the youth in our schools to carry on the dreams of the SRM founders. The future will be better. ◆

How a Student Views the Field

By Jesse Dillon

Editor's Note: This paper was presented at the Colorado Section, Society for Range Management, Annual Winter Meeting, Fort Collins, Colorado, December 9, 2005.

It was the Colorado Section meeting in 2004 when the presiding president Rob Alexander told the members that one of his goals during his term was to tie bonds between the student chapter and the section. He said this was because "everything is more exciting for us when the students are involved." As the acting president of the Range Ecology Club at Colorado State University, thus the head of the student chapter at the time, I thought to myself, "How can I help to develop and encourage this bond?" Then it hit me. I should speak to the members at the next section meeting. During the next break, I found Rob Alexander, who was chatting with Roy Roath, the next president, and other members of the group, and introduced myself and suggested (perhaps foolishly) that I could speak at the next meeting if they thought it would be interesting.

About 6 months later, Roy Roath, who was in charge of organizing the meeting for 2005, approached me to say that he had developed the speakers list for the meeting and was counting on me to speak. I thought to myself, "Surely he is not holding me to an off comment I made nearly 6 months ago," but he was. So that is how it came that I would be speaking at the Colorado Section's 2005 meeting.

Approximately 1 week before the meeting I was starting to worry, I had spent considerable time thinking about my speech and still had no direction. The theme of the meeting was "Past, Present, and Future" and I was there to represent the future. My speech was titled "Preparing for a Career: How a College Student Views the Field" in the program for the meeting which had been distributed a month earlier. It was too late to back out now. I needed to focus and develop something to talk about. Again, I was hit with a moment of clarity, "Jesse," I said to myself, "you have heard all of your professors say 'you don't know where you are going, unless you know where you have been.'" I decided that I would tell my story of how I got into the field.

I grew up in a quaint little town of nearly 200,000 about 25 miles straight west of America's third largest metropolis, Chicago. Illinois is a state with a diminishing 0.01% of the historic rangelands, the tall-grass prairie. However, I was drawn to them in high school when I had taken a class entitled "Integrated Natural Resource Management (INRM)." This class taught basic ecological principles and processes but most importantly to me at the time it included many field trips with opportunities to leave school. On one of our field trips, we were taken to Treehaven, a field campus for natural resource students for University of Wisconsin–Stevens Point. On this trip I was exposed to multiple ecosystems and ecological processes. This exposure fueled my ever-growing interest in natural resources; so much so, that after this trip that I had decided that I would study natural resources in college.

The rest of that year in high school was spent looking at colleges and spending free time in the tall-grass prairie near my house. The prairie was located at Fermilab National Laboratory, an underground particle accelerator. They had a very intensive management plan and had even returned the native grazer of buffalo to their land. This land had truly drawn my interest. I really wanted to know how and why it worked as it did. At the same time the land was drawing my curiosity, my teacher from INRM class had suggested Colorado State

University (CSU) as a place to continue my studies in natural resources.

Under that advisement of my teacher from the INRM class, I came to CSU in the fall of 2001 to study as a natural resource management major. I was told if I took a broad selection of classes I would be guaranteed to get a job in the field, a continued trend at CSU, which, in my estimation, is a common misconception. However, being young and naïve, I blindly followed this advice and took a wide range of classes to get me started within the major. It was not until I took my freshmen seminar course for natural resource majors that I was able to leave behind the idea of broad-based curriculum, and find the passionate focus of my education.

During this freshmen seminar course, one of the assignments in the class was to describe our dream job. As I was contemplating the question, I thought back to my fond memories in high school and the tall-grass prairies of Illinois. I had a very romantic view of natural resource management. I wrote "I want to restore tall-grass prairies and buffalo to the Midwest." Upon reading this response, the teacher's assistant for the class suggested I change majors to rangeland ecosystem science. That is exactly what I did; after all I was now on my way to save the world.

At the same time that I was learning I was in the wrong major, I was interested in getting involved in something related to natural resources on campus. I began to ask professors how I could find what I was looking for. I learned that CSU had received some sort of grant to get students interested in range management and with my new major; it was the perfect thing for me. I interviewed and was selected for placement in the Restoration Ecology Laboratory.

Things were finally going great for me; I had the right major for my dream job and was getting my first true experience in the Restoration Ecology Lab. However, I did have one problem: I had no idea what the heck range management was!!! This is another place where I think we might be failing at recruiting new range professionals. I think that we are not educating students early enough in their career about what range management is and what kind of jobs they can obtain with such a degree.

After working my first 2 semesters at CSU in the Restoration Ecology Lab, I realized this was a job I enjoyed and that I was learning stuff I found very interesting. I made the decision to join the field crew after a gracious offer from the professor in charge of the lab. This was another important opportunity that taught me so much about myself and the discipline of rangeland management. I loved being out in the field; the challenge of learning the plants and why they might be found in that particular area intrigued me. I liked my choice of study more and more each day.

To aid in my education of what rangeland ecosystem science was, I was directed to the Range Ecology Club on campus. The club offered me an opportunity for continued involvement and education of different aspects of rangeland management, beyond what I had learned in the Restoration Ecology Lab. The club also offered me another opportunity. During my sophomore year at CSU, I was able to join the club on my first trip to an SRM International Conference.

I was on the road to Casper, Wyoming, for my first professional conference. I did not know what to expect, or why I was going as a sophomore, as most students from CSU go as upperclassmen. Already feeling out of place, when I arrived at the meeting I was able to understand that the society was actually a community. I was very different from a lot of the people at the meeting, however, I felt that I shared common interests and even identified with a lot of people at the meeting. I should note, by this time in my career, I had gotten over my romantic view of range management. After all, I am a scientist at heart. I felt that these people were my colleagues and would be a resource for me to draw continued knowledge from. Most of all, I felt like I belonged.

An epiphany occurred on my trip to Casper; I had the opportunity to see Bob Budd speak. As most everyone knows, Bob Budd has an amazing ability to move people and excite them about probably anything he is speaking about. In my case, he was speaking about cooperative management, and it was a packed house. I cannot remember *exactly* what he was saying, but I do remember that he made an analogy to working together like the three legs of a stool. His analogy had a personal impact on me when I applied it to my life. My education, field experience, and involvement in the Society were the three legs of my stool that supported me as a student and a young range professional. At this moment in time, I was never more confident that I had made the right decision by pursuing a career in range management. I was truly moved by his speech.

I now felt like I was on the right track as I continued to make decisions that I felt would make me a more attractive hire for a potential permanent job in the future. I continued my involvement in the Range Ecology Club and participated in numerous field trips and in-class learning opportunities. I became the president of the club my senior year and hopefully provided the leadership for upcoming range students to choose a path right for them, like previous presidents had done for me. I continued attending SRM International Conferences where I was awestruck by different people I had met and things that I was learning.

I was diversifying myself through different field experience by obtaining different summer positions. I spent 2 summers working in academia with the Restoration Ecology Lab field crew. Then, I moved on to take a job at a federal agency. My final summer in school, I decided take a job in the private sector. Each of these jobs taught me a different view of rangeland management. Receiving a proper amount of field experience is another place that I feel needs attention within higher education. With a lot of schools constrained by decreasing budgets, students are feeling increasing pressure to gain an appropriate amount of field experience for themselves in order to prepare for the impending job. Often, I think that the clubs are doing a good job providing some

of those opportunities, but it is still up to students to supplement that experience themselves.

Similar to the range programs, the clubs also require continued support from their respective sections and the Society. Monetary and philosophical support will aid students in the clubs in reaching their ultimate goals within the field. Each and every member of the society can contribute by providing a few dollars by buying T-shirts at our booths or by being a mentor to a student, providing guidance and support.

The people who are currently in the field have paved a path in range management. They have spent their lives furthering the science and understanding of rangelands. They have left the next generation with big shoes to fill. However, there are many students that have the passion to fill these shoes. We will continue to strive to better ourselves and continue the legacy of rangelands.

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Youth Forum

Senators, Soccer Moms, and Sideoats Grama

By Ross Tolleson

Editor's Note: This paper is the 1st Place winner of the High School Youth Forum contest at the Society for Range Management Annual Meeting, February 2006, Vancouver, British Columbia, Canada.

As a child when I heard the word "rangeland" several scenes came to mind. I saw Woodrow Call and Augustus McCrae on horseback herding cattle, bison grazing lazily on vast plains, and wide open lands with mountains and never-ending skies. Since that time I have had the opportunity to participate in the Texas Section Youth Range Workshop and my mental picture of range has changed. I still see wide open country, but now I see a rancher, talking to a rangeland professional about their prescribed burning plan. I see a scientist collecting data in the field, and I see a hiker enjoying the landscape purely for its aesthetic value. So whether we are producers, researchers, or nonconsumptive users we are all responsible for taking care of the rangelands of the world.

The perception of rangelands has changed over the years, but its importance has not. As urban sprawl and absentee landowning increase, the importance of properly managing rangelands has reached a critical juncture. That raises a question: if managing and protecting rangeland is so important, shouldn't everyone know about it? And how do we, as stewards of these lands, expect good decisions to be made if we haven't educated our neighbors about why they should care? There is an extensive list of the benefits of rangelands that most people don't know about. If we want others to care, the first thing we have to do is tell them.

First and foremost, we must inform our policy makers, all the way from your local city council up to our representatives in Washington, DC. There are 2 fundamental reasons for educating politicians. The first is that they need to be well informed about range when policies are presented that concern rangelands and their use and management. The second reason is that if range is important to their constituents, it will very quickly become important to them. When we educate policy makers, we will rapidly lose our audience if we try to explain to them the basics of managing range. Instead we need to tell them about the things that range can do for them. We should tell them how range is a multimillion-dollar industry and that it creates thousands of jobs and does its part to support the American economy. But the economic impact of rangelands worldwide extends far beyond simply helping the economy. In many third-world countries, the animals raised on rangelands are the primary source of income, and having healthy rangelands provides economic and often political stability because a country with a stable economy and a steady food supply is much less likely to feel the need to invade its neighbor. So, in some parts of the world, properly managed rangelands can help to create peace.

In addition to the economic importance of rangelands, we should also inform politicians about the role that rangelands play in the environment. Many states are currently having water shortages. Rangelands, when managed properly, are a vital part of aquifer recharge. The rainwater that falls on rangelands goes not only into the plants, but to aquifers as well. Rangelands additionally provide oxygen to the atmosphere through the photosynthesis of the plants present. With the rising concern of air pollution, oxygen replacement and carbon sequestration will make rangelands an invaluable resource that politicians will quickly recognize. However, simply educating politicians is not enough.

We must also educate voters.

Very few things that we can tell a senator will have as much impact as letters from soccer moms or other voters. Therefore we must also educate the voters because if they don't care, it isn't likely that politicians will either. Just as politicians are concerned with the economy, voters are concerned with family. Logic dictates, then, that we would present to voters all the reasons why rangelands are important to their family. Most people are concerned with the water shortages and, just as we told the politicians, rangelands are vital to combating that crisis, but to people who are not experiencing a shortage the quality of their water becomes important. Rangelands catch the majority of the water that goes into aquifers and as that water seeps through the ground it is filtered naturally, leaving behind many of the pollutants gained while in the atmosphere. Clean water is very important to people with children. And once again the clean air produced from rangelands carries weight with voters.

Besides clean air and water, the food supply is a significant issue to voters. Rangelands are primarily used for livestock. The animals raised on these lands provide food for voters and their families, which makes them imperative. But rangelands provide more than just crucial services to voters. They also provide recreational opportunities. Rangelands are also commonly used for recreational enterprises, most often hunting. The experience of taking a son or daughter on a hunting trip and spending that quality time together is just as valuable to some voters as clean air and water. For those who choose not to hunt, other options exist. Camping and hiking are also activities valued by many voters. Similarly, ecotourism has steadily become a preferred pastime. Bird watching, wildlife photography, and plant identification constitute an increasing amount of the usage of rangelands. No matter what the voters are interested in, rangelands are somehow involved in their everyday life. So it is our job to help them understand their worth. Without the support of voters, making the case for range will not be an easy task.

A recent topic of concern to voters and policy makers alike is the recent outbreak of wildfires. These fires have affected the forests and rangelands of many western states and have also destroyed many homes and businesses. The public's perception is that fires are bad and we should work hard to prevent them with burn bans. Though burn bans are sometimes needed they are very often misused. What people don't realize is that sometimes you have to fight fire with fire. Using a technique known as "prescribed burning," range professionals are able to minimize the number and scope of wildfires. A prescribed burn is exactly what it sounds like; fires are set in pastures and forests in a controlled and planned way. The benefits of the fires are twofold, benefiting rangelands and homeowners at the same time. The pastures and forests benefit because the fire promotes regrowth and clears out the detrimental plants from the landscape. Homeowners benefit because those controlled fires eliminate the fuel load around their home or place of business. Changing the perception of fire is vital to the future of rangelands and the safety of suburban residents.

The question now is: Why? Why should we educate senators and soccer moms, politicians and voters? The answer:

sideoats grama, the rangelands themselves. If voters and policy makers understand and appreciate the value of rangelands they will be more likely to vote and act in favor of policies that will benefit rangelands, such as the current legislation before Congress concerning the use of fire as a management tool.

Finally, we should educate policy makers and their constituents to ensure the future of rangelands. Not only for the people that it benefits, but also for the people that have made preserving it their career, their passion. Organizations such as the Society for Range Management have taken steps in the right direction by organizing so that all of the best in the business can collaborate and learn from one another and improve and maintain our rangelands. Now it is up to us to do our part in preserving the rangelands of the world, which is work worth doing.

Woodrow Call and Augustus McCrae made their journey long ago and many things have changed, but the vast expanses of range over which they traveled are not gone. But to ensure that the next generation will continue to have these same rangelands we must effectively manage them. But if only people who know about range and how to manage it are the ones in the business, it does us little good. We have to educate policy makers and voters so that they will appreciate and help protect rangelands; in order to do that we have quite a bit of work ahead of us. But Teddy Roosevelt said it like this, "Far and away the best prize that life offers is the chance to work hard at work worth doing."

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Youth Forum

Controlling Leafy Spurge

By Ben Beckman

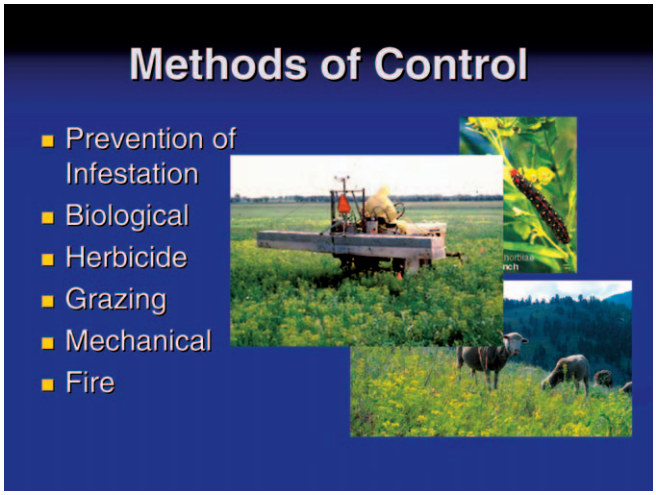
Editor's Note: This paper is the 2nd Place winner of the High School Youth Forum contest at the Society for Range Management Annual Meeting, February 2006, Vancouver, British Columbia, Canada.

Leafy spurge is one of the most invasive and hard-to-control weeds in ranching today. First introduced from Eurasia in 1827, it is now found in at least 26 states across America. In Nebraska leafy spurge currently infests 285,000 acres in all 93 counties. It can spring up anywhere, but is usually found in pastures and rangeland. This paper will give an introduction to leafy spurge, its reproduction, and delve into some of the different control practices that are being used to control it.

Leafy spurge, or *Euphorbia esula* L., is a perennial forb. It grows 2–3.5 feet tall, and is usually recognized by its bright yellow-green flower brackets, which appear in mid-June. These bracts contain small, similar-colored flowers. The leaves are oblong and drooping, with one main vein. Another distinguishing characteristic of spurge is the milky latex found throughout the plant. This latex can cause a number of problems to cattle that come in contact with it, including blisters, irritation of the mouth, and dermatitis. One of the most remarkable characteristics of spurge is its root system. The plants' roots can extend down 20 feet into the soil providing food storage to help the plant recover after the foliage is destroyed.

Leafy spurge spreads in 3 main ways. The plant's flowers produce large quantities of seed, in fact approximately 130,000 seeds per plant. Mature seeds are projected as far as 15 feet away from the plant from exploding seed capsules. The seed is also particularly hardy, lying dormant for up to 8 years before germinating and starting new plants. Leafy spurge can spread without seeds, through lateral roots. These roots spread out below the surface, acting like rhizomes, producing new plants. Located on the lateral roots are advantageous shoot buds. Wherever one of these buds is found a new plant can spring up. Spurge can also regenerate from severed root sections. Although prolonged disking can destroy spurge stands, one pass may only stimulate growth. The deep root system cannot be totally destroyed, and the chopped-up sections can develop into new plants. This not only fails to destroy the original patch, but invigorates and spreads the patch.

Because of its rapid reproduction, spurge is an invasive opponent. The good news is leafy spurge can be controlled in a number of ways. The best way to control spurge is to prevent it from getting established on your ranch. A strong diverse plant community can prevent spurge from being a problem. However, if leafy spurge does get established there are numerous ways to control it, including biologically (using spurge's natural enemies), herbicide, grazing (with sheep and goats), mechanically (mowing and disking), and using fire. When controlling leafy spurge, the best technique is to use integrated pest management. This involves using 2 or more different control techniques on the spurge. This double whammy controls spurge better than a single control agent could, and may even help kill the plants. This paper discusses the 2 primary control agents used in Antelope and Wheeler counties in Nebraska, biological control agents and herbicide usage.



Biological agents have been used to control spurge in Nebraska since 1988. In Antelope County, Nebraska, where I'm from, the first use of biocontrol came in the 1990s. *Apthona nigriscutis*, a flea beetle, was first released on a sandy site. After several years it was determined that the flea beetle had not been established. However the experimentation of biocontrol continued. Currently 3 types of insects are being used to control leafy spurge.

Apthona lacertosa, or the brown-legged spurge flea beetle, has been used since 1996. They appear to be doing well; however their chance of survival decreases on dry sandy soils. The beetles have been introduced onto 50 sites, and on 4 sites they have been sufficiently established to collect and move insects to new sites. The beetles feed on the spurge roots as larva, and on the foliage as adults.

Because of the flea beetles' poor response on sandy soils, new insects were tried on sandy leafy spurge sites. In 2005 there were 6 releases of *Oberea erythrocephala*. This beetle feeds on spurge as a larva and adult, depleting root reserves and often killing the plant.

There were also 3 releases of *Spurgia esulae*, or spurge tip gall midge. This insect attacks growing shoots, preventing formation of flowers and seed. The effects of *Oberea* and *Spurgia* on leafy spurge are still being observed. To get maximum spurge control, all 3 types of insects are released in the same area.

Spurge can also be controlled by herbicides. There are currently several different types of herbicide that can be used on spurge in a range setting. Two herbicides stand out exceptionally well, Plateau and Grazon P+D. Plateau should be sprayed in the fall 2 weeks before the first frost to get the best effect. It has an application rate of 8–12 ounces per acre, and will cost approximately $17–25 dollars an acre. Grazon P+D is a spring-applied herbicide that should be sprayed when leafy spurge is in its early bud state. It is applied at a rate of 2 quarts per acre, and costs around $15 dollars an acre.

While researching leafy spurge control methods I visited the Dierks ranch in eastern Wheeler County. Mr Dierks has had spurge infestations in several pastures for 25 years. Spurge is virtually impossible to eradicate; however Mr Dierks has made considerable progress in controlling his leafy spurge and its spread. Mr Dierks sprays leafy spurge twice each year, once before it seeds in the spring with 2,4-D and with Plateau in the fall, before the first frost. The spring application of 2,4-D burns back the spurge, preventing flowering and seed formation. The Plateau application in the fall reduces the root system, and can kill the plant. Mr Dierks chooses to use Plateau on his ranch instead of Tordon, because several pastures have high water tables, and several cottonwood trees are located in the pastures. Mr Dierks also isn't concerned about the potential damage Plateau poses to cool-season grasses, because his pastures are mostly warm-season mixtures.

Some of the spurge on the Dierks ranch is in their hay meadow. To prevent the spread of patches Mr Dierks uses a simple technique. He mows around spurge patches. Not only does this prevent spurge-contaminated hay and spreading of seed, but leaves him a nice flag for spraying in the fall.

In order to prevent the spread of leafy spurge to other parts of his ranch, Mr Dierks places all bales made from hay near spurge patches in the same area, away from other bales. These quarantined bales are not sold, and only fed in those

pastures that already exhibit a presence of spurge. This prevents the spread of spurge plants that may have grown up around the unmowed area.

In conclusion, once established, leafy spurge is a formidable opponent. Leafy spurge has cost Nebraska farmers and ranchers around $50 million in control costs and reduced stocking rates. Its vast root system and reproduction make it difficult to control. Quick identification and immediate control action can keep spurge in check and prevent a bigger infestation. The most cost-effective way to control spurge is to use an integrated pest management approach. We reviewed the main characteristics of spurge and its reproduction and delved into the many control techniques. We examined biological control and its history in Antelope County and looked at one rancher's efforts to control spurge on his ranch using herbicides. Spurge has been and will continue to be a problem on ranches across the nation. Vigilance, innovative control techniques, and proper range management will continue to play a deciding role in the effort to control leafy spurge.

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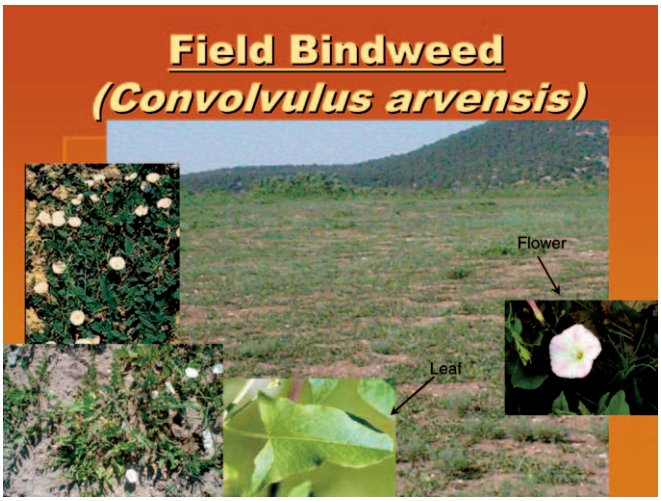
Youth Forum

One "Mite-y" Mission: Compensation Suppression of *Convolvulus arvensis* After Implementing Host-Specific *Aceria malherbae*

By Kaitlyn Lingus

Editor's Note: This paper is the 3rd Place winner of the High School Youth Forum contest at the Society for Range Management Annual Meeting, February 2006, Vancouver, British Columbia, Canada.

At a glance, field bindweed (*Convolvulus arvensis)* is a very attractive plant. Behind the facade of its striking appearance, however, field bindweed is an agricultural disaster. So, how do we address this problem? Biological control methods may prove to be the best chance to suppress this rapidly increasing invader.[1] A minute mite, commonly known as a bindweed gall mite (*Aceria malherbae*), is giving bindweed a run for its "land."



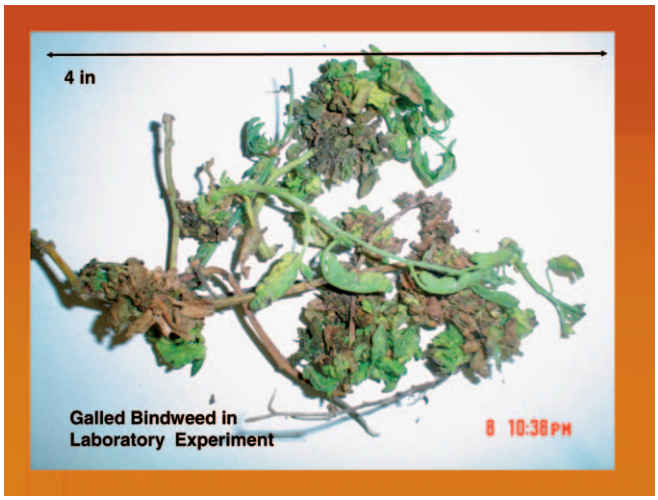
Field bindweed, known as creeping Jenny, possession vine, or wild morning glory, originated in Europe and poses major threats to the environment and rangeland (R. Hammon, personal communication, December 2004). It is one of the most competitive perennial weeds in the United States.[2,3] It's easily recognized by its arrow-shaped leaves and trumpet-shaped flowers. Flower color can vary from white to pink.[4] With its aggressive root system, bindweed is hard to control using mechanical control agents or chemical applications.[5] Its deep, penetrative tap root reaches 20 feet into the ground and removes the limited moisture from neighboring plants that are usually native to the land, thus killing them. Because their roots store 2 to 3 years worth of food, bindweed is very difficult to suppress or kill.[6]

An average bindweed plant produces approximately 500 seeds. These seeds are protected by a very hard coating that allows them to stay viable in the soil for up to 40 years (M. Henry,

personal communication, March 2004). Because 500 seeds are produced annually, the problem is increasing at an unbelievable rate; think of it as cells multiplying by the minute.

Long roots and numerous seeds are not the only problem. Field bindweed stems stretch out as far as 15 feet in diameter with an average stem length of 3 feet from the base. Some plants have 40 to 50 stems. Nothing is seen but bare ground underneath the dense mat of stems. It is not an unusual sight to see this type of futile land. It is rapidly becoming a significant concern for farmers, ranchers, developers, and landscapers because yield to field crops are decreasing and rangeland coverage is quickly diminishing.[7] The bindweed gall mite feeds on the plant and may actually help the ranchers and farmers to control if not rid this devastating weed.

Bindweed gall mite is a small microscope mite, approximately 0.2 mm in length. They are a yellowish color and resemble worms. Like field bindweed, they originated in Europe.[8] The adult mites are active from May to November, and 1 mite can produce over 200 eggs annually. The mites move an average of 400 feet per year, and are dispersed by wind, root systems, or other moving foliage (T. Locke, personal communication, November 2004).



The bindweed gall mite is host specific to field bindweed.[9] The mite feeds along the center of the upper surface of the bindweed leaves causing the leaves to fold and fuse along the middle vein. As the feeding progresses the plant cells thicken and develop a rough surface.[10] It produces a "fuzzy" feeling. These galls can form on the rhizomes, stems, buds, and deeper roots. The mites retard the growth of the plant, causing a reduction in seed production, a stunted root system, and fewer stems created, each having shorter lengths (G. J. Michels, personal communication, December 1999). Eventually the mites can suppress the bindweed. Current researchers' studies conclude that the mite winters in the root system of the weed and thus totally restrains the plant's further development.[11] Dispersing from one plant to another, the mite has a large impact on a vast area of land that is infested with field bindweed.

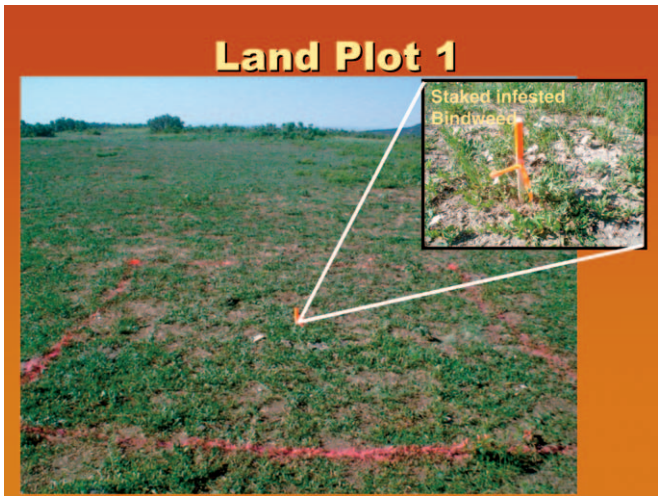
Realizing the effect that field bindweed was having on our rangeland, I set up a project to address the problem using a bindweed gall mite. The purpose of my experiment was to determine what effects the bindweed gall mite would have on field bindweed, and how the mite affected the bindweed's growth rate and seed production. I also wanted to identify the physical effects of the mite on the bindweed and how easily the mites spread.

It is hypothesized that if *Convolvulus arvensis* is infested with *Aceria malherbae*, then growth rate, seed/flower production, and bindweed coverage will be affected enough that it would prove to be a potential biological control agent to be used across Colorado.

This double experiment project began by collecting information on field bindweed and its effects on rangeland productivity. To find a biological control agent I went to Palisade, Colorado, to meet with scientist Terri Locke, who is rearing the bindweed gall mite. After sufficient information was gathered, 2 experiments followed. One experiment was based in the laboratory environment, where I had control over climate, moisture content, amount of light, and soil. The other was a range experiment where I utilized the bindweed's natural setting.

For my laboratory controlled experiment, I took 2 matured bindweed plants and recorded stem length, stem count, and seed production as my dependent variables. I measured these variables over a 2-month period.

For my range experiment that took place in the 2005

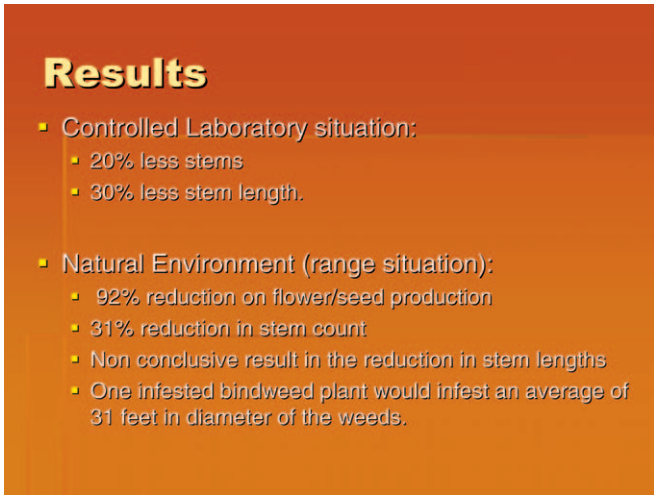


growing season, I staked out two 10- × 10-foot plots. I infested the 1 center bindweed plant with the mites. For my dependent variables I recorded plant concentration, stem length, stem count, seed/flower production, and movement of mites, as well as physical signs of suppression.

After analyzing the data on my laboratory experiment, the mite-infested bindweed plants had 20% less stems and the stem length grew 30% less than the average noninfested field bindweed plant.

In the natural environment setting, there was a 92% reduction in flower/seed production and a 31% reduction in stem count. I could not reach a conclusive result in physical measurements in stem length because of the gall effect exhibited by the mites. However, there was a large visible reduction in stem lengths. Mites from 1 infested bindweed plant would infest an average of 31 feet in diameter of the surrounding weeds.

After finding a possible control agent for a weed that is threatening our rangeland productivity I was able to establish 2 parts of an experiment to find the conclusiveness on a biological control agent. After using a controlled environment and a natural environment for infesting the bindweed with the mites I was able to compare 2 sets of data to test the effectiveness of the control agent.



From the results of my experiment, I can conclude that biological control using the bindweed gall mite, *Aceria malherbae*, will be an option using biological methods to control field bindweed that threatens productivity on rangelands throughout the state of Colorado.

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Youth Forum

Immigration Crisis in Texas: The Impact of the Exotic Axis Deer on the Texas Hill Country

By Kenna Brooks

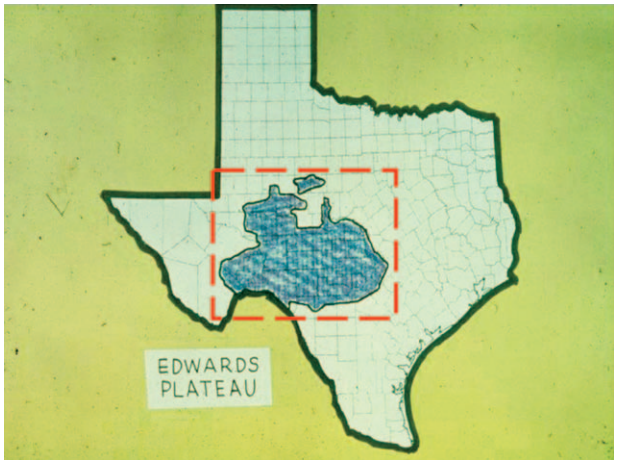
Editor's note: This paper is the 4th Place winner of the High School Youth Forum contest at the Society for Range Management Annual Meeting, February 2006, Vancouver, British Columbia, Canada.

Texas is facing a serious immigration crisis. I don't mean the immigration of people, as is currently in the news, but the importation and proliferation of nonnative deer species, specifically the axis deer *(Axis axis)*.

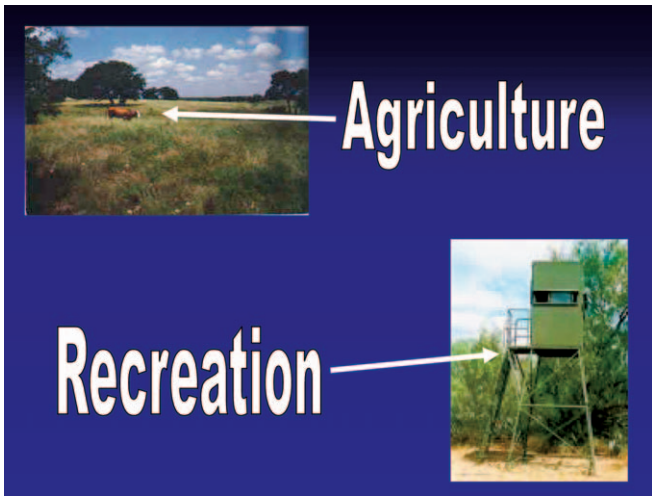
"We are the best of a bad example." These are the words of Wayne Haley, Superintendent of the South Llano River State Park. His words not only speak for the condition of the park, but serve as a reminder of the condition most of the area is in. The park is overpopulated with white-tailed deer and exotics, and struggles to provide enough forage to feed them. Additionally the Texas Hill Country is currently in the midst of a heavy drought, which compounds the problem.

The South Llano River State Park is located in Kimble County just outside the town of Junction in the heart of the Texas Hill Country. The Hill Country, or Edwards Plateau region, contains approximately 24 million acres and is located in the southwestern part of the state. Junction, located at the confluence of the North and South Llano rivers, has an elevation of 1,750 feet, and an average annual rainfall of only 22 inches per year. Located approximately 150 miles west of Austin, Junction is accessed by US Highway 83, Interstate 10, and US Highway 377.

Historically an agricultural and ranching area, the Hill Country is being transformed into a popular place to visit for recreation, and to retire. The hunting of white-tailed deer, Rio Grande turkey, white wing and mourning dove, and more recently the exotic imports, brings a significant increase in the number of visitors, and has become the major source of income in the local economy. River activities such as fishing, canoeing, tubing, and kayaking bolster the increasingly tourist-oriented atmosphere. Because of the gaining popularity of the area, property values have risen over the past decade, and the use of the land is steadily shifting from agriculture to recreation.



With this change to increased recreational land use, ranches are being subdivided into smaller tracts, and many landowners look to hunting as a source of income. A number of these landowners have also added the hunting of exotics in order to boost that in-



come, and in some cases to hang on to the family ranch. Exotic species are very attractive to hunters because they make fine trophies and they can be harvested year-round. Exotic animals in Texas are not regulated like the native game species are. White tails can only be hunted for roughly 2 months in late fall and early winter. Year-round hunting of exotics allows for more income outside of the regulated hunting seasons.

The most numerous of all exotics in the Texas Hill Country is the axis deer. The first known stocking of the axis deer

in Texas was in Kerr County in 1932. Axis deer, also known as chital deer, or Indian spotted deer, are native to India and have a bright reddish coat with white spots that are arranged in rough lateral rows along the body of the deer. Adult males differ in coloration from females in that their coats are darker and they have black facial markings. Axis deer are much larger than white-tailed deer, and have a stockier build. Males often exceed 200 pounds live weight, and females weigh approximately 35 percent less. In contrast, white tail males in the Hill Country will rarely exceed 110 pounds. The antlers of the axis are large and massive, yet simple in design, and can reach lengths of over 40 inches, making them an attractive wall mount.

Axis deer also produce much more meat than the white tail. Axis are a tropical species, and they do not put on fat, therefore there is no marbling in the meat. The meat is lower in calories, fat, and cholesterol than either beef or chicken, and is high in protein. Axis venison has an excellent flavor, and doesn't have the "gamey" taste that is unappealing to some consumers.

In the Hill Country area, axis deer compete both directly and indirectly with white-tailed deer. The white tail's diet consists mainly of forbs and browse, with grass making up a very small percentage, most of it consumed in the spring. Axis deer prefer forbs and browse as well, placing them in direct competition with the white tail. But when forbs and browse become in short supply, as is often the case with the Hill Country climate and range conditions, axis become like cows. They switch over to grass and do very well on it, while the white tails starve due to a lack of forage. White tails, being selective feeders, cannot digest mature grass, and can die with a rumen full of it. The cellulose in mature grass cannot be broken down in the short amount of time that food is contained in the white tail digestive tract. The axis, which is an intermediate feeder, is able to shift to a new food source when others become unavailable, giving them a major advantage over the less efficient white tail.

Axis have no particular breeding season and reproduce year round. Axis females can be bred while still lactating, which means axis can multiply at a faster rate. In comparison, white-tailed deer are restricted to a single breeding season during the late fall and early winter. The Hill Country can experience very cold, dry winters, which coincide with the gestational period of the white tail, and these harsh conditions can severely limit fawn production. The reproductive differences between the 2 species contribute to the continually increasing numbers of axis deer in the Hill Country, and are an example of indirect competition with the white tail.

Studies conducted in the Kerr Wildlife Area confirmed that axis deer could out-perform the white tail when an equal number of each species were placed together with only native vegetation to survive on. At the conclusion of the study the axis population was 5 times greater than the white tail population. There is evidence in this study to suggest that the Hill Country could lose much of its native population if current conditions and range management are not improved.

The appearance of Hill Country rangelands is very different today compared to 150 years ago. The vast grasslands, which were covered with an occasional bunch of live oak, have disappeared. Midgrass and tallgrass communities have been replaced with shortgrass communities, and unfavorable vegetation has spread from the steep draws and canyons to cover a majority of the rangelands.

These changes began to occur when settlers moved into the Hill Country with sheep, goats, and cattle, taking advantage of the lush grasslands and eventually overgrazing them. This overgrazing allowed unfavorable forage to grow and spread. Additionally, wildfires that would naturally occur

every 1 to 6 years kept unfavorable growth in check and put nutrients back into the soil, benefiting the grasses. Efforts to control natural wildfires have been successful, but have resulted in a huge increase of plants such as mesquite, live oak, shin oak, Ashe juniper, and a wide range of forbs.

The change of the land from grassland to a more brush-type habitat also encouraged the increase in a previously small white-tailed deer population. White-tailed deer thrive in areas with food and cover, and the numbers of deer increased proportionately with the increase in brush and weeds. It has been estimated that at the turn of the century there was roughly 1 white tail per 40 acres. Present day estimates place that ratio at 1 deer per 8 acres. The Edwards Plateau area supports the largest deer population in North America.

The greatest concerns between white tail and axis are those of overcompetition for this habitat. Earlier in this paper I mentioned some of the current problems faced in the Hill Country, the main ones being drought, overpopulation, and poor range management. As of right now there are too many deer in the Hill Country for a sound ecosystem to exist between axis and white tail. There is not a steady food supply for the native white tail; therefore a majority of them starve from time to time, sometimes leading to increased death rates. Another byproduct of forage shortage is the declining size of white-tailed deer in the Hill Country.

Decades ago, as hunting began to gain popularity, landowners were encouraged to preserve female white tails so that the population would grow. The state placed harvest limits on does according to the size of the ranch, and hunters were severely limited on doe bag limits. Landowners are now encouraged to reduce the doe population, and hunters are allowed to take up to 5 does in some counties. Following the regular season, some areas in Texas are allowed an additional 2 weeks to harvest excess does. Only so many animals can occupy a certain space of land, and we have pushed the limit. Now we must pay the price by watching the native population suffer while the exotics continue to thrive.

The solution is management. If white tails and axis are to interact successfully, a cooperative management plan must be implemented, incorporating food plots which provide enough forage for both species to coexist. Species populations should be monitored and controlled by harvesting so that neither species can overpopulate and overrun the ecosystem. Prescribed burning should be utilized on a normal basis rather than remaining an experimental range management device. Supplemental feeding and deer feeders should be used during times of stress, but should not be used to replace good range management practices.

I'm concerned today that many landowners have their priorities reversed, placing *game* management over *range* management. Installing deer feeders and building a high fence may produce more income, but these changes may have a detrimental effect on our native species. Complete containment of individual herds of white-tailed deer inside of game fences for extended periods can cause genetic deficiencies

within that herd. Unless new bloodlines are introduced on a regular basis, mutations will occur in that population that could eventually be passed on to the general white tail population outside of the contained area.

Property owners must be educated if the condition of the Hill Country is to be improved. Programs need to be utilized for the dispersal of vital information on the current status of the area and how to improve it.

As with many things it is easier to cause a problem than to fix one. A complete reversal of the immigration of axis deer to the Hill Country is not possible. They are here to stay, and in large numbers. The actions of our forefathers changed the landscape, stimulating the currently excessive white-tailed deer population. The more recent invasion of axis is now threatening to alter that equation. Whether this is a change for the better or a change for the worse depends on the perspective and motives of the individual. Whatever steps we take from here forward will produce more change, for change is inevitable. I do believe, however, with proper education and a concerted effort, a workable balance of axis and white tail can be achieved. This is a long-term goal, but with many small steps, and the help of others, it may one day succeed.

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Youth Forum

Balancing Native Grassland Conservation With Economic Activity

By Sarah Anderson

Editor's Note: This paper is the 5th Place winner of the High School Youth Forum contest at the Society for Range Management Annual Meeting, February 2006, Vancouver, British Columbia, Canada.

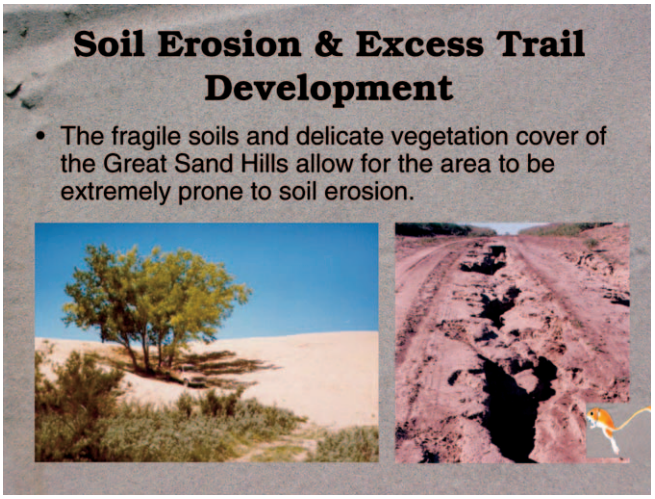
Four percent is what many experts estimate to be the amount of Saskatchewan's original native grasslands that remain in good ecological condition. Globally, native grasslands are disappearing at an alarming rate. As urbanization continues and industry expands, this trend will only continue to escalate and the world will be in jeopardy of losing a precious resource forever. The fragile ecosystem of Saskatchewan's Great Sand Hills, one of Canada's largest contiguous areas of native grassland, has been shaped naturally by the combination of soils and climate. This ecosystem is prized for its aesthetic qualities, its ability to generate tourism and recreation, its archeological significance, and most importantly, its value as a relatively undisturbed native grassland. Only within the last 16 years has its potential for natural gas development been realized. Now, more than ever, it has become important to examine some of the consequences surrounding poorly managed development and, secondly, address the issue of finding a balance between economic activity and the conservation of one of the few remaining native grassland habitats in the province for future generations.

Ranching has been the predominant land use of the area since the early 1900s and the Great Sand Hills have not only responded positively to this industry, but have prospered as a result. The introduction of ranchers and livestock brought about the development of underground water resources which led to a tremendous increase in vegetation and wildlife. To this day, the Great Sand Hills are renowned for providing habitat for some of Canada's largest populations of mule deer and sharp-tailed grouse, as well as a variety of species that are considered to be either threatened or indigenous to the area. The Great Sand Hills were able to adapt so successfully to the changes brought on by the ranching industry because ranching is a relatively natural land use, and one that was able to mimic the way the land had been utilized for thousands

of years before cattle replaced the roaming bison. However, the extraction of natural gas is a much more mechanical and invasive process, which has never been naturally simulated in the past. There is little evidence to suggest that the impacts of gas development will benefit this ecosystem in the same way that ranching has, and even more to suggest that—without careful planning—it has the potential to have devastating consequences.

The importance of an unpolluted water source is indisputable. Contaminated water is detrimental to all life forms in any ecosystem. Spills, ruptured pipelines, leaking wells, and gas migration allow for the shallow water table of the Great Sand Hills to become extremely susceptible to contamination. Purification of toxic water sources will not only be time-consuming and difficult, but will also come at an immense cost. The unforeseen consequences of contaminated water are certain to be devastating and widespread.

Second only to land conversion, the introduction of invasive species is the biggest threat to remaining native grasslands. The petroleum industry allows for increased accessibility, and this increased out-of-area traffic threatens to introduce invasive species through cross contamination. The construction of a portion of the Trans-Canada Pipeline is a prime example of this issue. The extent of erosion was so severe that a vehicle could have easily driven beneath the pipeline, so it was covered with sand and straw to attempt to stabilize this area further. However, the straw was contaminated with downy brome, which quickly established itself within the area. Even the most minimal alterations to the vegetation of a fragile ecosystem can have significant repercussions, as the native species will have increased competition which may not only deprive them nutritiously, but may eliminate the species entirely. Vegetation is the basis of all life forms in any habitat, and if variety, quality, or quantity are modified there will undoubtedly be negative consequences for the wildlife, especially the rare species which have become dependent on the diet which this particular habitat has provided in the past. Once invasive species are introduced, it will be extremely difficult—if not impossible—to reverse their effects and revert back to a completely native grassland.



Considering that the active dunes of the Great Sand Hills move approximately 2 meters per year, soil erosion is a primary concern because of the area's fragile soil type and delicate vegetation cover. Increased vehicular traffic associated with natural gas exploration leads to excess trail development, which disturbs vegetation and exposes mineral soils. The process of soil erosion, once initiated, tends to escalate quickly and severely. In the past, straw or other mulched material was predominately spread along trails in an attempt to prevent erosion and reduce vehicular impacts. However, the risk of spreading material containing noxious weeds, in combination with the need for frequent reapplication, required gas companies to search for a more effective method. Gravel application has since replaced the original techniques or trail conservation, but unfortunately, this method successfully eliminates any opportunity for complete reclamation in the future.

Excess trail development presents an additional problem in the form of habitat fragmentation. For example, in 100 acres of contiguous, undisturbed land there are a particular number and type of species that are able to exist. Now imagine if a trail were to cut this area in two. It would seem as if the remaining result would be two 50-acre portions of relatively unaltered habitat; however, this is not the case because the number of species in any given area is directly related to its geographical size, and, therefore, the sum of the parts does not equal the whole. Additionally, on either side of this trail there is what is known as edge effect—altered habitat along the source of a disturbance which consequently further decreases the area of suitable habitat. Natural gas development and habitat fragmentation are directly proportional to one another; the greater the number of wells there are, the greater the number of trails, and thus the greater the rate of habitat fragmentation.

In regard to the initial development and operational stages of natural gas exploration, there have been significant advances made. However, the final decommissioning stage

of development has not been significantly or adequately addressed in any Environmental Protection Plan. Although there are guidelines pertaining to the decommissioning of the actual well site, there has been limited consideration given to repairing soil, vegetation, and potential water damages of the entire affected area, suggesting that native grassland deterioration will become permanent. Is this because of lack of concern, or simply the fact that there has not been enough research conducted to develop a strategy to satisfy these issues? The unforeseen consequences of natural gas exploration in an environmentally sensitive area are perhaps the most threatening aspects of this issue. If these problems cannot be foreseen how will they be reversed? Or better yet, how will they be prevented? Careful contemplation of all potential problems and solutions has been neglected due to rapid industry expansion, leaving too many unanswered questions to allow for educated decisions. In 1990 there was a limit of 4 wells per section; barely 16 years later, that quota has doubled to 8 wells per section. Perhaps this is an indication that this fragile ecosystem will undergo a substantially greater impact at perhaps 16 wells per section. If industry expansion continues at the same rate this will be the reality as there are already similar areas currently operating at a 16 well-per-section limit and seeking to expand to 32 wells per section.

Admittedly, the natural gas industry has generated a substantial amount of revenue within the province, and has unquestionably promoted the population growth in declining rural towns, but do the short-term economic benefits supercede the long-term ecological risks at this point? Balanced decisions based on education, research, and careful planning are imperative. The voices of all land users should be heard despite increasing economic demands. Eventually, natural gas resources will become depleted and the Saskatchewan population will be left to once again sustain itself on the resources—agriculture, wildlife, and recreation—found within the Great Sand Hills and similar native grasslands. The ultimate question, however, is will these original industries be able to continue after all nonrenewable resources have been exhausted, or by then will the human footprint be too large to maintain the integrity of a fragile ecosystem? What the future holds for our native grasslands is uncertain, but it will undoubtedly depend on our actions today. Therefore, it is absolutely imperative that society continues to strive to find a balance between native grassland conservation and economic activity.

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Recruiting Thoughts and Experiences

Presentations about rangelands can be an effective way to better inform the public and attract students into college range programs.

By Jerry L. Holechek

Introduction

Across the western United States, student enrollment in college range science programs has been in a general downtrend for nearly 25 years. At New Mexico State University (NMSU), where I have taught range science classes for the past 27 years (since 1979), undergraduate enrollment in the range science program peaked in 1980 with about 85 students and steadily declined into the early 1990s, when it leveled off with 28 to 38 students depending on year. In spite of this relatively low number of undergraduate students, we managed to maintain the 6 range science teaching faculty we had at peak enrollment in 1980. However, times change. The advent of a new president at NMSU and other administrative changes in 2004 resulted in a hard look at the range science teaching faculty members relative to student numbers. The range science program was put under pressure to either increase undergraduate enrollment or reduce faculty. We began discussing various options to increase student numbers such as internet classes, off-campus classes, and actual recruiting in high school classrooms.

In my own case, after much thought as well as considerable encouragement from my department head, I decided that speaking to high school classes throughout New Mexico could be both interesting and productive. In the past I have strongly advocated improved information and education as a necessary way to build public support to conserve and improve rangelands. Although I have talked to many producers, college students, and conservation groups through the years, I had seldom talked to grade school or high school students or the public at large. I have now reached a point where the academic pressures to build teaching and research programs are behind me and my concerns are how to best finish my career and have a productive retirement. I reflect often on what a gratifying and enjoyable career choice range science has been for me. I still remain highly enthusiastic about the possibilities and opportunities that lie ahead for those who are in or entering my profession. Why not share my experiences and thoughts with young people who are trying to decide their career choice?

As this is written in February 2006 I have now spoken to 30 different high school classes scattered throughout New Mexico. I have been surprised by both the lack of knowledge they have about rangelands and the level of interest they show in learning about them. In summary, I have felt my time and effort invested in speaking to high school classes was well spent.

My PowerPoint presentations evolved as I spoke to more classes. I still consider them a work in progress although I have been connecting well with the students. I will briefly discuss some of the key points of the approach I have found most effective.

The PowerPoint Presentation

I have learned it grabs attention and interest to start with 2 slides showing rangeland landscapes in high ecological condition showing livestock and wildlife in grassland and forest

settings. I use these slides to explain and demonstrate what rangelands are and what modern range management is all about. I emphasize the concept of multiple use and the various products, including ecosystem services, that rangelands provide to society. I do point out that about 50% of the land area of the United States and 70% of the land area of the world is classified as rangeland. From there I explain that the unique feature of range management is that it involves manipulating the grazing activities of large herbivores. I emphasize that we are first concerned with the protection and enhancement of soil and vegetation resources and next with maintaining and increasing the output of consumable range products for society such as red meat, wildlife, and water. The concept that rangeland is a renewable resource and about one-third of the annual production of forage plants can be safely removed is carefully explained. Next, I focus on describing the primary activities of range managers. I characterize these as 1) monitoring and surveys, 2) range improvements, 3) range management plans, 4) landscape planning and management, 5) dispute resolution, and 6) information and education. I use a variety of slides showing range professionals of different races, sexes, and age groups engaged in vegetation sampling, burning, fence construction, and computer analysis to illustrate these activities. In my next section I show some degraded landscapes invaded by brush and trees followed by slides illustrating what can be achieved with various range restoration practices. I express my own sense of satisfaction over my involvements in helping to restore degraded landscapes to a productive, esthetically pleasing condition. Near the end of my presentation I discuss how the growing challenges such as noxious plant invasion, urbanization, climatic change, energy development, endangered species, multiple use conflicts, destructive wildfires, human population increase, and more intensive monitoring needs create opportunities and increased need for range managers. I do mention we have been quite successful in improving rangeland and riparian health nationwide through better grazing management but note that these efforts must be maintained and strengthened.

To cap things off I discuss the various employment opportunities in range management. I emphasize that people who choose a range career have considerable flexibility in where they choose to live and work. International opportunities are good and should get better. At NMSU we have had 100% employment of our range graduates during the past 6 years. Employer demand for our range graduates exceeds the number of students we have supplied. Generally, starting salaries for our range graduates have exceeded the average for other graduates with majors relating to some aspect of agriculture or natural resource management.

I have found that a 40–45-minute PowerPoint presentation with 30–35 well-chosen slides, followed by a 10–15-minute question-and-answer session works best. It is my observation that high school students tended to lose focus and interest if the presentation was too long, was redundant, or became verbose. Incorporating some of my own life story and personal experiences improved their interest. Slides showing sharp landscape contrasts from different grazing, brush, and riparian management practices have been effective in capturing and holding student attention. Most students seem to find the opportunity to improve landscape health compelling.

Recruiting Effectiveness

By now I am sure some readers of this article are wondering what the impact of my recruiting efforts have been on undergraduate range enrollment at NMSU. The results are incomplete, but the initial results have been quite encouraging. In spring 2005 I initiated my recruiting efforts by speaking to 6 high school classes. In fall 2005 undergraduate enrollment in the range program at NMSU increased from 36 to 44 students. This inspired me to expand my recruiting efforts to cover 30 high schools during the autumn 2005 through spring 2006 period. The results from these efforts will remain a question until the autumn semester begins at NMSU in late August 2006. Whether or not we receive a major boost in enrollment in the range program at NMSU, I have enjoyed, learned much from, and felt gratified from my recruiting efforts. I most firmly believe that the future of rangelands depends heavily on better informing young people and attracting them into our discipline. The effects of my programs in educating high school teachers may be as or more important than those on students. It quickly became obvious to me that high school teachers can play a major role in furthering range education and encouraging promising students towards range careers.

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The Colorado Section Youth Program

By Ben Berlinger

"Perhaps the most serious obstacle impeding the evolution of a land ethic is the fact that our educational and economic system is headed away from, rather than toward, an intense consciousness of the land.

"The problem, then, is how to bring about a striving for harmony with land among a people many of whom have forgotten that there is any such thing as land, among whom education and culture have become almost synonymous with landlessness."

—Aldo Leopold, from "A Sand County Almanac, and Sketches Here and There" (New York, NY: Oxford University Press; 1948)

These quotes from Aldo Leopold are at the heart of the youth program of the SRM's Colorado Section. The Section has had a long-running history of strong support for youth education and awareness of our rangeland resources. The program is guided by the Youth Affairs Committee, a standing committee within the structure of the Section.

Camp Rocky

History

Colorado's premier outdoor environmental education program for high school youth has long been Camp Rocky. The Camp had its beginnings in the mid-1950s! In its earlier years this program was known as Colorado's Youth Conservation Workshop. It was then directed by the Colorado State University (CSU) Cooperative Extension. Camp Rocky was born when CSU restructured and dropped the program about 9 years ago. The Colorado Association of Conservation Districts stepped up to the plate and assumed the administration of the program. The Camp is codirected by the Colorado State Forest Service with many program partners, including the Colorado Section SRM and the Colorado Chapter of the Soil and Water Conservation Society.

The Program

Camp Rocky is a weeklong residential camp for 14- through 19-year-olds who enjoy the out-of-doors and are interested in natural resources. Camp Rocky staff, made up of resource

Colorado Section member Dan Nosal assists Camp Rocky rangeland science students as they complete their field inventories. Photo courtesy of US Department of Agriculture–National Resource Conservation Service (USDA–NRCS).

professionals from around the state, help participants learn about our environment while working in teams and meeting other students from across Colorado.

Students choose from one of the following resource fields for their area of focus: rangeland science, soil and water conservation, forest management, and wildlife management. During the second half of the week, students from the 4 different resource teams work in new, integrated management teams to develop and present natural resource management plans. Participants also explore, discuss, and use critical thinking and problem-solving techniques to find solutions for various controversial environmental issues. For the rangeland science team members, past issues have been prairie dog management, public land grazing, feral horses and burros, and the Endangered Species Act. There is still plenty of time for fun, though, with group learning exercises such as setting up a llama short-duration grazing demonstration, rangeland Jeopardy, Colorado rangeland types, and nature trail hikes!

Each year the Colorado Section recognizes 2 of the outstanding students in the rangeland science group. SRM belt buckles are awarded to those students who, during the week, have shown the most interest and have come the furthest toward enhancing their knowledge and understanding of rangelands.

Black Mesa Ecological Academy

Multi-SRM Section Involvement

The rangeland camp for high school students at Black Mesa is an SRM-sponsored function involving 5 Sections: Colorado, Oklahoma, New Mexico, Texas, and Kansas. It was started in 2002 when the Oklahoma Section decided to move its range camp to the panhandle and invited the surrounding states to participate. The Cimarron County Conservation District stepped up to the plate and agreed to host the event just outside of Kenton, Oklahoma.

Range plant identification exercise at the Black Mesa Ecological Academy. Ben Berlinger (foreground, holding plant) and Dwayne Rice, Kansas Section (background), lead the demonstration. Photo courtesy of USDA–NRCS.

"All of us are smarter than one of us" could be the theme of the Academy. The weeklong program at the Academy begins with a challenge course, a tool used to build teamwork, teach problem solving, and cultivate self-confidence. The topics included in the curriculum include basic ecological principles, a plant identification and collection competition, leadership and speaking skills, and resource planning integrating the use of Global Positioning System satellite and Geographic Information System technologies.

During the latter half of the week the students participate in the identification of natural resource concerns and the development of a land management plan. This information forms the basis for working in teams to prepare a rangeland management plan based on objectives. This exercise brings together the skills in problem solving and teamwork.

A unique aspect of the Academy is the involvement of the students in activities that include a "tour" through the history of the southern Great Plains region, starting with the early Native American culture and ending with the present-day inhabitants. The foods as well as other aspects of the culture and historical living skills are featured during the entire week.

Section presidents and parents are invited to attend the awards luncheon on the last day of the Academy. Each Section recognizes its top camper, and the Academy staff award the "Trail Boss" to recognize the highest overall achiever at the Academy. Finally, the students vote on and recognize one of their own with a "Top-Hand" award.

FFA Rangeland Judging

The Colorado Section involves many members located throughout the state in numerous high school FFA Voc/Ag rangeland judging activities. These are mostly the district contests held in the fall near the start of the school year. Members also help with the instruction and field practice events as students prepare for the contests.

Colorado Section member Kimberly Diller (background, in brown shirt) supervises the plant identification part of the FFA rangeland judging contest at the San Isabel District. This part of the contest is usually held indoors using preserved or mounted specimens. Photo courtesy of USDA–NRCS.

The contest in Colorado involves 2 parts: the identification and characterization of 50 rangeland plants and the identification of 2 ecological sites together with determining rangeland similarity index, plant basal cover, proper stocking rates, apparent rangeland trend, and recommended management practices based on stated goals and objectives.

The highlight of the FFA rangeland judging program is the state contest. The location is rotated each year among 3 sites in eastern Colorado. Upwards of 120 students participate and "dot" the eastern Colorado plains with their blue FFA coats during the contest!

High School Youth Forum

The Colorado Section strongly supports the SRM High School Youth Forum as one of the foremost opportunities to learn about rangelands. The Section sponsors 1 to 3 high school youth to participate at each Forum. Section members from all over the state, from Fort Collins to Trinidad, help prepare these students for the daunting task of writing and presenting their papers for the illustrated talk competition! The top performers from Camp Rocky and the Black Mesa Ecological Academy, as well as the high achiever in the Agate High School's rangeland management curriculum, are chosen as potential delegates to the Forum.

Colorado Section delegates to the 2006 High School Youth Forum held in Vancouver, British Columbia, were (left to right) Kaitlyn Lingus, Branson, Colorado; Jake Meinzer, Yoder, Colorado; and Nikki Jorbin, Agate, Colorado. Kaitlyn was recognized with third place honors for her illustrated talk during the paper presentation contest. Photo courtesy of John Mitchell, US Forest Service, Fort Collins, Colorado.

As with the other SRM Sections, our Forum delegates are quick to understand the awesome responsibility they have been given. Likewise, as with other Sections, our membership will attest that much work is required on our parts. However, the reward is, without saying, great, as we proudly watch, with much anticipation, their presentations and a job well done!

The Benefits

Through both austere and good budget years, the Colorado Section Board of Directors has shown strong support for the youth of Colorado. Many positive outcomes have resulted from the SRM youth program in Colorado. As with all education programs, some of the benefits are measurable but most are not. Some of our youth continue in the field of rangeland science and move on to the university level, leading to a professional degree. Obviously, the most rewarding outcome is to see these youth employed in a rangeland management career, be that with a government agency, extension service, university, or private business! All indications are that this support will continue for the benefit of future generations of Colorado youth!

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A Fish Out of Water

By Jim Thorpe

Editor's Note: This paper originally appeared in the SRM New Mexico Section Spring 2005 newsletter.

Sometimes we gain perspective when plopped down in new surroundings. Last summer my wife and I had a chance to travel far off the ranch and explore the rocky coast of Maine. While loading up on clams and lobsters, investigating intriguing tidal zones, and wandering into a few too many lighthouses-turned-gift shoppes, I stumbled upon the realization that, while the coast and the range are indeed quite different worlds, they really are very much on the same planet. What led me to this observation (and Range Guys, if anything, are just *naturally* great observers) was *The Working Waterfront*, a local freebee publication that I picked up while Carol was scouring the LL Bean outlet mall.

We hear and talk a lot about rangelands these days as "working landscapes"; here, along side advertisements for bait, boats, boatyards, real estate, lobster festivals, and composting toilets, were discussions about the social and economic threats faced by "working waterfronts" and "traditional island communities." Instead of "sustainable grazing," the subject

Shoreline interface: the rocky coast of Maine.

The Maine meal: a sustainable harvest?

was "sustainable fisheries." Instead of "ranchettes," it was "summer homes and megayachts." Instead of "ORVs" it was "PWCs" ("personal watercraft"—ie, jetskis). Instead of fights over AUM permits, it was "environmentalist lawsuits" over "DAS" ("Days at Sea") and "catch quotas"; these latter are said to often result in perverse effects, such as the throwing overboard of inadvertently caught (but now dead) quota-exceeding species (and FYI, endangered fish are never caught…).

There were similar-sounding calls for "sound science," and the combat of opposing advocates and agencies. Media savvy enviro-experts were pitted against old salts "out on the water" (these guys can read the surface of the water like a soil guy can read the surface of the land). Nothing less than the "very existence of island communities and their way of life" (not to mention, to give the activists their due, "the survival of the entire oceanic ecosystem") is said to be at stake, and "educating the public" seems to be a pressing need difficult for anyone to achieve.

The big question is "Where are all the fish?"—the millions of cod, herring, and other fishes that had once been pivotal in developing the original New England maritime economies.

Lobster boats scenically moor offshore of swanky summer homes; lobstermen now live more modestly further inland.

These fish had once been an overabundant and seemingly inexhaustible resource (cf "swarms of buffalo" feeding on "grass up to their bellies"); now their numbers are so alarmingly depressed (up to 95%, by some estimates) that the worry is, to translate into our contemporary range science dialect, that an irreversible "threshold" may have been crossed.

Restoration efforts and studies are underway. The "best available science" is striving to understand fish population dynamics and spawning habitats and is quantifying sustainable yields; an arsenal of high-tech devices has been deployed to probe the formerly murky depths. A massive tagging study hopes to catch, tag, and recatch 100,000 cod. A sort of derby is being run to enlist the help of commercial fisherman, who are (surprise?) frankly quite skeptical of the work of "government scientists who have come to help." Prizes such as coffee mugs and T-shirts are offered to those turning in the tagged fish (and GPS catch location), with the big incentive being that 1 in every 10,000 fish has a special tag worth $100! A recent check on the Web site has noted that many more tagged fish are being recovered by Canadian fishermen than by Americans: go figure!

There are attempts to "retrain" displaced fishermen as data processors, security guards, and truck drivers, but it isn't so easy to teach old sea dogs new tricks. Those who wish to "stay on the water" might join the merchant marine or take up "oyster farming" or other forms of "aquaculture." Just about all salmon nowadays are "farmed," raised in shoreline pens that are akin to cattle feedlots, and while efficient, are not without their environmental challenges, such as diseases seeping out to imperil native "wild" fish or escapees turning into rampaging "invaders." And it turns out that the "trash" fish used to make salmon feed may be in danger of being overfished themselves (with the usual food chain disruption domino effect).

Lobstering seems to be the big success story, with lobster consumption (Dr Atkins is good for lobsters too, or so they say!) and catches at an all-time high, 3 times the levels of a decade ago (naturally this begs the sustainability question). While there are more traps in the water (tangling up more propellers of summer residents' pleasure craft) there are not really that many more fishermen; the established ones zealously guard their turf—much like in old-time range conflicts, newcomer lobster fishermen often find their traps robbed or cut adrift. (A cultural observation: instead of team-roping, lobstermen like to race special souped-up lobster boats in their spare time.)

Of course, it's not just only the fish who have problems, it's birds too. Apparently the Indians and early settlers used to raid the little island rookeries for their eggs. Many species, like Rosette Terns and Atlantic Puffins, were nearly extirpriated for their feathers (for fashionable ladies' hats). Now there are reintroduction efforts, especially as bird-watching tourists will pay good money to see them. (They are also something to look at on the "whale-watching cruises" when the whales don't show up!) Trouble is that the seagulls prey on their eggs and chicks; motivated summer interns are recruited to camp out on these islands and chase away the gulls, even destroying their nests when necessary (gull-lovers, however, are threatening to sue).

I was dwelling on the lead editorial ("Will Maine's island communities survive in the long run?") when it was time to go find some lunch (instead of a chile dog it was a "lobster roll"). I ruminated over the editorial's short answer while enjoying the fresh lobster meat stuffed into a hot-dog bun. Even with all the aforementioned challenges, Maine, with its often brutal climate, is not for "the faint hearted or the faithless" (nor is, for that matter, Clayton, New Mexico, in January or the "Jornada del Muerto" in July). The islands weren't going anywhere, so neither were their people. The parallel challenges faced by coastal and range communities, the pressing needs for applied sciences to address these, and the near-fatalistic dedication of their peoples to their working environments and livelihoods were thrown a bit into stark relief. It was cold comfort on a green summer day far from our home on the drought-tinted range.

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Bumper-to-bumper pleasure craft line a recreational waterfront.

Changing Western Landscapes, Debt, and Oil: A Perspective

Rapidly rising consumer debt, a real estate bubble, and depletion of world oil reserves could greatly affect western rangelands and ranching.

By Jerry L. Holechek

Introduction

As a lover of rangelands, ranching, and wildlife, I have deep feelings of consternation over the rapid urban and exurban development now occurring on many landscapes in the western United States. I often find myself wondering if and when this trend might slow down and stabilize. During the course of the last 5 years I have traveled rather extensively in the western and central United States, Europe, Russia, and Ukraine to observe farming, ranching, forestry, wildlife management, and other land use practices. In addition, I have been reading about national problems such as land fragmentation, government debt, consumer debt, changing demographics, rising oil prices, climatic change, and the possible bubble in real estate. I will attempt to look into the future evaluating how these forces might affect rangeland landscapes and ranching.

Land Hunger and Land Availability

Various times I have polled students in my range management classes regarding how they hope to live after they initiate their careers. Invariably I will find 9 out of 10 students aspire to a life in the western United States on a 10-acre or more tract of land. Over the next 60 years it is expected that the human population of the United States will double from 290 to 600 million people. If one-quarter of these additional people (75 million) lived on 10-acre tracts, 750 million acres of rangeland, or 68% of the rangeland in the United States, would be lost to non-ranching uses (Figure 1).

A major question is how much the privately held rangeland will be lost to development. I believe we may be approaching a point where the amount of rangeland that will undergo subdivision within the 10 contiguous western states will slow down. One major reason is that much of the private land that can be subdivided is being subdivided. Many of the subdivisions are not mature and many more parcels can be sold. There is a more subtle trend to further subdivide larger ranchettes into smaller ranchettes.

Conservation easements are becoming a popular way to protect privately owned rangeland.[1] I am hopeful that over

Land Area and Ownership in the United States

The United States has about 2.3 billion acres and one-half is considered to be rangeland. The total amount of land controlled by the federal government is 654 million acres or 28%. The Bureau of Land Management controls 264 million acres while the Forest Service controls 192 million acres. When Alaska is removed, the amount of federal rangeland in the 10 contiguous western states is near 300 million acres. Roughly 180 million acres is in private ownership. Some estimates indicate that 45 million acres have been converted into other uses so far.

This article has been peer reviewed.

Figure 1. Rangeland that has been subdivided into 10-acre parcels in northwestern New Mexico. This pattern of land use requires high amounts of infrastructure per individual home and typically involves long commutes between work and home.

the next 20 years at least 50% of the remaining privately held rangelands will be protected by conservation easements, federal government incentives, and private initiatives.

In New Mexico, where I live, the financial effectiveness of ranch subdivision is changing. Developers are now being required to sustain more of the costs of infrastructure such as roads, water, electricity, and waste disposal. Taxes assigned to the developers and buyers are increasing as counties become overwhelmed with costs for new roads, road improvements, road maintenance, water provision, and waste disposal. Regulations and restrictions on ranch subdivisions are being increased. These same trends are occurring to varying degrees in other western states.

Without question the baby boom generation born between 1946 and 1964 has driven the unprecedented demand for rangeland parcels as home sites and ranchettes over the last 15 years. Baby boomers will begin retiring in big numbers in 2008. However, many have already purchased their retirement homes in the western states. Nevertheless their incremental retirement between 2008 and 2026 could keep demand high for ranchettes for another 4 to 10 years. On the other hand they may soon run out of money. This I will discuss.

A Speculative Bubble in Real Estate

There is growing concern about a nationwide speculative bubble in real estate.[2] In some parts of the West a quarter of the new homes are vacant. They have been built for quick sale to take advantage of escalating home prices. It has become a common practice for homeowners to take out home equity loans to finance the purchase of second and even third homes. No or low down payment requirements (only 5%), low interest rates, and variable rate loans where the purchaser pays only interest for the first one to three years have made it easy to speculate in real estate. Las Cruces, New Mexico, and Pagosa Springs, Colorado, are examples with which I am familiar where lots alone have appreciated 30%–40% per year during the 2002–2005 period. In several remote pinyon juniper areas of western New Mexico rangeland valued at $50 an acre for grazing is now selling at $1000 or more an acre for 10- to 20-acre tracts. These deals typically involve high leverage and low occupancy.

Rising Living Costs on Ranchettes

In New Mexico property taxes for owners of ranchettes have averaged about 30%–40% of those for town homeowners. On one hand the ranchette owners receive fewer services from the county than town homeowners. Garbage disposal, sewage disposal, street maintenance, and provision of domestic water are some of the services that town homeowners receive that are not provided to ranchette owners. On the other hand ranchette homes compared to suburban homes require a much higher amount of infrastructure such as roads, electricity and communication wiring per home. Counties are finding it necessary to raise taxes on rural homeowners as both the number of dwellings and demand for services increases.

Economic Importance of Construction

I do think it is important to recognize that construction, particularly home construction, has played a critical role in rescuing the US economy from the stock market crash and economic slowdown in the 2000–2002 period. Nationwide construction accounted for about 40% of economic activity in 2004. Many counties in the western United States would be in deep financial trouble without the boom in demand for rangeland parcels as ranchettes and home sites. This boom has created many new jobs in western counties that were faltering from loss of jobs due to the banning of logging on national forest lands to protect spotted owl habitat. Rising ranching costs, drought, and increased regulation on federal grazing lands have made the last 10 years a very difficult time for western ranchers. Demand for ranchettes and home sites has allowed many ranchers to stay in business through liquidation of small portions of their property to pay off debt and generate income. It is quite rational and wise for financially stressed ranchers to sell rangeland to developers at prices 5 to 15 times fair value for grazing.

Debt Levels

Debt levels of both citizens and the US government are at unprecedented levels and rapidly rising.[3] Many econo-

Federal Debt of the United States

Presently the US government owes about $6 trillion which is $20,000 per person. Consumer debt is about $8,000 for every man, woman, and child. Mortgage debt adds on another $24,000 which adds up to a total of $52,000 per capita. These figures do not take into account future unfunded liabilities owed by the federal government to itself for social security, Medicare, and Medicaid.

mists worry that growing debt levels in the United States at some point will cause a major rise in interest rates and lead to a severe recession or depression.[3] These economists often point out that it takes more and more expansion of credit to achieve the same level of economic growth in each successive business cycle. During the past 20 years several books have been written projecting doom and gloom if the US government and people did not reverse their excessive borrowing and pay off some of their debt. However, these dark prophesies have been unfulfilled and there have been no serious recessions since 1982. The 1983–2005 period has been the longest run of prosperity in the 220-year history of the United States.

From 1982 through 2005 the official debt of the US government grew from $1 trillion to $6 trillion.[3] What this means is during the past 23 years the federal government on average has annually spent about 22% more than its revenues. American consumers in this same period have increased their debt about 2% per year. Without question all this spending has kept the economy much stronger than if the government and people had balanced their books.

Another worry is that approximately 40% of US federal debt is held by foreigners.[3] Some of these creditors such as the Chinese and certain Muslim nations are not exactly friends and their motives are uncertain. If they ever quit buying US treasury securities—or worse, started cashing them in—it would wreak great havoc with the US economy by causing a rapid rise in interest rates and a devaluation of the dollar.

Continued prosperity and demand for western rangeland as home sites and ranchettes seems contingent on sustained credit and debt expansion in the United States. Both the federal government and financial institutions have been quite imaginative in finding ways to extend credit and finance debt. It does seem that at some point a threshold will be reached where debt levels become overwhelming and cause a major economic contraction.

The Oil Factor

During the past 50 years the trend has been for Americans to disperse from cities and towns into the suburbs and countryside.[1] Both distance and time required for commutes between home and work have steadily increased. Cheap gasoline and the willingness of federal, state, and local governments to build more and better roads has reinforced this trend. Even interior western America is now characterized by several large semi-urbanized metropolitan areas involving 1,600 or more square miles where it is not uncommon for people to spend in excess of two hours a day driving between home and work. These areas include Phoenix, Arizona; Denver, Colorado; Dallas-Fort Worth, Texas; Salt Lake City, Utah; Las Vegas, Nevada; and Albuquerque, New Mexico. The trend towards urban sprawl is now accelerating at the very time when known world supplies of oil are in rapid decline. Some expert petroleum geologists believe that production of oil worldwide will peak within the next 2 to 5 years and then decline.[4]

Ten years ago the drastic increases in oil use by China, India, Russia, and several European countries was completely unforeseen. The United States imports 59% of its oil mostly from Canada, Saudi Arabia, and Mexico.[5] Spare oil capacity is considered to be primarily in the mideast with Saudi Arabia and Iraq holding the biggest reserves. However the magnitude of Saudi Arabian reserves is being seriously questioned.[4] The widening gap between growing world oil demand and supply (growing more slowly or shrinking) may push the price of oil to over $100 a barrel and gas prices at the pump to over $5 a gallon within 3 to 5 years. A bigger concern is that oil shortages in the United States will cause a massive economic downturn and long waiting lines at the pump reminiscent of the 1970s. While there is uncertainty over the extent of world oil reserves and how fast demand will grow, it does seem prudent to encourage more conservation and efficiency in oil use in the United States. Oil matters because it has become the world's primary energy source and is a critical component of plastic and many chemicals. Developing countries depend heavily on increased oil consumption to improve living conditions for their people.

Global Demand for Oil is Rising

The U.S. Department of Energy is now projecting that daily global demand for oil will grow by 50% during the next 20 years.[5] The United States with 5% of the world's population uses 25% of world energy. China with 21% of the world's population uses 7.6% of the world's energy. Oil demand in China is growing about 14% per year compared to 1% per year in the United States. Worldwide oil demand is growing about 1.6% per year. This demand is expected to accelerate as China, Russia, India, Brazil, and Eastern Europe expand their economies.

A likely indirect impact of continuing increases in oil prices will be to increase the importance of rangelands for meat production. American agriculture is highly dependent on use of fossil fuels (oil) to power farm equipment, synthesize nitrogen fertilizer, and transport crops.[6] Low oil prices have made it financially effective to raise cattle using high inputs of harvested forage and feed grains. At some point it is probable rising oil prices will force up grain prices and make it economically unfeasible to finish cattle for slaughter with a lengthy period of grain feeding. Cattle ranchers on western rangelands could experience higher profit margins if beef prices rise relative to production costs. Keep in mind that rangeland beef production involves lower fossil fuel inputs compared to when cattle are fed high quantities of harvested feed and grain. It requires about one third to one half less fossil energy (oil) to produce a pound of beef on rangeland compared to with harvested forage and grain.[7–9] Both human health benefits and improved pricing could make grass fattened beef more profitable in the future than in the past. Improved profitability of livestock

would likely influence western ranchers to continue their livestock operations rather than subdivide their rangelands.

Alternative Energy Sources

Problems with immediate large-scale conversion to alternative energy sources to oil are discussed in some detail by Leeb and Leeb.[4] They center around environmental contamination, difficulty in transport, difficulty in processing, lack of cost-effectiveness, high space requirement, and technological bottlenecks that need to be resolved. Other fossil fuels such as coal, natural gas, and oil shale have their individual drawbacks. With coal the primary problem is greenhouse gases, with natural gas it is difficulty in transport, and with oil shale it is difficulty in processing. Nuclear fission involves large expense in plant design and construction, terrorists and accidents can cause disastrous radioactive contamination, and radioactive waste creates major storage problems. Most of the better dam sites for hydroelectric power are being used and further dam building is not popular due to environmental problems. Presently cost-effectiveness is a problem for primary forms of solar energy, particularly photovoltaic

Figure 2. This solar energy system on southern California rangeland requires a large land area.

cells. The manufacturing process results in toxic wastes and requires high inputs of iron. Also photovoltaic cells need a lot of space (Figure 2).

Hydrogen offers the greatest hope for cheap, unlimited energy without pollution. The problem is that hydrogen does not occur in pure form. Basically to obtain hydrogen in pure form involves using energy from other sources to crush water to free up hydrogen molecules. This sounds rather simple but the drawback so far is expense. A low-cost, efficient way is needed to harness energy from the sun to crush water and free hydrogen. Next, big strides are needed in capability to store and transport hydrogen because it is very unstable. In summary, a hydrogen (fuel cell) based economy is probably several years down the road.

Wind offers the best hope to reduce reliance on fossil fuel in the short term.[4] Sound, efficient technology to harness

Figure 3. Rangelands fragmented into small parcels for homes often become severely degraded, support noxious weeds, and have low value for desirable native wildlife species based on Colorado research.

wind energy is now available. Wind energy is rapidly catching on in Europe and is starting to catch on in America. It seems certain wind ranching will become common and lucrative in the Great Plains and certain parts of the west. It is worth mentioning that North Dakota is the windiest state. Large areas supporting wind turbines will likely become part of western landscapes. I would rather see rangeland landscapes dominated by wind turbines than exurban sprawl.

Energy Conservation

Energy conservation in the United States played a big role in bringing down oil prices following the oil shock in 1981.[4] Heavy investments in nuclear power and development of new oil fields were also important factors in the fall of oil prices during most of the 1980s. However, worldwide there have been no major new oil fields discovered for 30 years. It is expected known oil reserves will last 35–40 years. Under this scenario it would seem prudent to conserve existing oil to the extent possible. Unfortunately over the past 10 years just the opposite has been the case in the United States which uses more oil per capita and in total than any other country. The popularity of sport utility vehicles (notorious for poor fuel efficiency) and the trend for people to drive longer distances between home and work are major factors causing oil consumption to increase in the United States.

Conservation of oil and rangeland go hand in hand. Convincing people to live close to their work and in compact communities that facilitate mass transportation by bus, train, and car pooling would greatly reduce consumption of oil, clogged highways, and loss of rangeland to exurbanization. This village approach to living is widely practiced throughout Europe, Ukraine, and Russia.

Some other approaches to encouraging oil conservation would be to raise gasoline taxes, assign increased taxes to fuel inefficient vehicles, and provide tax incentives for people to live close to their work. Presently gasoline prices in the United States average about $2.93/gallon compared to $5.40 to $6.50/gallon in European countries. It is my view that any

Figure 4. This compact village built on high ground in the Czech Republic facilitates mass transportation, is esthetically pleasing, and conserves land for agriculture, forestry, and wildlife.

increased taxes on gasoline in the United States should be used to fund research and development of alternative energy sources to fossil fuels. During the oil shock of 1981 gasoline near the equivalent of $3 per gallon today finally induced Americans to become serious about energy conservation.

Some Final Thoughts

Natural landscapes across the western United States are being fragmented by division into small land parcels for second homes, retirement homes, and homes for people wanting to escape the higher living costs and stress of city life. A massive home construction boom is occurring throughout the United States that has been quite stimulatory to the economy. However, it is based on easy access to credit, low interest rates, and large-scale expansion of debt. The increased dispersal of people out of the cities and across rural landscapes is creating many problems such as loss of open space, loss of habitat for wildlife, loss of agricultural land, need for more and expanded highways, increased air contamination with greenhouse gases, and depletion of fossil fuel supplies (Figure 3). Even though Europe has nearly four times the human population density of the United States, most European countries have maintained a large amount of agricultural and forest lands by living in compact cities and villages (Figure 4). Per capita use of oil by Europeans varies from 40%–60% that of Americans[10]. In India per capita use of oil is only about 8% of that in America.

Little has been done to encourage Americans to conserve either open space or oil. If the present trends continue unchecked both rangelands and oil in the United States could be largely gone in 40 years. However, government and consumer debt and world shortage of oil may soon force major changes in American lifestyles. These changes could raise the values of rangelands for meat production, wildlife, water, open space, and esthetics and reduce their value as home sites and ranchettes.

It is my belief that most people do not understand the importance of rangelands in food production and for ecosystem services. The magnitude and implications of loss of rangelands has not been thoroughly researched and is poorly understood. I believe information, education, and government policies will be needed to slow and better manage conversion of rangelands into other uses. A national committee is needed to assess this problem and provide recommendations to the president and congress that will sustain rangelands in the future. Maintaining large areas of rangelands will be one of the great challenges in the 21st century.

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Taking the Reins

Nevada and Idaho have taken a proactive stance on selling ranch stewardship to the public.

By Kindra Gordon

Put a cowboy on a TV commercial or in a magazine ad and odds are pretty good that you can sell about anything. Companies like Marlboro, Budweiser, and Dodge have been using that tactic for decades.

Now 2 entities in Idaho and Nevada are embracing the cowboy image as well to help garner urban support for the important role their states' ranching industry has in land stewardship.

Gretchen Hyde with the Idaho Rangeland Resource Commission (IRRC) explains that the goal is to raise awareness with the nonranching public about land management and help them understand that grazing is beneficial to the land.

She adds, "The need to educate the nonranching public about rangelands is becoming more important every day."

Indeed. With nearly 90% of both Idaho and Nevada federally owned and managed, the public has a large role in determining how those lands are used, which can make it a difficult environment for ranchers—especially with regard to legislative issues. And as fewer Americans have farm roots—or even know someone who lives on a farm—there is an increasing disconnect between rural and urban communities and issues.

To bridge that information gap, the state legislature in each of these neighboring states established their own rangeland resource commission a few years back.

Nevada's Efforts

The Nevada Legislature—spurred by state senator Dean Rhoads, who is a rancher himself—created the Nevada Rangeland Resources Commission (NRRC) in 1999. The NRRC's stated mission is to inform the public that Nevada's rangelands are a vital economic resource, protected and preserved for all citizens by a stable, sustainable livestock industry.

To carry out its information and education campaign, the NRRC collects 10 cents per animal unit month from public land ranchers and uses the money for the promotion, outreach, education, and research necessary to inform the public about the benefits of livestock grazing on public lands.

Some examples of NRRC's efforts include the following:

- Using print media and radio spots featuring scenic ranch images and people like popular rodeo announcer Bob Tallman.
- Participating in the Las Vegas Farm Festival, where nearly 7,400 kindergarten through fourth grade children were taught how ranching can benefit both livestock and wildlife.
- Hosting performances of western music and range poetry with "Texas" Tom Weatherby and Dennis Golden—and having the performers emphasize the important role of ranchers and rangelands.
- Placing billboards around the state that send the NRRC's message of healthy and productive range management to passing motorists. The billboards were put up this fall (2 along US 93 and 3 along I-80 near Winnemucca, Elko, and Reno) and will stay up for 6 months.

Idaho's Initiative

The NRRC is patterned after a similar Rangeland Resources Commission in Idaho that was established by its state legislature in 1994 to promote ranching and rangelands to city slickers.

Today, more than a decade since it was founded, and operating with a budget of $200,000, the IRRC is a resource for the urban community it set out to educate. Projects include

maintaining a Web site with information on frequently asked questions, links to grazing information, and the opportunity to "ask a range manager" questions. The site includes "stuff for students," as well as teacher resources. Additionally, the IRRC in conjunction with the University of Idaho offers a summer seminar for teachers to help them learn about rangeland ecology and bring it into their classrooms.

Hyde reports that the weeklong teacher workshops have been especially well received. "The focus is on rangeland ecology rather than grazing, but by the end of the week the teachers understand that management and grazing is necessary to keep lands healthy and productive," she says.

Also for the classroom, the IRRC has created an Idaho history curriculum for fourth grade teachers, and a science protocol is available for teachers who want to incorporate it into their curriculum.

Most recently, the IRRC has implemented the Care/Share public relations campaign designed to help ranchers and outdoor enthusiasts understand multiple uses on rangelands. The message behind the campaign is a noble one for the West—it states there is room for everyone, if we care for the land and treat one another with respect.

To help promote awareness for the Care/Share concept the IRRC created a unique radio campaign that aired this past summer aimed to educate the general public about livestock and the land.

Hyde says the radio spots took a humorous, tongue-in-cheek approach by using talking animals like cows, dogs, and sheep, but still the message about respecting each other on the land was clear. The 3 radio spots targeted hikers and bikers who might be out on public lands, and the topics addressed emphasized why it's important to close a gate if you open one, how to respond if you encounter a guard dog with a sheep herd, and why it's important to respect private property that may be intermingled with public lands.

Along with the radio messages, Hyde says that the IRRC offers complimentary signage for ranchers to post on the land. "These signs offer information about the management that's going on or remind recreationists to close gates. They are designed to create awareness and continue educating those who may be using the land," Hyde says.

All total, Hyde believes the campaign is making inroads. She reports that in past years, the IRRC has frequently gotten a lot of calls questioning livestock use on public lands, but she says, "That didn't happen this past summer. I think it's because more people are becoming aware of what ranchers are doing out on the land."

Ranchers appear to be supportive of the program as well. Hyde says at this point they have a less than 3% request for refund on the assessments that are received from public and private lands.

Looking to the future, Hyde says she is hopeful other Western states will implement similar efforts to educate the nonranching public. She says, "To have more of the Western states doing this would make a huge difference because it's a big issue."

For more information about these two programs visit www.nevadarangelands.org and www.idrange.org.

Editor's Note: This article originally appeared in the February 2006 issue of ***Western Cowman*** *and is reprinted here with permission from the author.*

Author is a freelance writer based near Sturgis, South Dakota, and has been a member of the Society for Range Management since 1992, office@gordonresources.com.

Selected Essays on Science, Rangelands, and Roles of the Society for Range Management, Volume II

By K. M. Havstad

Gary Frasier, the editor of *Rangelands*, took a risk and published a set of 4 of my essays in the December 2005 issue of this magazine. The risk was that these essays were written in an offbeat style, were of a personal and professional nature, bordered on editorial in content, and were overall not the type of writing routinely printed in *Rangelands*. In addition, I could not point to any prior success in publishing this type of essay. I appreciate that Gary accepted the risk and printed those essays. In my introduction to that set of essays, I commented that these were writings that until having been published had likely been read by only 2 people. Based on feedback I have received since that December publication, those essays have now been read by 4 to 5 times as many people as before. Given that none of the feedback comments on those essays were excessively derogatory or irate rants, Gary felt that he could take an additional risk and publish another set of essays. As before, these remarks are simply my reflections on matters related to our discipline, our profession, and our Society, and meant to serve as threads of conversation.

The Earth is Faster

I am certainly no expert on the subject of climate change. The amount of individual research on phenomena related to climate change published over the past 20 years is enormous. Even the number of synthesis volumes on the subject is impressive. Yet, it is obviously a subject that cannot be simply dismissed because it is viewed as too complex or too involved. At some point I think it would be easy to simply gravitate to one camp or the other (ie, "the atmosphere is overloaded with anthropogenically produced greenhouse gasses and warming is occurring" camp, or the "earth has experienced these kinds of changes in the past and this is just natural variation" camp) because of personal biases, political beliefs, inherent skepticisms, or unrelated professional agendas (characteristics probably found in either camp). Yet, the subject is deserving of far more detailed treatment, and I have to try and delve into this literature and see if some threads of sense can be identified. Our profession is rooted in trying to understand change, and even in the 19th century scientists suspected that human activities would affect climate (see Kingland's *The Evolution of American Ecology*, 2005). An essay seemed to be a reasonable motivation to take the plunge into this subject. My written words force me to stare at what I think. Though I'd certainly read related articles that had a bearing on other of my own writings in the past, this was an attempt to more specifically uncover and develop my own sense of understanding. I started with the most current work available—a series of papers published in several issues of *Science* during the spring of 2006. Here's a brief synopsis:

The serious climate change debate is not centered on whether or not our climate is changing. There is overwhelming evidence of change. The central debate is whether what is being observed is natural variation or an actual new climate, or at least new to us (see *Science*, 2006, Vol. 311, for numerous and relevant articles). For example, recent reports have documented a warming during winters over the last 30 years of the earth's Antarctic troposphere, the lower portion of the earth's atmosphere from the surface to about 26,000 feet above the South Pole (see Turner et al., *Science*, 2006, 311:1914). The warming has been 0.5°–0.7°C per decade, and the authors suspect this is a real change and not an artifact of instrumentation. Yet, they acknowledge that there is tremendous variability in these measures from year to year. They cannot be certain that this is a persistent warming trend. Another example comes from several recently reported observations

of dramatic increases in the discharges of glaciers tied to polar ice sheets in both the northern and southern hemispheres (see Joughin, *Science*, 2006, 311:1719; Bindschadler, *Science*, 2006, 311:1720; Velicogna and Wahr, *Science*, 2006, 311:1756). These discharges and subsequent glacier changes have been recorded using a variety of methods. They point to warmer conditions, and result in increasing sea levels that would threaten coastal systems. Again, significant, large-scale changes are being observed, but the observations are quite variable over time.

There are many, as in *very many*, examples like this where changes are observed, well quantified, and clearly described. The examples span from the abiotic to the biotic, and from the global scale to the community scale and finer. In many cases, though, causes are not clearly linked to the symptoms, however alarming. In most cases a set of possibilities are typically described, often linked to the present level of atmospheric carbon dioxide of 380 parts per million, up from the preindustrial level of the 19th century of 290 parts per million. But uncertainty of cause and effect is prevalent in these reports.

All of this quantitative climate change evidence is both stunning and overwhelming, and it is being published in the top scientific journals in the world. Yet, there is another type of evidence that strikes close to home with our profession. To a great extent our discipline relies on an ability to understand the history of a landscape, to understand how its legacies are manifested in its current structure and dynamic. Much of our management technology is based on an interpretation of where a landscape has been and how it has evolved to its present state. The best range managers are those that are able to "read" the land. This ability also has a history of importance in the climate change debate. For example, it is well recognized that the El Nino phenomena (unusual warming every 2–7 years of ocean currents flowing south from the equator along the coast of South America) were first recognized by native fisherman. The very active field of research on El Nino events has its roots in human observations of complex phenomena tracked over generations.

In 2002 the Arctic Research Consortium of the United States published a book entitled *The Earth is Faster Now*. The title comes from observations by people indigenous to the Arctic Circle that they could no longer make predictions about the weather. Their typical indicators did not work anymore, and weather patterns were changing faster than what the knowledge built up over generations of observations had taught them. The earth, or its collective processes that were important to people living on the edge of land and in direct contact with the margins most sensitive to change, was, in their words, "moving faster." The collective senses of their environment built up over generations, which have a direct bearing on their survival, were telling them that the climate is different, and different than just natural variations. Those are powerful and persuasive observations. Though these are not the type of observations that are typically accepted for publication in our top journals, these are powerful and persuasive observations to those who believe in the validity of personal interpretations of our environment, especially over generations. These environmental interpretations deserve strong consideration in this debate.

Our climate is changing. We are faced with the choices to mitigate and/or adapt. The truth is, we know ways to mitigate, but appear to lack the global resolve. Interestingly, our profession is based on employing skills to adapt to dynamic, harsh environments as our science has a history of addressing key issues associated with adaptation. Who has an active research community reporting on data sets related to coping with drought, contending with shifting vegetation structure and composition, plant responses to elevated CO_2, and vegetation relationships to water yields? See the March 2006 issue of *Rangeland Ecology & Management* for examples. The earth may be "moving faster," but our science is working to maintain its relevance for informing adaptation of policies and management in response to those changes.

Oysters

Joe Fortes Seafood and Chop House is just a few blocks from the 2 main hotels that hosted the SRM annual meeting in Vancouver this past February. Finding this establishment during the week of the meeting was a combination of luck and fate. Fortes offers a menu that matches its name, serves a number of regional beers complimented by a contemporary wine list, and is best known for its selections of the many local, seasonal oysters served shucked or pan seared. I think I should have just gone ahead and forwarded a pay check directly there to cover my tab. Actually, there were multiple tabs that exceeded any per diem because I took up occupancy in Fortes as a home away from home over a 7-day period. I could use the feeble excuse that my home town of Las Cruces is a long way from good fresh seafood, both in distance with its landlocked geography and in time because it has been tens of millions of years since shallow oceans covered the northern Chihuahuan Desert. In reality, though, it was the proximity, the company, the libations, and the oysters. As one who shies away from larger functions like receiving lines leading to convention banquets, the bar stools and dining tables at Joe Fortes provided the perfect compliment to the meeting rooms and hotel hallways of the convention. Though my following recollections of these outings may be a bit distorted for a variety of reasons, they capture their spirit and the inherent values of creating a time each year where we can sit down together and talk.

Early in the week it was a group of 8 for a very civilized Sunday brunch that included talk about science, recent federal agency activities in the District of Columbia, the financial status of SRM, food, local art, and champagne. It was a fitting way to initiate our convention-related discussions. On another occasion it was lunch with the SRM board members that started with talk about anything but board activities, but eventually wandered into reflections on the success

of our new executive vice president and the high quality of the SRM headquarters staff. Following the opening plenary session, a science colleague and I retreated to bar stools and reflected on the wonderful remarks delivered earlier that Monday morning by the Honorable Iona Campanola, the Lieutenant Governor of the Province of British Columbia. We discussed who in US politics could give a similar high-quality, self-drafted speech. The resulting list was short, and we agreed that the next set of board members need to work on this issue. Another evening it was sitting at the oyster bar with a colleague from Oregon and talking about science directions in our agency, finding new ways to build local support for rangeland research programs, the state of our 2 main SRM publications, beer, and clam chowder. Given that it was Valentine's Day and we were surrounded by urbane couples, he correctly commented that I was the worst looking date in the place. We've been friends for a long enough time that leads to friendly jabs, but my retort was concurrence. I should have had him pick up the tab. On a different occasion it was a late session after late meetings that led to talk of politics and career directions, and beer, and trying not to look too out of place downtown in a city and its surrounding area of 2 million people. Given that I had been nearly living at Fortes I'm afraid I looked like I fit in by then. Another outing followed the excellent day-long special session on Chinese grasslands made more memorable with Jianguo Wu's critique of David Tilman's hypotheses on species diversity and productivity. This after-hours session was with 2 close friends and talk drifted to the mini tempest arising around the proposed changes to our academic accreditation standards, beer, oysters, of course, and China. We recognized that outside of North America we need to find ways to better engage the international community in SRM. Fortunately, people within the Society already have some ideas on how to do this, and we are starting to act on those ideas.

On my last night in Vancouver we retreated to Fortes after a very enjoyable Thursday afternoon technical session involving 5 colleagues and myself critiquing results from decades of grazing systems research. That grazing systems session was one of my meeting highlights, not that we entirely satisfied the audience, but because we had engaged ourselves and fellow professionals, and that was certainly my main goal. But the wait to be seated at Fortes was going to be too long and we had to resort to another nearby establishment. I recalled Yogi Berra's classic quip about a nightclub in New York—no one went there anymore because it was too crowded.

Probably between one-fourth and one-third of our total membership attended the Vancouver meeting. It was a highly successful event, and the Pacific Northwest Section working in concert with Ann Harris and our Headquarters staff did a tremendous job in organizing and hosting this convention. I'm not sure how many other attendees I saw in Joe Fortes restaurant at one time or another, but it was quite a few. In Reno next year I may have to gravitate towards an establishment serving Rocky Mountain oysters. I know I will still drift away from the larger banquet-type gatherings. But the meetings are all about engaging in conversations, no matter how that is done. I will still find a place to sit down with friends and discuss events of the day and enjoy the fact that I belong to this profession and our Society, the subjects and debates it encompasses, and the people it attracts.

Cheese

A symposium critiquing the history of grazing system research findings held during the 2006 Annual Society for Range Management meeting in Vancouver upset some people. Some in the audience felt that the collective analyses of the speakers were biased, excessively controversial, needlessly provocative, and/or harmful to the profession of grazing management. I was one of 8 symposium participants (speakers and their coauthors), and I cannot disagree too strongly with this overall impression. My intent was certainly to explain my biases, offer discussion points that would encourage debate and controversy, and provoke in a professional manner. Never, though, was the intent to harm the profession. In the aftermath of this symposium there has been some discussion about responsibilities of speakers to consider the influence of their words, and possibly filter their remarks if they could be misconstrued and misinterpreted resulting in unintended consequences. Certainly, it is important to remember and recognize the powers inherent in the spoken and written word. However, beyond a reminder of that potential power, I think I have an obligation to avoid tempering my remarks for the following 3 reasons:

1. Who is to say what is appropriate?

In October 2004 I was invited to Croatia, Bosnia and Herzegovina to speak at an international conference on rangeland management. The conference was held in Mostar, a city in this area of the former Yugoslavia that saw some of the worst fighting 10–12 years earlier during the Bosnian War. Tens of thousands had been massacred, the centuries-old bridge over the Neretva River splitting the city of Mostar had been destroyed, and the war had global repercussions only now receding with Slobodan Milosovic's death. In walking to the convention center from my hotel I passed graveyards where the expanse of headstones all carried the same dates in 1994. Buildings were still rubble in certain sections of the city. The Old Bridge had been rebuilt, though, and this meeting was one of the region's first forays into bringing the outside world back into this part of Herzegovina. At noon of the first day of the conference they had a side activity where local cheese producers had brought their products in for judging. These were sheep cheeses aged inside skins, a local, traditional product they were trying to market more broadly across Europe. Their national television was on site to broadcast the event, including the subsequent awards ceremony. Though I was not involved in the judging, I was asked to sit in front as a US Department of Agriculture (USDA) official while winners were announced. There was a good crowd as they began

the ceremony, though I have no sense of the "ratings" for the television broadcast. Near the end of the event, as they were nearly ready to announce a grand winner, they named a third place award. The farmer stood, in the black leather jacket classic to the eastern European style of dress, and protested loudly. While he spoke the person next to me learned over and translated for me. He said the farmer was announcing to his local and television audience that his cheese was better than third place and he was not going to accept this award. He was pretty upset. This was important to him, and he was going to speak his mind. I couldn't help it, but I started to laugh. Not a big attention getting kind of laugh, but one that was a product of the situation as I perceived it. Here we were just a few years from a country torn apart by war, religious hatred, fear, and lack of leadership. The graves were right outside. Maybe someone with State Department training would have remained stoic. But, for me, I thought this was a great example of how far they had come from that prior devastation, and I wouldn't have realized that progress without hearing his comments. I think it was a laugh of some relief. I'd like to think that in 10 years I could sit in some town in Iraq and hear someone complain about the results of a cheese judging contest. Maybe as a USDA representative I should not have found the situation that amusing. But I know that I could explain my behavior to satisfy my own sense of what is appropriate and responsible. That is the only measuring stick I can consistently use.

2. I can only speak and write from my own perspectives.

Earlier this year I wrote an essay entitled "Oysters" (included in this set of essays) about my reflections on our 2006 annual SRM meeting. Those reflections were accumulated while hanging out after hours in a restaurant in Vancouver that specializes in oysters. For me, this essay is about conversations, and the importance of conversation with friends and colleagues. Yet, I realize the essay does focus on the bar elements of this restaurant at times, and drinking beer and wine depending upon the meal. It is quite possible that some members will perceive this as an essay about drinking. The truth is, I leave those essays to Hunter Thompson's legacy because I could never write from that level of depravity. I realized, though, as I hit the send button in submitting this essay to the publisher, that I ran the risk of that perception, and that some might hold me in a lower esteem (if that is possible) after reading this essay. Yet, it would have been false for me to filter this perception out of the essay. It reflects who I am, and conveys my perception about what I think is important. All I can hope is that if someone arrives at a different perception about what I have spoken or written that they speak or write to me or someone who does know me for further clarification. Maybe the responsibility for perceptions is also shared by the listener or the reader.

3. We have to critique to advance.

I work in Las Cruces with a wonderful group of people. We are basically on the same pages, and we have a fairly decent understanding of each other and where we are headed. It is a congenial group of professionals. Yet, for us to really move forward, to really advance our ideas and our science, I know that we have to be able to thoroughly critique each other's ideas. This is our next big hurdle as a group. We have to have professionally tougher skins, and be able to be frank and direct with each other. In this fashion we will make sure we are putting forward our best ideas. It is not easy, and sometimes I weaken. Yet, upon reflection I know that I need to push this standard of behavior. Now is not the time to weaken, irrespective of what position we might hold in a professional nonprofit organization of 3,500 members. There just aren't enough of us to have some of us back off.

None of the above reasons fall back to the standard rationale that we all have the right, as has often been said, to say either incredibly stupid (see above text) or incredibly smart things (to be written, I trust). What these reasons speak to is that even if we are misunderstood, what is important is that we offer our perspectives, that we push the envelope of our understanding of our environment and our place in it, and that we work to further instill in this Society a culture of conversation without filters. We need to stand up and tell people what we think about our own cheese.

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Famous People and Events in Reno–Tahoe History

By Doug Busselman

The theme of the Society of Range Management 60th Annual Meeting, "Traditions and Transitions," aptly describes the "neighborhood" that conference visitors will be traveling into on February 10–16, 2007, when they arrive and stay in Reno, Nevada. This is an area with a rich history of famous people and events that played a significant role in the development of the West, and much of their legacy is still apparent and a part of our current culture.

For those inclined to appreciate the history of an area of the country you might be visiting, Reno–Sparks, Nevada, has much to offer and a quick trip to a historical website (www.nevada-history.org) will give you lots of prearrival information to get you started in developing your list of things to do while you're in the Reno–Sparks neck of the woods.

You won't be the first to make a business/pleasure trip to Nevada—explorers such as Peter Skene Ogden and Jedediah Strong Smith were among the first white men to enter the area, in the 1820s.

About 1843, Captain John C. Fremont and a 25-man party arrived at Pyramid Lake (one of the things you might want to visit and take a look at when you come to town—it's roughly 30 miles northeast of Reno). Back then this area was part of Mexico. Fremont and his group, which included a tracker–pathfinder, Kit Carson, moved on with their look-see, traveling down to the Truckee Meadows (now the site of Reno–Sparks). This bunch was not inclined to stay still for long and headed up into the Sierra Nevada Mountains where the Carson River comes out of the mountains. Shortly after this, the Fremont crew became the first white men to see a high mountain lake, now called Lake Tahoe (you'll also want to mark this area on your list of places to visit when you come over in February 2007). It's not known whether the Fremont party took advantage of the combination of snow and mountainsides for skiing, but it might be an activity you'll want to try.

Staying too long in the Truckee Meadows (or leaving before you should) is not a new phenomenon. In 1846 an emigrant party, passing through the Truckee Meadows, either stayed too long or left too soon, and ended up stuck in the heavy snows of the Sierra Nevada Mountains. Forty-seven of the 87-person group perished in this ill-fated outing. Today, a mountain pass in California not far from Reno on Interstate I-80 is named after the Donner party.

California has had and continues to have a corollary effect in Nevada. In January of 1848, when James Marshall made his discovery of a very valuable rock at Sutter's sawmill on the South Fork of the American River, the Truckee Meadows became a significant stopover site for those making the trip west on the California Trail. In the days before the Reno–Sparks Visitors and Convention Authority started keeping track of actual numbers of visitors, estimates of settlers passing through the Truckee Meadows were around 22,500 in 1849, 45,000 in 1850, and over 52,000 in 1852.

In February of 1848, the Treaty of Guadalupe Hidalgo transferred ownership of Nevada from Mexico to the United States.

Traffic through northern Nevada at this time also led to areas of gold and silver exploration on the east side of the Sierra Nevada Mountains. The first Nevada gold discovery was made in Gold Canyon, near Dayton, Nevada (which is located a few miles east of modern-day Carson City).

In 1850, Captain Joseph DeMont and Hampton Beatie were among the first to consider the retail potentials of Nevada. This group was associated with Brigham Young, of Salt Lake City, and they set up the first trading post at the site that would become Mormon Station/Genoa. In 1851 this area became the first permanent settlement in Nevada. Ge-

noa is located in Carson Valley, a few miles south of Carson City on present-day Highway 395.

Although the Genoa community didn't last on a continuous basis after 1851, in July of 1859 those who were around back then held a Constitutional Convention in Genoa.

The same year, about 40 miles south of the Truckee Meadows, the Comstock Lode discovery was made. This discovery triggered a strong and almost overnight urban development project that turned into Virginia City, Nevada. (This is another area you might want to have on your trip itinerary during your visit.)

One of the significant Virginia City business enterprises of this era was the *Territorial Enterprise* newspaper. This publication had as one of its reporters a writer hoping to get his start in the profession…his name was Samuel L. Clemens, and he also went by the name Mark Twain. Mr Twain will be making an appearance at the 2007 meeting.

Although we can't claim to have the literary track record of that Clemens guy, we hope that this background information will help stimulate your interest in making the trip to the 2007 SRM Annual Meeting, February 10–16. We're looking forward to having you stop by for a visit!

Author is Executive Vice President, Nevada Farm Bureau Federation, dbusselman@aol.com.

Youth Awards

SRM Annual Meeting, Vancouver, British Columbia, Canada, 15 February 2006

Masonic Scholarship: Zachery Val Anderson, Utah Section.

High School Youth Forum, 2nd Place: Ben Beckman, Nebraska Section.

High School Youth Forum, 1st Place: Ross Tolleson, Texas Section.

High School Youth Forum, 3rd Place: Kaitlyn Lingus, Colorado Section.

Note: Award recipients pictured with outgoing SRM President Angela Williams. Names in group photos do not reflect the order of those pictured.

High School Youth Forum, 4th Place: Kenna Brooks, Texas Section.

Undergraduate Range Management Exam (URME) Individuals 2nd Place: Nadia Mori, University of Saskatchewan.

High School Youth Forum, 5th Place: Sarah Anderson, Northern Great Plains Section.

Undergraduate Range Management Exam (URME) Individuals 3rd and 4th Place Tie: Eric Gardner, Brigham Young University and Joshua Peterson, North Dakota State University.

Undergraduate Range Management Exam (URME) Individuals 1st Place: Dean Hystad, University of Alberta, with Fred Norbury, US Forest Service.

Undergraduate Range Management Exam (URME) Individuals 5th Place: Jennifer Williams, Oregon State University.

Undergraduate Range Management Exam (URME) Teams 1st Place: Brigham Young University. Deborah Hobart, Brian Taylor, Daniel Olson, Aaron Robinson, Jay Howard, Lexie Carroll, and Jennifer Coleman.

Undergraduate Range Management Exam (URME) Teams 2nd Place: University of Alberta. Brenda Shaughnessy, Darin Sherritt, Dean Hystad, Kiley Gibson, Kelty McIntyre, and Tianna Magis.

Undergraduate Range Management Exam (URME) Teams 3rd Place: University of Saskatchewan. Beki Gummerson, Nadia Mori, Holly White, Denise Benfield, Shannon Poppy, and Adrienne Wovley.

Undergraduate Range Management Exam (URME) Teams 4th Place: Oklahoma State University. Josh Lofton, Matt Wheaton, Lauren Wilkerson, Adam Gourley, Kyle Whitmire, Rusty Norrie, Derek Matz, and Dane Varney.

Undergraduate Range Management Exam (URME) Teams 5th Place: North Dakota State University. Miranda Vlaminck, Joshua Peterson, Pamla Jo Wolff, Krista Brag, and Jill Nannenga.

Plant Identification, Individuals 1st Place: Pascual Gallegos Ayala, Universidad Antonio Narro with Bob Bolton, Bureau of Land Management.

Plant Identification, Individuals 2nd Place: Ignacio Velasco Vite, Universidad Antonio Narro.

Plant Identification, Individuals 5th Place: Dean Hystad, University of Alberta.

Plant Identification, Individuals 3rd Place: Felicisimo Salazar, Universidad Antonio Narro.

Plant Identification Teams 1st Place: Universidad Antonio Narro. Ignacio Velasco Vite, Fernando Martinez Garcia, Felicisimo Salazar, Reyna Rojas Garcia, Rufino Sandaval Garcia, Pascual Gallegos Ayala, and Rodrigo Javier Pacheco-Rivera.

Plant Identification, Individuals 4th Place: Rodrigo Javier Pacheco-Rivera, Universidad Antonio Narro.

Plant Identification Teams 2nd Place: University Of Alberta. Dean Hystad, Brenda Shaughnessy, Darin Sherritt, Kiley Gibson, Kelty McIntyre, and Tianna Magis.

Plant Identification Teams 3rd Place: Brigham Young University. Brian Taylor, Deborah Hobart, Daniel Olson, Lexie Carroll, Jay Howard, Jennifer Coleman, Eric Gardner, and Mark Judson.

High Combined (Plant Identification and Undergraduate Range Management Exam), 1st Place: Dean Hystad, University of Alberta with Dennis Thompson, Natural Resources Conservation Service.

Plant Identification Teams 4th Place: Texas A&M University. Aminda Gallardo, Loren Naylor, Preston Ingram, Ashley B. Mock, Kristen Nelson, Courtney Ratheal, Rixey Jenkins, Ramiro Lopez, Meghan Paclik, Kimberly Harle, and Robert Knight.

High Combined, 2nd Place: Jennifer K. Coleman, Brigham Young University.

Plant Identification Teams 5th Place: New Mexico State University. Estevan Gallegos, Sara Davidson, Alicia Gracia, Linda Mackay, Lenora Hawkins, Sarah Ricketts, Nathan Lombs, and Brady Allred.

High Combined , 3rd Place: Brenda Shaughnessy, University of Alberta.

High Combined, 4th Place: Eric Gardner, Brigham Young University.

University Student Display Contest, 2nd Place: Utah State University. James Stuart, Sarah Redd, Katie Santini and Deb Collins.

High Combined, 5th Place: Darin Sherritt, University of Alberta.

University Student Display Contest, 3rd Place: Oklahoma State University.

University Student Display Contest, 1st Place: Oregon State University. Erica Ersch, James Hayes, Jennifer Williams, Sheena Miltenberger, Jennifer Wiseman, and Kelly Smith.

Undergraduate Public Speaking Contest, 1st Place: Scott A. Davis, Brigham Young University.

Undergraduate Public Speaking Contest, 2nd Place: John Reese, Utah State University.

Undergraduate Public Speaking Contest, 3rd Place: James Hayes, Oregon State University.

Letters to the Editor

Editor (Gary Frasier):

Elaine Grings writes an excellent article and makes an excellent point in her article entitled "The Language of Rangeland Science," *Rangelands*, April 2006, pp. 36–37. It is a point which is commonly forgotten and, in my experience, exacerbates conflict, particularly the word "condition."

Thank you *Rangelands* for sharing it with us.

W. Alan Schroeder, Esq.
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Dear Gary,

I just wanted to let you know how much I appreciated your April issue, and the book review you did for *Beyond the Flames*. I also appreciated your giving me the opportunity to write 2 articles (thoughts on fire and our experience with the fire on our range) for that issue.

Also, my husband and I very much appreciated your editorial, and your own comments, which very appropriately set the stage for the theme of the issue. Those of us (like yourself, losing your father) who have experienced the terrible power and tragic consequences of fire have a great respect/fear of this awesome force of nature, and a totally different perspective than people who have never personally encountered what fire can do.

Thanks again for your efforts in creating this special issue. If it gives people more things to think about when considering fire (either as a tool for land management or better/safer ways to control an unwanted fire) it will have done a great service. Fire is never something to be taken lightly.

We certainly commend you on producing this special issue of *Rangelands* and plan to share it with many of our friends.

Best wishes for a good summer.

Sincerely,

Heather Smith Thomas
PO Box 215
Salmon, ID 83467
Phone: 208-756-2841

P.S. The photo for the cover turned out well. One small correction: this was a photo of the Twelve Mile fire (in which our daughter was burned), not the Withington Creek Fire, but it is not important, just an insignificant error.

Editor's Note: We regret that the cover photo was mislabeled. When submitted the photo was correctly labeled.

Thad Box

Suffer the Little Children

Last summer my 3-year-old grandson and I "worked" in my flower garden. William was far more interested in bugs and worms than flowers. He laughed as earthworms burrowed into fresh-turned earth. He poked pill bugs to watch them turn into little balls.

Then he found a dead butterfly. We admired its colors, its strong yet beautiful wings. We talked about how its colors evolved to make it less visible to predators. Then William asked me to make it fly. I told him it was dead. He said, "Grandpa, get some more batteries. His batteries have run down."

In William's world of electronic toys and computer games, that was a logical conclusion. Batteries making images appear on a screen is more real to him than decaying leaves providing energy for an earthworm. Unless we do a better job of exposing our children to natural processes, we sentence them to live in an unnatural world where war over energy sources is easier to promote than taking care of the land.

"Never before in history have children been so plugged in—so out of touch with the natural world," writes Richard Louv in his new book *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*. Louv directly links the lack of nature in the lives of today's children, something he calls nature deficit, to the most disturbing childhood trends such as rising rates of childhood obesity, attention deficit disorder, and depression.

Nature deficit disorder is not a medical condition. It is a combination of human costs of alienation from nature. The nature deficit damages children and shapes adults, families, and communities. It is a major contributor to the shocking fact that this generation of American children may be the first with shorter life spans than their parents.

Research, quoted in Louv's book, shows exposure to nature is essential for healthy childhood development—physical, emotional, spiritual. Environment-based education dramatically improves standardized test scores and grade-point averages. It develops skills in problem solving, critical thinking, decision making, and creativity.

Nature deficit disorder is not something that just affects kids in big-city slums, condos, and apartments. It occurs in all regions of our country. It affects kids from all economic classes. It is exacerbated in more affluent households by prevalence of electronic toys, television, and computer facilities that produce "virtual nature" on demand.

It is also made worse by lifestyle choices in American households. Fear of harm to their children leads many parents to keep children indoors even when parks, vacant lots, or agricultural land is nearby. Organized programs from sports to music to other group activities fill the time of children and parents alike. The net result is that today's American children have less time to explore, wander, wonder, and try to sort out the unexplained mysteries of nature.

Curing nature deficit disorder is an immediate, commonsense need if our culture is to survive. It will take a major effort to change values and lifestyles. That is an area where land care professionals have an obvious role.

The theme of this month's *Rangelands* is "Youth." In this issue we find papers by young people and listings of awards others have earned. Let us celebrate them. But let us also realize that they are the exception, the living examples of what we would like our youth to be. All around them are children who will never feel the excitement of watching a bird egg hatch.

Our responsibility, to paraphrase John F. Kennedy, is to, "Ask not what our youth can do for us, but what we can do for our youth." And what we can do for them includes helping our youngsters learn the interconnectedness of the world around them. Our audience is made up of young professionals in natural resource jobs, those in training for a job, school kids, and children not yet in school, and their parents as well.

It has been decades since I have seen as much concern among land care professionals as I see today. The baby-boom foresters, wildlife people, soil scientists, and range managers are reaching retirement age. After years of service, they are asking, almost desperately, who will replace them. Many of the new hires in the last decade have been specialists lacking in-depth ecological, geological, and economic training traditional for land care professions.

Some employers are turning to experienced retirees for help. Don Nebeker, a range manager who retired as a forest supervisor, has been asked to organize a series of workshops and short courses for young employees. The need is not to teach administration or policy, but prepare people on the job to do practical things in the field and with the public.

The lack of practical experience and skills among young employees offers SRM a chance to have an immediate and lasting impact on the land. We have people with lots of experience. We have a professional range certification program. It is mainly input oriented, that is, one gets points by attending, not performing. We need specific certification exercises that are output oriented for specific jobs. Credit would depend on satisfactory completion of supervised field work leading to land care objectives. SRM people would make ideal mentors and referees.

There is a shortage of university students taking curricula that equip them to fill jobs being vacated by the retirees. Many universities abandoned traditional land care curricula and replaced them with generalist science or environmental degrees. SRM has a program to accredit universities. The Range Management Education Council meets regularly. SRM, with representatives from forestry, soils, and wildlife societies, has a responsibility to get university administrators and faculties back on track educating people for our professions. We should use accreditation and other tools we have to demand that universities turn out the people needed for the land.

Incoming university students lack the outdoor or "farm boy" skills of previous generations. Schoolchildren in K–12 are having extracurricular activities reduced through funding deficits and mandated program testing. Most SRM sections have range camps to help fill the gap, but they serve only a limited number of students. Imagine the impact if 3,000 of our SRM members each adopted a classroom.

Land care professionals have special qualifications for adopting classrooms. They are educated in ecological processes. They have experience working with complex systems of agencies and users. They have connections to landowners, resource managers, town councils, etc. who could make field sites available. And they know how to make silk purses out of sows' ears.

One of the most successful "nature" demonstrations I have seen occurred when a flash thunderstorm destroyed the carefully planned booth and associated displays at a county fairground. Weeks of work lay scattered. A biology teacher, a range manager, and a soil scientist each waded into a water puddle. With pre-school-age children they caught water bugs, tadpoles, and frogs. They laughed and examined life in the puddle. Some mothers were not happy with the muddy clothes and smudged faces, but both children and teachers enjoyed what nature offered.

There are many opportunities for range people to treat nature deficit disorder. And giving to youth will ultimately make our profession stronger. Youth at any age needs the inspiration and guidance of proven professionals. Rex Peiper recently reflected on the people who helped him become one of our SRM stalwarts. He was quoted in the New Mexico Section newsletter, "Mentoring is an obligation, and we still need people to fill that obligation."

Ask not what youth can do for our profession; ask what our profession can do for youth. Our survival depends on getting youngsters of all ages involved with natural interactions in a vacant lot, on a farm, in a forest, or out on the range. We can teach many things in our own backyard. If we do not suffer little children to experience nature, we can never have competent people in future land care jobs. But if each SRM member seeks a way that she or he can mentor a young person, both our land and our profession will prosper.

William's dead butterfly could not be helped by power stored in batteries. The power to change butterflies or the world lies in us. We have the power. We are the power to prevent our kids from being the last ones left in the woods. We can see that every public office is filled by someone dedicated to building sustainable natural systems. We can take time to dig in soil with little children. We have the power.

Thad Box, thadbox@comcast.net

Fourteenth in a Series: Insight From SRM's Charter Members

The SRM History Committee has conducted interviews with many of the Society's charter members to capture their perspective of events leading to and subsequent to the formation of the American Society of Range Management in 1947–1948. Interviews from several of these individuals will be shared for today's SRM members to enjoy and learn from.

SRM Charter Member – Rudy J. Pederson

Editor's Note: Rudy Pederson lives at 2702 Rio Grande, San Angelo, TX 76901. Rudy submitted his written responses to the interview questions to History Committee member Henry Pearson. Committee member Tom Bedell edited them and trusts they accurately reflect Rudy's perspectives.

Rudy was born in December 1917 on a farm in Teton County, Montana. He was valedictorian at Virginia City High School in May 1935 and went on to the University of Montana at Missoula, graduating there with a BS in Forestry and Range Management in June 1939. He spent summers working on national forests. Rudy became interested in rangeland in 1935 when working on a ranch in the Ruby River valley in Montana. He participated in a cattle roundup on a national forest. He worked for 50 cents a day plus board and room. The local sheriff advised him that if he wanted to make money he should study business. He knew he didn't need much money so he decided to study range management and forestry, which he liked. Rudy says that the sheriff was right; he didn't make a lot of money but he enjoyed his work.

Rudy worked for the Soil Conservation Service (SCS, US Department of Agriculture) from June 1939 to 1974 with the exception of 3 years in the US Navy, 1943–1946, with service both in the Atlantic and Pacific. His work was primarily as a range specialist with the SCS developing technical guides, assisting ranchers, and training people. All of his SCS service was in Texas with the exception of his first 4 months in 1939 on a land utilization project in Montana. Rudy was State Range Conservationist for Texas from 1957 to 1974 and retired from civil service then.

He worked for the Texas A&M international program from 1976 to 1980 in Tanzania, Africa, and Jamaica. From 1981 to the present time Rudy has been retired on a small ranch stocked with blackbuck antelope.

Bill Allred, SCS Regional Range Conservationist, asked Rudy if he wanted to "hit a good lick" for range management in 1947 and join the fledgling American Society of Range Management. Six dollars, Rudy thinks, was the dues. The Texas Section was started a little later. Rudy says that Texas A&M was active in its formation.

Rudy did not participate in the first meeting at Salt Lake City in 1948 but did work at the meeting in San Antonio the next year. His expectations were that the Society would help keep him abreast of new developments and provide reports on what others were doing and learning as well as summaries of research results. These expectations were well met. Also, he wanted to meet and visit with other rangemen.

Rudy was President of the Texas Section in 1954. The Excellence in Grazing Management award was started that year. He served on a few national committees. He helped start the plant judging contests and awards. One of the first judging contests was held in 1947. The first place award—a free appendicitis operation! That got into the newspapers and the number of plant judging contests increased greatly. Rudy received the Outstanding Rangeman award from the Texas Section in 1980.

Rudy conveys to young people that interest in plants and natural plant communities can be a lifetime interest. One can always be near and see plant communities and they can be companions through life.

SRM Charter Member – Lowell K. Halls

Editor's Note: Lowell Halls lives at 2720 Dogwood, Nacogdoches, TX 75965. He graciously composed this in response to the charter member format.

I was born May 7, 1918, in Monticello, Utah, and graduated from Monticello High School in 1936. I attended Utah State Agricultural College before World War II.

In April 1941 I was conscripted into the Armed Services at Fort Douglas, Utah. During World War II, I began military service in the Field Artillery and was transferred to the Army Air Force in January 1943. I graduated as a Bombardier, Second Lieutenant in March 1944. I received further training at Colorado Springs, Colorado, and then was assigned to the 8th Air Force in Europe. I completed 30 missions as lead Bombardier, receiving the Air Medal and 3 Oak Leaf Clusters. I then served 21 years in the Air Force Reserve, retiring as a Lieutenant Colonel.

In September 8, 1945, I walked out of the Fort Logan Separation Center in Denver, Colorado, with honorable discharge papers from the United States Air Force and a basket full of money in my pockets. I had absolutely no idea of what I was going to do next. I wasn't particularly anxious to go to work so I finally decided to take the bus to Fort Collins, Colorado, and look over the Colorado State Agricultural College campus (Colorado State University) with the possibility of going back to school. I sauntered into the Forestry Building, visited with Clint Wasser, Professor of Range Management, and tentatively arranged to enroll in school the fall semester. I had saved up some money, and with the GI bill I had no financial worries.

My next few years at Fort Collins were extremely pleasant and productive. I definitely made up my mind to major in Range Management. Finally, I had a goal. The professors were friendly and helpful. They were more like friends than a distant scholar or an ivory tower. The classes were interesting and informative. I easily passed all courses with an A or B and was elected to Xi Sigma Pi, an honorary forestry fraternity.

Those were exciting years. The attitude of the students was exceptionally good. There were no groups of dissenters. We were all thankful to be alive and have a chance to learn a profession. We wanted to have a good time, yet we didn't neglect our studies. The war had matured us and we had an aim in life. Everything was in our favor and we took advantage of it. To a large extent, I believe the whole nation shared in this feeling. These were the good old days insofar as national pride and initiative were concerned.

My studies at Texas A&M University were also informative and enjoyable. Faculty and students were most friendly. My major professor was Dr Vernon A. Young, a native of my hometown, Monticello, and whose brother and family were my childhood neighbors. Dr and Mrs Young took a special interest in me and accorded me many courtesies and help, even to loaning me their family car to conduct fieldwork on my thesis.

My career with the US Forest Service began in June 1946 when I received a temporary summer assignment as a range crew member on the Pike National Forest with field headquarters at the Manitou Experimental Forest in Colorado.

In June 15, 1949, I began work as a Range Conservationist with the Southern Forest Experiment Station, US Forest Service, with headquarters at the Georgia Coastal Plain Experiment Station in Tifton, Georgia. My main job was to find out how to grow cattle among the longleaf–slash pine forests of the southern Coastal Plain. Field research was conducted mainly at the Alapaha Experimental Forest in cooperation with Dr Glenn Burton and Byron L. Southwell. The research was quite interesting and we devised a pretty good routine for managing the cattle and their forage on land devoted primarily to timber production. We were never entirely successful, however, in selling the idea to landowners. They either wanted to grow timber or cattle but not a combination of the two on the same land. In April 1957, I was transferred to the Southern Forest Experiment Station in New Orleans, Louisiana, as an assistant to the chief (Dr Robert S. Campbell) in the Division of Range Management and Watershed Management Research. Phillip Briegleb was the station director.

In early 1961 the Station decided to strengthen and expand the research program in wildlife habitat and to establish a project for that specific purpose in Nacogdoches, Texas. Dr Campbell asked me to screen interested candidates for project leader and to give him a recommendation by late summer. In September I politely told him I was the best available candidate.

This was sort of a crossroad in my professional career. I had to decide whether to continue in a staff position and live in a big city with emphasis on administration or get back into field research and live in the country. It didn't take me long to decide and on December 3, 1961, I transferred to Nacogdoches to fill the newly created position of Project Leader for Wildlife Habitat Research in the Southern Forest Experiment Station. It was a decision and move I have never regretted.

The unit's mission was to devise systems for integrated production of wildlife and timber. My major research efforts were directed towards finding how to grow food and cover for white-tailed deer in shortleaf–loblolly pine–hardwood forests. Field tests were concentrated at the Stephen F. Austin Experimental Forest near Nacogdoches. Minor investigations were conducted at the Sylamore Experimental Forest on the Ozark National Forest in Arkansas; at the Kisatchie National Forest in Louisiana; at the Desoto National Forest near Hattiesburg, Mississippi; at Brewton, Alabama; and at the Jacinto Experimental Forest near Huntsville, Texas.

As an extracurricular activity from 1965 to 1977, I taught a course in Wildlife Habitat Management at the School of Forestry, Stephen F. Austin State University.

Professionally, I was associated with the Society of American Foresters, the Texas Forestry Association, the Society for Range Management, The Wildlife Society, and the Texas Outdoor Writer's Association.

Honors include the following: Texas Forestry Association Award of Merit, Texas Chapter of The Wildlife Society Service Award, The Wildlife Society Publication Award, and the C. W. Watson and Southeastern Conservationist Award for Outstanding contributions to Fish and Wildlife Management.

I was a charter member of the Society for Range Management and served as Secretary, Vice chairman, and Chairman of the Southern Section 1955–1957, Book Review Editor of *Journal of Range Management*, November 1958–May 1962, and Associate Editor for *Journal of Range Management*, March 1972–January 1975. I served as Secretary and Chairman of the Range Management Division for the Society of American Foresters, 1957–1958, and as Associate Editor for the *Southern Journal of Applied Forestry*, August 1979–August 1986. I also served on the board of directors for the Texas Section of The Wildlife Society.

I thoroughly enjoyed my work in wildlife habitat research. The general subject fascinated me, especially since it fit right in line with my favorite hobby, hunting. It enabled me to spend many enjoyable hours in the woods and gain a better perspective and appreciation for natural laws, and for the role that animals and plants play in the welfare of our society. The people I worked with, and for, were additional pleasures that contributed to a satisfying experience.

SRM Charter Member – Harold F. Heady

Editor's Note: Harold F. Heady lives at Grande Ronde Retirement and Assisted Living Home, Apt. 321, La Grande, OR 97850.

Dr. Harold Heady has been interviewed numerous times in one form or another. ***Rangelands*** *25(6):58–59, February 2003, contains an article by Kindra Gordon,* ***Rangelands*** *Managing Editor. For excellent historic information, consult* ***A History of the Society for Range Management 1948 to 1985****, pages 1–5, on the formation of the Society, which documents Dr. Heady's role in that endeavor. In addition, Dr. Heady appears on videotape as a past president (1980) and as one of the charter members interviewed in Spokane in 1992 (tapes are at the Society headquarters office). An article on Dr. Heady also appears in* ***Parade of Presidents*** *(page 23), which was prepared for the 50th anniversary SRM annual meeting in February 1997 at Rapid City. Consequently, this statement will only be to "fill in the blanks" using the charter interview format utilized by the SRM History Committee.*

In 1947–1948, Dr. Heady was on the range faculty of Texas A&M University at College Station, Texas. He had moved there after having been on the faculty at Montana State College. He received a BS from the University of Idaho in 1938 in Forestry (major in Range Management), an MS from Syracuse University in 1940 in Botany, and a PhD from the University of Nebraska in 1949 in Plant Ecology.

The following are Dr. Heady's statements:

"My career has been centered on university teaching. I began as a lab assistant in a course on wood identification at the University of Idaho, spring of 1938 of my senior year in the School of Forestry as a major in Range Management. Next was a half-time lab assistantship in botany and half-time studies in ecology for an MS in the New York State College of Forestry, Syracuse; followed by 6 months as a range technician in the SCS in southern Washington; then teaching for a semester back in New York; and in 1942 until 1947 as Assistant Professor for Range at Montana State College, Bozeman. From there it was Associate Professor at Texas A&M; and 1951 to retirement in 1984 at University of California, Berkeley (UCB). During the latter part of that time I was a Dean for 3 years followed by Associate Director of the California Agricultural Experiment Station that included the title of Assistant Vice-President of the University System.

"There were many leaves from UCB for overseas assignments in 20-some countries. I put together the International Congress on Range Management in 1978 and was its first President. I was elected Honorary Member of the Grassland Society of Southern Africa and have held memberships in Rangeland Societies as well in East Africa, Australia, and India.

"I led the formation of the Texas Section and was its first President. Later in California I was elected to the Section Board and was President for a year. In 2001, the California Section presented me with the Range Manager of the Year award."

Dr. Heady was the first Secretary–Treasurer of the American Society of Range Management in 1948. He served as President of the Society for Range Management in 1980.

Tom Bedell is a member and former chairman of the SRM History Committee and a member of the Pacific Northwest Section living in Philomath, Oregon, tbedell@peak.org.

Jeff Mosley

Browsing the Literature

This section reviews new publications available about the art and science of rangeland management. Personal copies of these publications can be obtained by contacting the respective publishers or senior authors (addresses shown in parentheses). Suggestions are welcomed and encouraged for items to include in future issues of *Browsing the Literature*. Contact Jeff Mosley, jmosley@montana.edu.

Animal Ecology

Lizard abundance in an exurban southwestern savanna, and the possible importance of roadrunner predation. B. W. Audsley, C. E. Bock, Z. F. Jones, J. H. Bock, and H. M. Smith. 2006. *American Midland Naturalist* 155:395–401. (C. Bock, Department of Ecology and Evolutionary Biology, University of Colorado, Boulder, CO 80309). In southeastern Arizona, roadrunners were more common in grazed areas within low-density exurban housing developments than in undeveloped sites. Some species of lizards were scarce in developed areas, especially where homeowners kept livestock, but overall lizard abundance was unaffected by livestock grazing or development.

Nesting ecology of lesser prairie-chickens in sand sagebrush prairie of southwestern Kansas. J. C. Pitman, C. A. Hagen, B. E. Jamison, R. J. Robel, T. M. Loughin, and R. D. Applegate. 2006. *Wilson Journal of Ornithology* 118:23–35. (Kansas Department of Wildlife and Parks, PO Box 1525, Emporia, KS 66801). The primary cause of nest failure was predation by coyotes and gopher snakes.

Thermal balance of cattle grazing winter range: model application. E. N. Keren and B. E. Olson. 2006. *Journal of Animal Science* 84:1238–1247. (B. Olson, Department of Animal and Range Sciences, Montana State University, Bozeman, MT 59717). Behaviors such as lying and orientation to the sun enabled beef cows to mitigate the effects of extreme winter weather. Failure to account for these behaviors will likely overestimate energy requirements of cattle acclimated to winter range.

Visibility and vigilance: behavior and population ecology of Uinta ground squirrels (*Spermophilus armatus*) in different habitats. M. J. Hannon, S. H. Jenkins, R. L. Crabtree, and A. K. Swanson. 2006. *Journal of Mammalogy* 87:287–295. (Yellowstone Ecological Research Center, 2048 Analysis Drive, Suite B, Bozeman, MT 59718). Shrub cover makes it more difficult for ground squirrels to detect predators, but shrub cover also makes it more difficult for predators to detect ground squirrels. Ground squirrels can adapt to more or less shrub cover as long as grasses are sufficiently abundant to provide fattening seeds for forage.

Grazing Management

Differences among beef sire breeds and relationships between terrain use and performance when daughters graze foothill rangelands as cows. H. C. VanWagoner, D. W. Bailey, D. D. Kress, D. C. Anderson, and K. C. Davis. 2006. *Applied Animal Behaviour Science* 97:105–121. (D. Bailey, Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003). In northern Montana, cows sired by bulls from breeds devel-

oped in mountainous terrain appeared to use rugged topography more completely than cows sired by bulls from breeds developed in more gentle terrain. Also, cows from dams that used steeper slopes and grazed farther from water displayed similar behavior when compared with cows from dams that typically grazed gentle terrain near water.

Nutrient content and in situ disappearance in genotypes of buffelgrass (*Cenchrus ciliaris* L.). R. Morales-Rodriguez, R. G. Ramirez, G. J. Garcia-Dessommes, and H. Gonzalez-Rodriguez. 2006. *Journal of Applied Animal Research* 29:17–22. (Department of Alimentos, University Autonoma Nuevo Leon, Apartado Postal 142, Suc F, Cd University, San Nicolas de los Garza 66450, Mexico). Evaluated 78 genotypes of buffelgrass and identified 5 genotypes that provide superior nutritive quality for grazing cattle.

Plant–Animal Interactions

Effect of plant litter on seed predation in three prairie types. A. W. Reed, G. A. Kaufman, and D. W. Kaufman. 2006. *American Midland Naturalist* 155:278–285. (Museum of Natural History, University of Kansas, 1345 Jayhawk Blvd, Lawrence, KS 66045). Plant litter in prairie grasslands inhibits seed removal by rodents, but not by ants.

Plant Ecology

Defoliation effects on arbuscular mycorrhizae and plant growth of two native bunchgrasses and an invasive forb. S. Z. Walling and C. A. Zabinski. 2006. *Applied Soil Ecology* 32:111–117. (C. Zabinski, Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, MT 59717). Spotted knapweed growth rate recovered faster after clipping than either bluebunch wheatgrass or Idaho fescue.

Nutrient availability does not explain invasion and dominance of a mixed grass prairie by the exotic forb *Centaurea diffusa* Lam. K. D. LeJeune, K. N. Suding, and T. R. Seastedt. 2006. *Applied Soil Ecology* 32:98–110. (Stratus Consulting, Inc, 1881 9th St, Suite 201, Boulder, CO 80302). Diffuse knapweed requires reduced competition to invade grasslands. Also, heterogeneity in plant cover, generally believed to enhance species coexistence and biological diversity, provides increased opportunity for diffuse knapweed invasion.

Oxalate contributes to the resistance of *Gaillardia grandiflora* and *Lupinus sericeus* to a phytotoxin produced by *Centaurea maculosa*. T. L. Weir, H. P. Bais, V. J. Stull, R. M. Callaway, G. C. Thelen, W. M. Ridenour, S. Bhamidi, F. R. Stermitz, and J. M. Vivanco. 2006. *Planta* 223:785–795. (J. Vivanco, Department of Horticulture and Landscape Architecture, Colorado State University, Fort Collins, CO 80523). Roots of lupine and blanketflower excrete oxalate, which negates the allelopathic effects of catechin secreted by spotted knapweed. Root-secreted oxalate helps lupine, blanketflower, and surrounding plants to better compete with spotted knapweed.

The invasive forb, *Centaurea maculosa*, increases phosphorus availability in Montana grasslands. A. S. Thorpe, V. Archer, and T. H. DeLuca. 2006. *Applied Soil Ecology* 32:118–122. (Division of Biological Sciences, University of Montana, Missoula, MT 59812). Spotted knapweed appears to have the ability to increase the availability of phosphorus in some soils which, in turn, benefits spotted knapweed growth.

Virus infection and grazing exert counteracting influences on survivorship of native bunchgrass seedlings competing with invasive exotics. C. M. Malmstrom, C. J. Stoner, S. Brandenburg, and L. A. Newton. 2006. *Journal of Ecology* 94:264–275. (Department of Plant Biology, Michigan State University, East Lansing, MI 48824). In California, clipping seedlings of native bunchgrasses (purple needlegrass and big squirreltail) increased their rate of survival.

Yellow starthistle continues its spread in California. M. J. Pitcairn, S. Schoenig, R. Yacoub, and J. Gendron. 2006. *California Agriculture* 60(2):83–90. (California Department of Food and Agriculture, 1220 N St, Sacramento, CA 95814). Most yellow starthistle infestations currently occur in northern California, but future invasions and spread are predicted in the coastal region of southern California. Between 1985 and 2002, yellow starthistle infestations increased in all regions of California except the interior Great Basin and the desert regions.

Rehabilitation/Restoration

2006–2007 Weed management handbook for Montana, Utah, and Wyoming. S. A. Dewey, S. F. Enloe, F. Menalled, S. D. Miller, R. E. Whitesides, L. Johnson, W. E. Dyer, M. A. Ferrell, and R. Richards. 2006. Montana, Utah, and Wyoming Cooperative Extension Services at Bozeman, Montana; Logan, Utah; and Laramie, Wyoming. ($15; Publications, Montana State University Extension Service, P.O. Box 172040, Bozeman, MT 59717 or http://uwadmnweb.uwyo.edu/UWCES/WeedManagementHandbook.asp). Up-to-date reference of herbicide recommendations for controlling weeds on rangeland, cropland, riparian areas, and right-of-ways in Montana, Utah, and Wyoming.

Changes in non-target arthropod populations following application of liquid bait formulations of insecticides for control of rangeland grasshoppers. D. I. Smith, J. A. Lockwood, A. V. Latchininsky, and D. E. Legg. 2006. *International Journal of Pest Management* 52:125–139. (J. Lockwood, Department of Renewable Resources, University of Wyoming, Laramie, WY 82071). All treatments effectively reduced grasshopper densities on native rangeland in Wyoming without significant effects on nontarget insects, spiders, etc.

Experimentally induced colony expansion by black-tailed prairie dogs (*Cynomys ludovicianus)* and implications for conservation. S. Milne-Laux and R. A. Sweitzer. 2006. *Journal of Mammalogy* 87:296–303. (Department of Biological, Geological and Environmental Sciences, Cleveland State University, Cleveland, OH 44115). In North Dakota grassland, a combination of controlled burns and mechanical brush removal enhanced habitat for black-tailed prairie dogs.

Fuel breaks affect nonnative species abundance in California plant communities. K. E. Merriam, J. E. Keeley, and J. L. Beyers. 2006. *Ecological Applications* 16:515–527. (US Forest Service, PO Box 11500, Quincy, CA 95971). Fuel breaks can provide sites for weed establishment and invasion into adjacent areas. Fuel break construction and maintenance should minimize exposure of bare ground.

Habitat edge, land management, and rates of brood parasitism in tallgrass prairie. M. A. Patten, E. Shochat, D. L. Reinking, D. H. Wolfe, and S. K. Sherrod. 2006. *Ecological Applications* 16:687–695. (Sutton Avian Research Center, University of Oklahoma, PO Box 2007, Bartlesville, OK 74005). Brood parasitism of grassland birds was highest near tree cover and in areas burned in spring and subsequently grazed by cattle. Removing trees and shrubs from tallgrass prairie, less frequent burning in spring, or lower cattle grazing intensities may decrease brood parasitism.

Henslow's sparrow winter-survival estimates and response to prescribed burning. B. S. Thatcher, D. G. Krementz, and M. S. Woodrey. 2006. *Journal of Wildlife Management* 70:198–206. (Department of Forestry, Fisheries and Wildlife, University of Tennessee, Knoxville, TN 37996). In coastal pine savannas of Mississippi, winter habitat for Henslow's sparrows will be improved by prescribed burning of a large percentage of savannas each year.

Weed control in forage legumes. L. J. Wrage and D. L. Deneke. 2006. South Dakota State University Extension Fact Sheet FS 525L. (http://agbiopubs.sdstate.edu/articles/FS525L.pdf). This 12-page guide provides herbicide recommendations for controlling weeds in new and established stands of forage legumes.

Socioeconomics

Nature needs us. W. E. Howard. 2006. Xlibrus Corporation, Philadelphia, PA. (ISBN 1-4134-9628-8 softcover or 1-4134-9628-6 hardcover). This 271-page nontechnical book presents an in-depth analysis of the reasons why nature cannot manage most human-modified environments alone. The book stimulates readers to explore their personal convictions about what is ethically right or wrong as humans decide which animals should live and how the others should die.

Soils

Soil lichen and moss cover and species richness can be highly dynamic: the effects of invasion by the annual exotic grass *Bromus tectorum*, precipitation, and temperature on biological soil crusts in SE Utah. J. Belnap, S. L. Phillips, and T. Troxler. 2006. *Applied Soil Ecology* 32:63–76. (Southwest Biological Sciences Center, 2290 South Resource Blvd, Moab, UT 84532). Cover of both lichens and mosses can increase dramatically over short time periods in response to weather conditions (eg, air temperatures).

Soil response to long-term grazing in the northern Great Plains of North America. M. A. Liebig, J. R. Gross, S. L. Kronberg, J. D. Hanson, A. B. Frank, and R. L. Phillips. 2006. *Agriculture, Ecosystems and Environment* 115:270–276. (USDA-ARS, Northern Great Plains Research Lab, PO Box 459, Mandan, ND 58554). After more than 70 years of cattle grazing in spring–summer–fall, soils did not differ much between heavily and moderately grazed sites. Fall application of nitrogen fertilizer decreased soil pH and cation exchange capacity and increased nitrous oxide emissions.

The role of the native soil community in the invasion ecology of spotted (*Centaurea maculosa* auct. Non Lam.) and diffuse (*Centaurea diffusa* Lam.) knapweed. P. J. Meiman, E. F. Redente, and M. W. Paschke. 2006. *Applied Soil Ecology* 32:77–88. (University of Wyoming, PO Box 470, Lander, WY 82520). Native rangeland soils benefited spotted knapweed growth more than they benefited bluebunch wheatgrass or diffuse knapweed.

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HIGHLIGHTS

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Spatial Variation in Remnant Grasses After a Grassland-to-Shrubland State Change: Implications for Restoration

Debra P. C. Peters, Isabella Mariotto, Kris M. Havstad, and Leigh W. Murray

Historical desert grasslands now dominated by woody shrubs are resistant to restoration efforts. We examined the potential for black grama recovery by remnant plants in a degraded area as a function of plant location. High spatial variation in the occurrence and basal area of black grama plants was related to water availability rather than livestock grazing: most plants were found in or adjacent to an arroyo (67%), at a northern aspect (47%), and outside experimental exclosures (43%). These remnant plants can be used as propagule sources in restoration efforts, and information on microsite conditions can be used to improve restoration potential for similar sites.

Individual Animal Selection Has the Potential to Improve Uniformity of Grazing on Foothill Rangeland

Derek W. Bailey, Harv C. VanWagoner, and Robin Weinmeister

Livestock distribution is a critical issue for sustainable grazing management of rugged rangelands. Grazing patterns of cattle previously observed at higher elevations and areas farther from water (hill climbers) were compared to cattle observed on gentle terrain near water (bottom dwellers) in separate, but similar, foothill pastures. Hill climbers used rougher topography than bottom dwellers, especially during the first 2 to 4 weeks of the 6-week grazing periods, which resulted in higher stubble heights near ephemeral and perennial streams in pastures grazed by hill climbers. Selection has the potential to increase uniformity of cattle grazing in foothill rangeland.

Spatio-Temporal Constraints on Moose Habitat and Carrying Capacity in Coastal Alaska: Vegetation Succession and Climate

Thomas R. Stephenson, Victor Van Ballenberghe, James M. Peek, and James G. MacCracken

We used a geographic information system and a Markov chain analysis to model vegetation succession on the Copper River Delta, Alaska, relative to moose (*Alces alces*) habitat availability and nutritional carrying capacity. A decline in glacier-related disturbance has reduced early successional communities in the outwash plain. Successional modeling suggests a decline in the availability of tall willow communities that provide winter forage; they are being replaced by Sitka spruce (*Picea sitchensis*) forest in the glacial outwash plain. Consequently, nutritional carrying capacity of moose on the outwash plain during winter will decline by 42% during 1959–2013.

Consequences of Ignoring Geologic Variation in Evaluating Grazing Impacts

Jonathan W. Long and Alvin L. Medina

Natural variation can confound evaluations of grazing impacts within geologically diverse landscapes. We tested the robustness of a previous study from the White Mountains of Arizona that had attributed diminished trout biomass to livestock grazing and has been repeatedly cited in debates about grazing management. Incorporating geology as an explanatory variable in that study's exploratory analyses suggested that geologic variation induced an illusory correlation that undermined the study's findings. Ignoring geologic variation can mislead conservation policies by wrongly implicating land uses, inflating expectations for inherently less-favorable habitats, and diverting attention from inherently favorable habitats.

Effect of Fire on Microarthropods in New Zealand Indigenous Grassland

Barbara I. P. Barratt, Peter A. Tozer, Robin L. Wiedemer, Colin M. Ferguson, and Peter D. Johnstone

Native grassland land managers are uncertain about the impact of fire at different times of year on microarthropods, a

major component of the invertebrate fauna. We measured the abundance of Collembola and mites before and at intervals up to 2 years after spring and autumn fires at 2 indigenous grassland sites. The results demonstrated initial substantial reductions in population density of most groups after fire, then rapid recovery of some, which was not strongly influenced by season of the fire. These data will assist in decision support for both grazing and conservation land managers who want to maintain the ecological integrity of indigenous grasslands.

Can Abundant Summer Precipitation Counter Losses in Herbage Production Caused by Spring Drought?

R. K. Heitschmidt and L. T. Vermeire

Drought is an inherent trait of most rangelands and managers must know the impact of seasonal rain on the quantity and quality of herbage. Substantial herbage production can be expected in the Northern Great Plains during summer when precipitation is well above average because of the growth of blue grama (*Bouteloua gracilis*). Production following a spring drought and wet summer was only about 50% of that attained in a normal (ie, wet spring, dry summer) year. Although these rangelands can respond favorably to summer precipitation, the low probability of receiving substantial summer precipitation ensures that levels of ecological and economic risk remain high.

Grazing Effects on Snow Accumulation on Rough Fescue Grasslands

Walter D. Willms and David S. Chanasyk

Heavy grazing pressure can impair the ability of grasslands to capture and retain snow and leads to increased aridity. We conducted a study in the rough fescue grasslands to determine the effect of grazing pressure on snow accumulation and its relationship with selected meteorological variables. Snow accumulation was reduced with increased grazing pressure, which influenced the effect of average daily temperatures, average daily maximum temperatures, and snowfall on snow accumulation. Grazing can be managed to retain the necessary vegetation properties of a functioning watershed while avoiding overgrazing that destroys those properties and increases aridity.

Fragmentation Effects on Soil Aggregate Stability in a Patchy Arid Grassland

Brandon T. Bestelmeyer, Judy P. Ward, Jeffrey E. Herrick, and Arlene J. Tugel

Soil aggregate stability (AS) has been promoted as a primary indicator of soil surface function and a key metric in state-and-transition models. We measured variation in AS across vegetated–bare patch boundaries. Average AS was highest in grass patches adjacent to small to medium-sized (0.5–1.5 m) bare patches and was low in grass patches adjacent to large (>3 m) bare patches. AS of bare ground was also lowest when bare patches were large and formed an interconnected matrix. Careful attention to pattern within states and stratification is important, and simple classifications of strata may not be sufficient to document variation in soil function.

Removing Adult Overstory Trees Stimulates Growth and Transpiration of Conspecific Juvenile Trees

Georgianne W. Moore and M. Keith Owens

Recently, juniper removal has been advocated as a regional water conservation tool. In this study, we investigated whether juvenile trees released from an overstory canopy after clearing exhibited accelerated growth and water consumption. Released plants grew faster and used more water than other juvenile trees. Our evidence suggests released plants have better access to water, because predawn leaf water potential was significantly more favorable for released plants. Although adult canopy removal temporarily reduced leaf area of juniper, we demonstrated that released juveniles partially compensated for the reduced overstory by increasing rates of water use and growth.

Near-Ground Remote Sensing of Green Area Index on the Shortgrass Prairie

Agnieszka Przeszlowska, Milton J. Trlica, and Mark A. Weltz

Traditional methods for measuring canopy structure variables such as biomass and leaf area index are often destructive, labor intensive, and restricted to small areas. We evaluated several near-ground remote sensing methods (spectral indices, digital camera imagery, laser point frame) as reliable and cost-efficient alternatives to the standard leaf area meter method for measuring green area index (GAI) on the shortgrass prairie. The index of reflectance in the 0.63–0.69-µm range obtained with a portable multispectral radiometer was the most cost-efficient and best estimator of GAI. This technique may be an efficient ground-truth alternative to satellite remote sensing of rangelands such as the shortgrass prairie.

Using Light Attenuation to Estimate Leafy Spurge Impacts on Forage Production

Matthew J. Rinella and Roger L. Sheley

Rangeland managers often must decide whether or not to suppress dicotyledonous weed populations with expensive and time-consuming management strategies. Currently, intuition and guesswork are used to determine whether or not weed impacts are severe enough to warrant action. In this paper, we explore a rapidly measured attribute that is highly correlated with weed (ie, leafy spurge [*Euphorbia esula* L.]) abundance. After measuring light attenuation in plots plant-

ed to leafy spurge and grasses, we developed a probabilistic model that predicts leafy spurge impacts on forage production. We conclude that the model successfully accounts for spatial and temporal variation.

Comparison of Comparative Yield and Stubble Height for Estimating Herbage Standing Crop in Annual Rangelands

Melvin R. George, Sheila J. Barry, Stephanie R. Larson, Neil K. McDougald, Theresa A. Ward, John M. Harper, Dennis M. Dudley, Roger S. Ingram, and Emilio A. Laca

We compared calibration equations for estimating herbage standing crop (HSC) from comparative yield (CY) rank or stubble height (SH) to determine which technique, or combination of techniques, provides the best estimate of standing crop. We also investigated whether there is a seasonal effect on either technique, and if botanical composition influences the prediction. The results of this study indicate that CY is a slightly better predictor of HSC than is SH. Addition of SH to CY did not improve the prediction of HSC. Although predicted HSC from CY in summer was weaker than models for winter, early spring, and late spring, the CY method can be used with confidence throughout the year.

BOOK REVIEW

Ghosts of the Guadalupes: A Factual History of Agriculture, Families and Violence Between 1905 and 1955 in Southern New Mexico. By Jerry R. Cox. 2005. Action Printing, 2407 82nd Street, Lubbock, TX, 79423. 528 p. US $75 plus tax in New Mexico, and shipping; hardcover. Autographed copies available directly from the author, Jerry R. Cox, 1603 West Riverside Drive, Carlsbad, NM 88220 (Phone 505-887-8835). ISBN 0-9773008-0-3.

We all have impressions or ideas of what the early pioneers went through to settle the West. We have seen it all in movies and on television. Is what we have seen and thought really true? In *Ghosts of the Guadalupes* we see what occurred in a relatively small section of New Mexico on what might be called the second "Old West." Jerry Cox has selected an area in southern New Mexico on what was designated as the Guadalupe Ranger District for the period of 1905 through 1955.

The author started with a small metal box of 3 × 5 index cards that contained ownership and grazing records for the US Forest Service Guadalupe Ranger District. He then looked at old newspapers and court cases and sought out descendants of the original residents for interviews. From this he developed a "look-in-time" of what the early settlers went through and how they survived. The book goes through each of the 22 allotments on the Ranger District. Using a unique style, the author has placed a factual history on the left-hand side of each page. On the right-hand side of the page are stories from newspaper accounts, eyewitness accounts, and descendant recollections of happenings during the period. They are stories of the everyday events and of murders, depressions, drought, flooding, bank closures, bank robberies, and declining livestock markets. This takes up over 450 pages of the book.

The next section is titled "Vegetation Changes." The author has used paired comparative photos from 2 different times to show how the vegetation of the area has changed from a grassland with few trees to a landscape where various trees are the dominant vegetative feature.

The last major section covers the "Livestock Populations." He documents how the numbers of livestock have declined by over 90% in some areas over the past 60 years. He ends with a section of "Observations" where he provides some personal thoughts as to what the future holds for the area.

Throughout the book are a large number of photographs depicting the early settlers living in the area. These photos, from many sources including relatives of the settlers, provide a lasting impression of the people. These people were not like the ones we see in the movies or on TV. They were a group of hard-working people that only wanted to stay alive and maybe be able to leave a little something to their descendants. They are the type of people that settled much of the West. They provided the background of our Western heritage. Dr Cox has brought the "good old days" to life in all their glory and sadness.

This is a must-read book for history buffs.

Gary Frasier, Editor-in-Chief *Rangelands.* ◆