Rangelands

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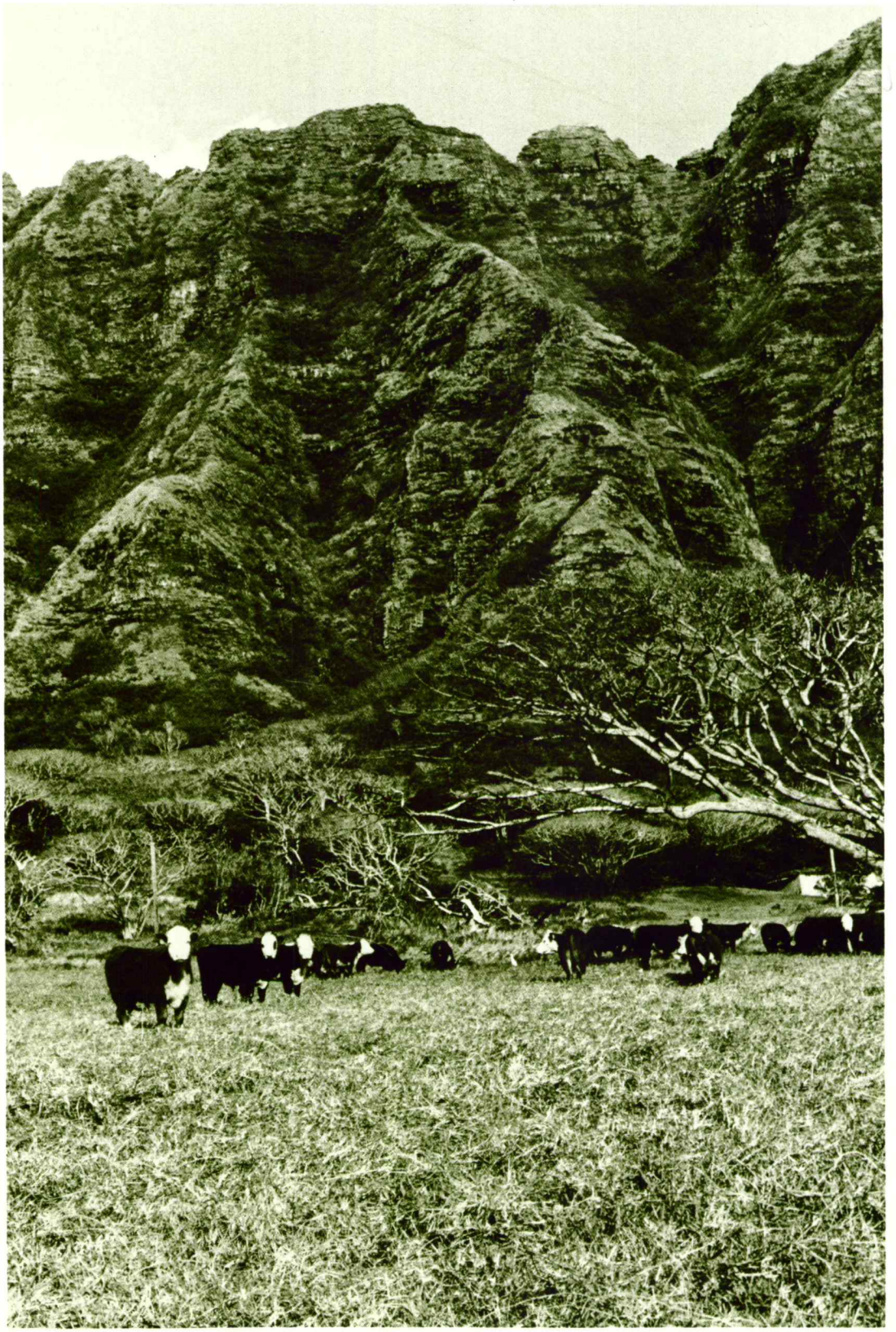
Richard M. Hansen



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Because the last names on the alphabetical list of range consultants were overlooked in preparing the last issue of *Rangelands*, we are publishing the entire list at this time. Our apologies for this oversight and inconvenience.

Glenn R. Adams
20383 Rae Road
Bend, OR 97702

E. William Anderson
1509 Hemlock
Lake Oswego, OR 97034

John L. Artz
Natural Resource Unit
Room 5925 South Building
Reno, NV 89557

Rodney Baumberger
Box 206D Pine View Star Rte.
Sturgis, SD 57785

Thomas E. Bedell
Ext. Rangeland Res. Specialist
Oregon State University
Corvallis, OR 97331

Thadis W. Box
College of Natural Resources
Utah State University
Logan, UT 84322

Ralph S. Cole
1645 32nd Street
Rapid City, SD 57701

C. Wayne Cook
Dept. of Range Science
Colorado State University
Ft. Collins, CO 80523

Donald D. Dwyer
Range Science Department
UMC 52
Utah State University
Logan, UT 84322

Marion Everhart
6341 North 82nd Way
Scottsdale, AZ 85253

Neil C. Frischknecht
1345 Cherry Lane
Provo, UT 84604

Dillard Gates
3514 NW McKinley Dr.
Corvallis, OR 97330

Grant Harris
NE 1615 Upper Drive
Pullman, WA 99163

Donald Hyder
1008 East Elizabeth
Ft. Collins, CO 80524

James L. Kramer
2519 Springfield
Bismarck, ND 58501

Walter Lindley
Box 795
Silver City, NM 88061

James A. Linebaugh
4290 Gander Lane
Carson City, NV 89701

Robert W. Lodge
2 Dunn Place
Regina, Saskatchewan
Canada S4S 4J4

Niels Leroy Martin
P.O. Box 589
Mancos, CO 81328

S. Clark Martin
4402 East 6th St.
Tucson, AZ 85711

Lamar R. Mason
6884 S. 800 East
Midvale, UT 84047

John L. McLain
340 North Minnesota
Carson City, NV 89701

Jeff Powell
Dept. of Range Science
University Station
Box 3354
Laramie, WY 82071

James Preston
P.O. Box 394
Homer, AK 99603

C.E. Shannon
P.O. Box 1176
Sonora, TX 76950

Jon M. Skovlin
Rt. 2, Box 2315
La Grande, OR 97850

Ronald E. Sosebee
Dept. of Range Mgmt & Wldlfe
Texas Tech University
Lubbock, TX 79409

Paul Tueller
Renewable Resource Center
University of Nevada
Reno, NV 89507

Robert E. Williams
30 Creek Drive
Winding Creek Village
Millsboro, DE 19966

Joseph Wirak
2915 Central Ave.
Great Falls, MT 59781

John Workman
Dept. of Range Science
Utah State University
Logan, UT 84322

Lewis Yarlett
808 N.W. 39th Drive
Gainesville, FL 32605

SOCIETY FOR RANGE MANAGEMENT

President
GERALD THOMAS
Drawer 3BC
University Park Branch
Las Cruces, New Mexico 88001

First Vice President
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Range Science Dept.
Texas A&M Univ.
College Station, Texas 77843

Second Vice President
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Executive Secretary
PETER V. JACKSON III
Society for Range Management
2760 West Fifth Ave.
Denver, Colo. 80204
(303) 571-0174

Directors
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DONALD JOHNSON
Universidad de Sonora
Toledano 15
Villa Satelite
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ALASTAIR McLEAN
3015 Ord Rd.
Kamloops, B.C.
Canada V28-8A0

1982-1984
THOMAS E. BEDELL
Ext. Rangeland Res. Spec.
OSU
Corvallis, Oregon 97331

DON D. DWYER
Range Science Dept. UMC 52
Utah State University
Logan, Utah 84322

1983-85
PAT O. CURRIE
Livestock and Range Research Station
Miles City, Montana

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Faith, South Dakota

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—to develop an understanding of range ecosystems and of the principles applicable to the management of range resources;

—to assist all who work with range resources to keep abreast of new findings and techniques in the science and art of range management;

—to improve the effectiveness of range management to obtain from range resources the products and values necessary for man's welfare;

—to create a public appreciation of the economic and social benefits to be obtained from the range environment;

—to promote professional development of its members.

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Managing Editor
PETER V. JACKSON III
2760 West Fifth Ave.
Denver, Colo. 80204

Technical Editor
DANNY FREEMAN
316 Whitney
Prescott, Ariz. 86301
(602) 445-0565

Production Editor
PAT SMITH
2760 West Fifth Ave.
Denver, Colo. 80204

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Cattle grazing on the Kualoa Ranch at the foot of the Koolau Range rising 2400 feet above the cattle. (Island of Oahu) SCS photo by George Love

Livestock in the Land of Aloha

Burt Smith, George Love, and Earl Spence

"When dawn came and we could see clearly, we tightened our saddle-girths, adjusted our lariats, deadened the jingle of our spurs, mounted and stole quietly along the edge of the plain towards the cattle, and then, as soon as they discovered us and began to start for cover, there was a wild rush, and each able rider roped his bullock before the wild creature had plunged back into the forest, or down a deep valley-side." The above, written by a settler on Oahu, near the famed Waikiki Beach, in the early 1840's is a partial description of day-to-day activities in an area the world knows best for its beaches, sparkling blue water, swaying palms, and the hula.

The State of Hawaii stretches some 1,525 miles across the Mid-Pacific ocean and comprises a land area of 6,425 square miles. Eight major islands make up 99% of the State's land area with the balance scattered among 124 islands, reefs and shoals. The Big Island, Hawaii, is larger than all of the rest of the islands together, 4,038 square miles, and is the focus of the State's beef cattle industry. The other islands listed in declining order of beef cattle numbers are: Maui, Kauai, Molokai, Oahu, Niihau, Lanai, and Kahoolawa. In spite of the fact that the major islands all lie within the Tropic of Cancer, the climate is predominantly sub-tropical along the coast. The ocean, whose temperature fluctuates from 74 to 80° F, acts as a giant thermostat and the northeasterly tradewinds keep the temperatures from soaring to the highs that the latitude would suggest. Occasional winter storms, Kona winds, disrupt the trades and allow temperatures to climb into the 90's, but soon the trades are back with their moderating effect. The highest temperature recorded is 100° F (Honolulu) and the lowest is 9° F, at the summit of Mauna Kea; elevation 13,796 ft. Four of the major islands have mountains that are above 4,000 ft., and on the Big Island skiing is a regular winter sport. The mountains of Hawaii are placed in better perspective when it is remembered that their bases lie 13,000 feet below the surface of the ocean.

The authors are: Extension specialist in pasture and livestock management, Univ. of Hawaii Cooperative Extension Service, P.O. Box 237, Kamuela, Hawaii 97643; resource conservationist, Soil Conservation Service, P.O. Box 50004, Honolulu, Hawaii 96850; Agronomist, Parker Ranch, P.O. Box 458, Kameula, Hawaii 96743.

THE RAINFALL OVER THE OCEAN averages 25 inches per year; however, parts of the Islands may receive over 15 times this amount and others a third or less. The cause of this extreme variability are the mountains which force the moist tradewinds over them. The belt of maximum rainfall lies not at sea level, but at elevations between 1,500 and 3,000 ft. The difference in rainfall can vary dramatically over relatively short distances. For example, Waikiki Beach receives a yearly average of some 20 inches; the University of Hawaii at Manoa, three miles inland, close to 40 inches; and three miles

*Relic Koa tree (*Acacia koa*), on Parker Ranch, elevation 5500 ft, near the Waimean plateau, Kamuela, Hawaii.*

farther up the canyon, over 90 inches. On the leeward sides of the Islands, the trades having dropped their moisture on the windward sides, act similarly to the dry Santa Anna winds of Southern California, sucking up moisture and turning the lee areas into a desert. The winter Kona storms, which originate south of the Island chain, are generally the only precipitation that these areas receive. Rainfall can be very intense during Kona storms, and it is not unusual to receive over half the yearly average in an hour or less. Convective showers, during the summer months are another source of moisture, primarily on the Big Island. They are erratic, though often quite severe.

The tradewinds blow about 90% of the time in the summer and 50% of the time in the winter. When the trades are absent, the winds are usually from the south and result in typically tropical-type weather; however, this situation only lasts a week or so. In the Kohala mountains, on the northern end of the Big Island, the average yearly wind speed is 27 mph. Gusts of 40 to 50 mph are common and over 70 not unusual for this part of the Island. The wind coupled to temperature and moisture, often causes the effective temperature to dip into the low 30's, even though the ambient air temperature registers in the 60's. Wind stress of both plants and animals is common, resulting in lower digestibilities of the forage, while requiring higher energy intakes by the grazing animal.

The short difference in day length from summer to winter, 2 1/2 hours, also contributes to problems for both plants and animals. Plants that require a long day to flower, may fail to do so. Animals at the higher elevations often fail to shed their winter coats when summer arrives. On the plus side, seasonal breeding is almost eliminated.

The Islands are all volcanic in origin. The Pacific plate, as it drifts towards Japan, passes over a localized "Hot Spot" of the earth's mantel, which in turn causes volcanic activity over the "Hot Spot." As the plate moves northeast, about 10 cm per year, the volcanic activity decreases as it gets further from its energy source, eventually becoming dormant, then extinct. As time goes on, the unrelenting forces of the ocean and climatic erosion prevail and the once proud volcano is reduced to a coral atoll or shoal. The Islands are relatively young, geologically speaking. The northernmost large island, Kauai, is 4.5 million years old, while the southernmost island, Hawaii, is still forming. Two hundred acres of new land have been added to the island of Hawaii during the last 11 years as a result of lava flows. Further south, sea mounts are forming which eventually will produce new islands.

IN SPITE OF THE STATE'S YOUTHFUL AGE, all 10 orders of the USDA's soil classification series are represented. Soil pH runs from quite acid on the wetter windward sides to quite alkaline on the lee sides. Because of the high porosity of the volcanic rock and soils, water is only plentiful on the windward sides. Ground water is almost nonexistent on the lee sides, except at low elevations and then brackish. Further confounding the environment is the recent discovery that Hawaii is receiving acid rain, the source of which is believed to lie many thousands of miles away.

For all of the above reasons, plus a few more, Hawaii has the most diverse environments of any State in the Union. Every major life zone, except Arctic, is represented in the State; often only a mile or so apart. This unique feature poses numerous management problems for most of the major ranches in the State. On the island of Hawaii, the Parker Ranch, one of the largest individually owned ranches in the United States, runs cattle from the tropical and sub-tropical coast to elevations of 8,000 feet where temperate grasses prevail; variation in rainfall is from well over 100 inches to less than 8 inches a year. Drought is always a problem somewhere in the State. The high porosity of most of the soils, coupled to high transpiration losses due to high incident solar radiation and winds, makes even a short break in rainfall cause for concern.

In 1777 there was not one cow, sheep, horse or goat anywhere in the area that is now the State of Hawaii. In fact, the only land mammals in the Islands were a small light weight pig, Poi Dogs (eating type), Polynesian rat, Hory bat, and Hawaiians. All this was destined to change abruptly and dramatically. Goats were introduced to some of the Islands by Captain James Cook, who rediscovered them in 1778; the Islands were initially discovered and colonized by the Polynesians around 400 AD. In two voyages, 1792 and 1793, Captain George Vancouver landed 7 cows, 1 heifer, 2 bull calves, and 1 bull on the Big Island. These animals were for the most part black longhorns, believed to be of the line that the Mexicans used for their bull-bear contest. The animals were obtained from what is now British Columbia and Monterey, Calif. In addition to the 11 longhorns, 7 rams, 9 ewes, and some goats were also presented to the ruling monarch, King Kamehameha. The King placed a kapu (taboo) against the killing of these animals, which were subsequently turned loose upon the unsuspecting vegetation. By 1830, the number of anmals on the Big Island alone was estimated to be 20,000 cattle, 3,000 sheep, 1,200 horses (introduced in 1803) and numerous goats. Not a bad increase by any standard; but then they were in paradise, no natural predators and few parasites, mosquitoes didn't even arrive until 1828.

The naturalist Nelson, who accompanied Cook, surveyed the Big Island and recorded some 19 species of grass present and established. Later authorities estimated that there were perhaps 65 species present at the time of rediscovery; today, there are over 450 and still counting. Numerous native legumes were also present such as the Koa *(Acacia koa)* and Mamane *(Sophora chrysophylla),* seedlings of which were relished by the introduced livestock. The native and endemic vegetation was ill prepared for the livestock invasion and even less for the secondary invasion of introduced plants and insects. So great has been the impact of the exotic species that over 90% of the vegetational species found below 1,500 feet elevation are recent introductions; the native plants that are still holding out can be found only in relic or inaccessible areas. The vast majority of the plants that people see when they come to Hawaii were not here 200 years ago. The same can be said for the mammals, birds, reptiles, insects, and even the different races of Man.

THESE CHANGES DID NOT GO UNNOTICED. As early as 1856, noted naturalists, such as Dr. William Hillerbrand and others, were warning of the continued attack against the native vegetation by both man and beast. They saw the mass removal of the forest for commercial exploitation, and the failure to reseed, caused by indiscriminate grazing, as a major cause of the dramatic climatic changes that were occurring, particularly in the Waimea and Kawaihae regions of the Big Island. The Waimea plateau lies between Mauna Kea to the south, and the Kohala Mountains to the north, on the northern end of the big Island. Kawaihae, presently a harbor which handles most of the Island livestock shipping, is about 10 miles west, on the lee side, of old Waimea. Wai-

mea was renamed Kamuela some years back; however, the plateau still bears the old name. Kawaihae, when the forest still existed, used to be frequently hit by a strong destructive wind, known locally as Mumuku. Since the forest has been removed and replaced by grass, the Mumuku is a thing of the past.

Ever since rediscovery, the Islands have been consistently rocked by repeated waves of introduced species. Hawaiian Department of Agriculture estimates that 17 species of insects are introduced to the State annually; estimates of plant introductions are not available. Most introductions do not survive, but many find a wide open niche. Free from natural predator and other constraints, they rapidly naturalize and expand throughout their area of adaptation. Kikuyu grass *(Pennisetum clandestinum),* introduced in 1924 as an improved pasture grass, presently comprises over 70% of the range grass community in its area of adaptation. Fountain grass *(Pennisetum ruppelii)* introduced as an ornamental in 1926, escaped and now makes up the bulk of the vegetation on the drier side of the Big Island. Lantana *(Lantana camara)* and Christmas berry *(Schinus terebinthifolius),* also brought in as ornamentals, are now the 2 major brush problems found Statewide. The list goes on and on.

By 1815, the depredations of the wild herds of longhorns, introduced by Vancouver, forced the natives to build rock walls to protect their gardens and themselves. Some of the animals were particularly vicious and would attack humans without provocation. The first Hawaiian monarch, King Kamehameha, died in 1819 and in the early 1820's, King Liholiho commissioned the first bullock hunters in an effort to diminish the danger to the natives, as well as their gardens and to provide export material in the form of hides and tallow.

THE FIRST BULLOCK HUNTERS WERE an adventuresome and colorful lot, composed mostly of sailors that had jumped ship. Many went native and by the time the hide and tallow trade reached its peak in the late 1830's, all but a few had vanished from the scene. The early hunters worked the animals by foot, often with dogs and occasionally employing large bullock pits to trap the animals. In 1834 the Botanist David Douglas, of Douglas fir fame, met his death in one such pit, although the circumstances of his death may have been assisted by a person or persons unknown. The usual procedure for hunting was similar to that of any large animal; stealth followed by brisk musket fire. As might be expected, there were considerable casualties, as the animals were wont to charge anything that they dimly preceived as a danger. Although horses were available they were not used in the early days, due primarily to the lack of sufficient skill in horsemanship and the use of the lariat.

One of the sailors that did achieve prominence in Hawaiian affairs was John Palmer Parker. Arriving a destitute sailor in 1809, he was befriended by King Kamehameha and subsequently married a Hawaiian princess and settled down in North Kohala on the Big Island. His transformation from sailor to cattle baron went at a leisurely pace. He maintained firm roots with his family and farm in Kohala and never went to the excesses that eventually extinguished the other hunters of the era. Parker was no slouch as a hunter: one rifle which he retired from service, is claimed to have dispatched 1,200 beasts. By the late 1820's the transformation of the Waimean plateau from a forest of Mamane and Sandalwood (*Santalum* spp) to grassland was virtually complete. In spite of the hunters, the herds of wild cattle had increased immensely, and so had the demand for hide, tallow, and salt beef. During the 1830's Parker aligned himself with the trader William French and began acquiring wealth that would later translate into one of the largest ranches in the United States.

The increased demand for cattle products, especially salt beef for the whaling ships that had begun to use Hawaii as a port of call, prompted a search for a better method of harvesting the wild herds. In 1832 or 33, three Mexican vaqueros arrived on the Big Island, Juan, Jose, and Joaquin, to teach the natives the art of cattle handling. These were not the first Mexicans or Spaniards with cow savvy to appear on the Hawaiian scene; two others are worthy of comment. Don Francisco de Paula Marin was an early arrival to the Islands and at various times lived on the Big Island, Maui, and Oahu. He was a friend and confidant of King Kamehameha and acted for a while as a physician for the Royal Court. He was reputed to have had a herd of cattle in the early 1800's, used primarily for milking. The other was Joaquin Armas, who was wooed off his ship by King Kauikeaouli in 1831 to help catch wild cattle in the Waimean area in an effort to replenish the Royal coffers. There is considerable confusion regarding these two men, primarily due to the fact that they were both referred to as "The Spaniard." The Spanish influence on the Hawaiian cattle industry was immense, even to this day. It is interesting to speculate what might happened had those first cowboys been Texans rather than vaqueros.

THE THREE VAQUEROS ARRIVED WITH BRIGHTLY COLORED ponchos, split bottom pants with buttons down the seams, high boots armed with cat claw spurs, silver inlaid saddles and bridles, and the best trained cow horses the Hawaiians had ever seen. It wasn't long before the musket gave way to rawhide and hair ropes and the natives embraced the daring-do of the vaqueros as their own. The Hawaiian word for cowboy is paniolo and was derived from the pronunciation of Español, which the natives found difficult to say; it is in common usage today. With the introduction of Latin American cattle handling methods, equipment, dress, and cow savvy, Waimea took on the appearance of a Southwestern cow town, complete with tan-pits, blacksmith and saddle shops, and also the shoe or boot maker's trade. Horsemen became a common sight, captured cattle were domesticated, corrals and cattle pens erected, and the wild herds were so decimated that in 1840 the King issued a 4-year kapu against killing any animal for just the hide and tallow. The heyday of the wild cattle herds was over. Although, wild cattle continued to be a source of income, even to this day, their importance rapidly diminished in favor of domesticated herds. Man can not long tolerate a freedom so flagrantly displayed.

During the fifth decade of the 1800's the landholding system was changed from a feudal to an alodial basis in what was called the "Great Mahele." The King divided the land among himself, 23.9%; the Government, 36.2%; the Chiefs, 39.2%; and the common people, 0.7%. While it sounds a bit lopsided, the lands given to the commoners were the irrigated taro lands in the valley bottoms, by far the most valuable at the time. However, the natives were slow in grasping the full significance of land titles. Returns from lease or sale of the land were high and life in port towns, tempting. By 1896, 57% of the taxable lands were in the hands of non-Hawaiians: operators of sugar and rice plantations and cattle ranches.

With the advent of private ownership in fee simple, or long

Editor's Note: Figures 1 through 5 depict the cattle loading procedure that was used at Kawaihae harbor, on the Big Island of Hawaii, until 1949.

Today, the animals are loaded at the ranch in special container trailers, trucked to the harbor, and loaded directly on barges; travel time to Honolulu remains about the same. Shrink of the animals, from the ranch to Honolulu is around 13 percent; there is no reliable estimate of the shrink that occurred under the old method.

Fig. 1. *The animals to be shipped were trailed to the harbor and placed in a rock corral with an open side to the ocean. Paniolos then roped an animal and with assistance of another acting as hazer, led it into the harbor and swam it to an awaiting longboat. The horses used for this work were half blooded draft types, the saddles were made out of wood and iron.*

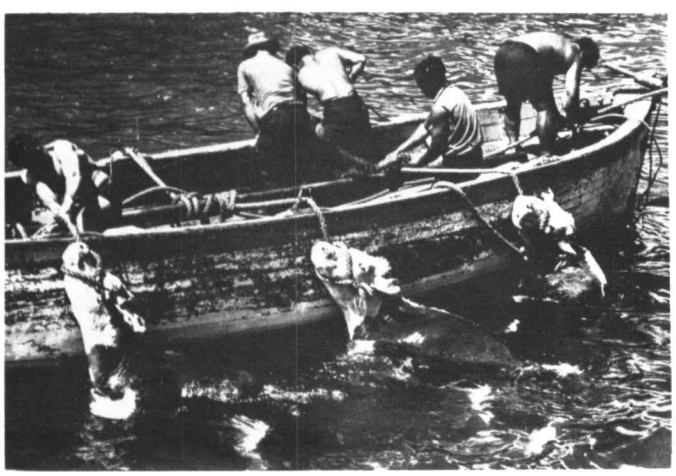


Fig. 2. *Upon reaching the longboat, a rope-halter was placed on the animal, the lariat removed and the end of the halter passed over the gunwale and secured to a wooden brace down the center of the longboat.*

Fig. 3. *With three animals secured to each side, a signal was given, and a donkey engine on the transport towed the longboat and its unwilling cargo to the ship.*

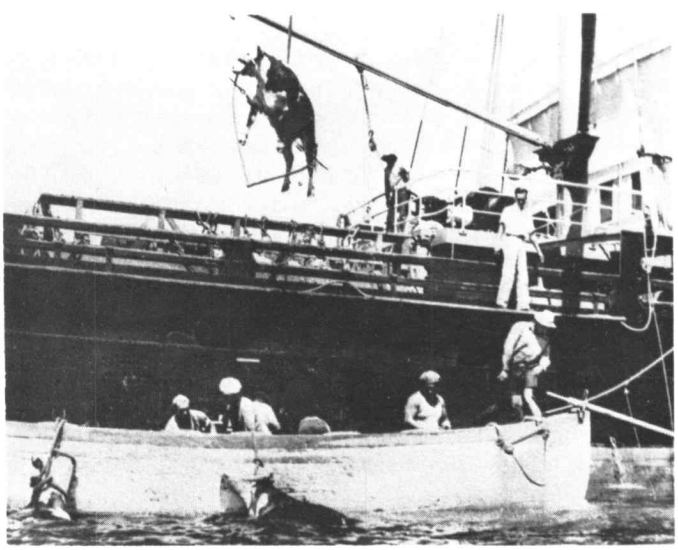


Fig. 4. *Upon reaching the transport, the longboats stood off a short distance, a sling was passed under the animal, attached to a boom and tackle and the animal hauled on board.*

term lease, cattle ranches sprang up throughout the Islands. The California gold camps increased the demand for fresh and salted beef, as did the increasingly growing market in Honolulu. The first blooded lines were brought to the Islands in 1850, a shorthorn and an angus bull. By 1900 there were 96,000 head of beef cattle and 102,000 sheep. Sheep raising became a serious enterprise in the 1850's and reached its peak in 1884 with over 122,000 head. The decline of wool prices in the 1940's removed the last of the large sheep operations from the picture. Presently, there are just a few thousand sheep, primarily on the island of Niihau, although two ranches have recently introduced sheep on a commercial scale.

ALONG WITH THE DEVELOPMENT OF commercial cattle operations came the apparent need or desire for improved forages. Hitchcock, in "The Grasses of Hawaii," 1922, lists 87 introduced grasses. Some of the notable introductions were rhodes grass, guinea grass, dallas grass, orchard, brome, and kentucky bluegrass; bermudagrass was also introduced

Fig. 5. *Once on board, the animals were tethered to the sides of the pen, until that pen was loaded; once loaded, the halters were removed. Transportation time to Honolulu was about 24 hours.*

prior to 1900, but was not noted by Hitchcock. A.W. Carter, manager of the Parker Ranch during much of the first half of this century, also introduced numerous legumes and grasses to the Big Island. Paniolos would be given a sack of seed and told to scatter it on bare areas, or where feral pigs had been rooting. The result of the deliberate introductions and escapes, is a potpourii of vegetation bearing little relationship to one another, or in many cases, what is assumed to be their natural habitat.

A.W. Carter, perhaps more than any other individual, was responsible for shaping the cattle industry during the first half of this century. One year after the United States annexed Hawaii in 1898, Carter assumed the guardianship of Thelma Parker, half owner of the Parker Ranch; he also took over the responsibility of managing the entire ranch. During his early stewardship, he not only bought the remaining interest in the ranch for his ward, but along with 6 other ranchers purchased the Metropolitan Meat Co. When Carter took over the management of Parker Ranch, Metropolitan was paying 10 cents per pound for beef and dictated when and how many cattle it would take. This was annoying, but it wasn't until they unilaterally dropped the price to 9 cents that Carter acted. Since Parker Ranch supplied most of the beef to Metropolitan, Carter simply announced that he was going to build his own slaughterhouse; a price was quickly agreed upon. A hard but fair man, he as much as John Palmer Parker was responsible for the ranch's success.

Presently, the State of Hawaii has about 80,000 beef cows, of which approximately 22,000 are on the Parker Ranch. There are about 800 ranches in the State, of which 400 have 20 head or more. Beef is the third largest source of agricultural income, behind sugar and pineapple. The industry faces numerous problems, the biggest of which is runaway land prices. Land that sold for 50 to 60 dollars an acre in the 1950's now commands upwards of $15,000 per acre. Developers are everywhere, and the unofficial State bird, the building crane, is ever present. Marketing of animals always has been, and continues to be a major problem, even though the industry supplies less than one third of the beef consumed in the State. Market price for weaners is mainland price, less the cost of getting them there. Conversely, most ranch equipment and supplies is mainland price plus transportation; a differential each way of around 25%. Most of the steers raised are sent to a feedyard in Honolulu, even though Hawaii does not produce any feed grains of its own; there is, however, a locally active "grass fat" market. And of course there is Australian and New Zealand beef, much of which gets dumped in Hawaii, since it is the closest port of call.

In general, ranch and rangeland management has not kept pace with mainland counterparts. Continuous grazing is the rule. Animals require 32 to 36 months to reach slaughter weights of 1,050 to 1,100 pounds for the grass fat market. Kikuyu grass has taken over most of the range, but management practices on many ranches are still geared to the temperate bunch grass ranges that are no longer in existence. The vaquero heritage is still strong in the local paniolos; the art of gentle persuasion has not made many converts. On the upbeat side, the local population is increasing, as is the demand for beef. Foreign markets appear promising. High energy and transportation cost have forced ranchers to take a hard look at their operations and many have started revamping their operations. Five ranches have put in Savory Grazing cells and numerous others are expected to follow suit in the near future. However, the most promising note is that the State is realizing that if it wants to maintain Hawaii as Hawaiian, certain steps will have to be taken to protect its unique agricultural and livestock industries from irresponsible development.

The Opportunities of Membership

Each of us has many *opportunities* during the year to share the many advantages of SRM membership with our friends and associates. Most of these people could benefit from Membership in SRM, but we pass up the *opportunity* to inform them of the many benefits of SRM membership.

Agency people have the *opportunity* to work with associates who are involved with the range resource and could gain from their SRM Membership. Those of us in industry and extension have many *opportunities* to inform ranchers of the economic benefits to be gained from SRM Membership. Those of us working with people in the reclamation area have many *opportunities* to inform people how they can gain the knowledge necessary to accomplish their work and inform them of the advantages they receive from their association with SRM and its members. Let's all take advantage of the many *opportunities* we have to acquaint others with the many benefits to be gained from SRM Membership. By doing this we can increase our *opportunity* to become acquainted with new people and new ideas that will help further the *opportunities* we each have to gain from our involvement in SRM.—**Art Armbrust,** SRM Membership Chairman.

Buck Island Ranch—a Family Affair

Linda Campbell-Kissock

We often hear that ranching is not just a business but a way of life. Buck Island Ranch in south-central Florida—operated by Dan and Anita Childs, their son Tom, and his wife Sarah—is truly a family affair. It is an efficient, professionally run operation, a fine example of the potential in Florida ranching.

High calving percentages and weaning weights and productive grassland resources are the results of the Childs' management ability. By understanding the requirements of cattle and forage, they are able to meet the needs of both.

Cooperators with the Highlands County Soil and Water Conservation District since 1968, the Childs have been leaders in the ranching community. Dan is a member of the Animal Health Committee of the National Cattlemen's Association, Tom is president of the Highlands County Cattlemen's Association, and Sarah is past-president of the Florida Cowbelles. The Childs have hosted numerous tours and several training sessions for personnel of the Soil Conservation Service (SCS).

Born in Los Angeles, Dan managed ranches in California, Nevada, and Colorado before moving to Florida in 1968. He has seen a cross section of American ranching—from the annual grasses of the California foothills near Ventura (24 in/yr average annual precipitation), to the desert browse and ephemeral forbs near Fallon, Nev., (4 in/yr), to sheep and cattle on shortgrass range at 8,000 ft. elevation near Alamosa, Colo., (8 in/yr), and, finally, to the cabbage palm prairies of central Florida (54 in/yr).

Before moving to Florida, Dan consulted a former classmate at California Polytechnic, Dr. T.J. Cunha, who at that time was head of the Animal Science Department at the University of Florida. Dr. Cunha advised Dan to choose a ranch in the subtropical zone (south of an imaginary line extending across the state between Vero Beach and Tampa), attempt to get a mixture of soil types (some organic, some sandy), locate near a water control canal to permit efficient water management, and choose a ranch with a combination of planted grasses and rangeland. Dan took his advice.

The subtropical climate brought new opportunities and challenges to the Childs. High potential stocking rates, a long growing season with mild winters, and potential for rapid forage growth and range improvement are important advantages for Florida cattlemen. But the humid climate also brought a set of new problems for the Childs.

"We are faced with continuous maintenance of canals and ditches to keep them free of choking water weeds," explains Dan. "Deterioration of fences is more of a problem here, and we have to continuously fight encroachment of cabbage palms on some of our pastures. Providing necessary lime and fertilizers to planted pastures and meeting seasonal nutritional needs through supplemental feeding are critical challenges. We also had to adjust to the somewhat less gentle disposition of crossbred cattle as opposed to straightbred Herefords".

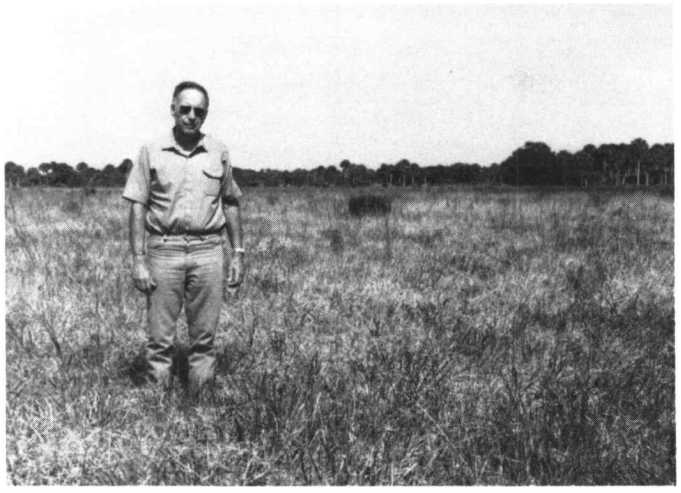
Cabbage palm, (Sabal palmetto), *is the state tree of Florida and is often used as ornamental plantings. The edible bud is cooked as a vegetable making delicious "swamp cabbage." Clumps of cabbage palms are a valuable source of shade and cover for livestock in open pastures and rangelands.*

The Childs' 10,300 acre ranch, all privately owned, consists of 7,100 acres of planted pastures and 3,200 acres of

Main water control ditch for irrigation of planted pasture.

The author is range conservationist, USDA Soil Conservation Service, Box 71, Huntsville, Texas 77340.

Editor's Note: In central Florida cabbage palm-oak hammocks exist in various sizes and shapes and are interspersed throughout the open rangelands. They are somewhat higher in elevation and appear as "islands" in the surrounding open rangelands. These wooded hammocks are prime areas for deer—hence, the name "Buck Island" comes from an old map of the ranch and when Childs bought the ranch he adopted the name.



Dan Childs in one of his rangeland pastures.

Dan Childs looks at marsh site. The erect-growing grass in the foreground is maidencane.

rangeland. Cattle graze the rangeland from December through March. Most of the calves are born during December and January, and Dan begins moving cow/calf pairs onto the planted pastures in March. By April cows and calves are grazing the lush, irrigated grasses and white dutch clover. Cow/calf pairs remain on planted pastures until mid-August, when calves are weaned and sold. Cows are put back on grass/clover pastures through November. The added nutrition of fertilized pastures enables the cows to begin winter in good condition. Fall grazing also further reduces grass accumulation so that the clover has adequate sunlight when warmth begins to return in February.

The rangeland pastures consist of freshwater marsh and slough range sites interspersed with cabbage palm/oak hammocks. Key grasses are maidencane and blue maidencane on marshes and sloughs, and beaked panicum,creeping bluestem, and chalky bluestem on somewhat drier sites. Rangeland pastures are in good and excellent condition and are stocked at 1 cow for each 2 acres during the December through March grazing period.

Introduced pasture grasses include pangola digitgrass; Argentine, Pensacola, and Paraquayan bahiagrasses; African stargrass; and Hemarthria grass. Many of the pastures have white dutch clover mixed with introduced grasses. Stocking rates on grass/clover pastures begin at 2 acres per cow-calf unit and increase to one acre per cow during summer.

Water management is a key to higher productivity on Buck Island Ranch. Four pumps pull water from a central canal to numerous irrigation and drainage ditches that crisscross the ranch. All planted pastures are irrigated by this open ditch seepage method. Water from the pumping locations flows by gravity through the ditch systems into the marshes and sloughs. Water control and discharge are through structures consisting of corrugated metal pipe and flashboard risers. Water management of this type is an advantage in south-central Florida, where rainfall is abundant but poorly distributed. Because the water holding capacity of sandy soils is poor, seepage irrigation maintains soil moisture within the root zone, thus increasing forage production.

Buck Island Ranch has a reputation for producing uniform, healthy crossbred calves. "We breed for a white-faced calf with 1/4 Brahman," says Dan. Crossbred cows are bred to performance-tested Hereford and Brangus bulls on a two-breed cross program. Brahman bulls are also used to maintain Zebu characteristics, necessary for performance under Florida conditions. Bulls are put with the herd from February 1 through June 1. Dan also manages a purebred Hereford herd, and many of his replacement bulls are ranch raised.

In 1981, weaning weights of steers from Hereford bulls averaged between 534 and 552 lb. Percentage calf crop averaged about 90. "Our goal has been to keep the calving percentage up. I believe it is better to give up some weight per calf than to have a poor calving percentage," explains Dan. "We like to have most of our calves born in early December. We find that early calving leads to higher calving percentages and weaning weights. Most of our calves are weaned at 7 1/2 months of age."

High rainfall and humidity, low fertility soils, and rapid leaching of nutrients all contribute to lower the quality of forages in Florida. "Providing proper nutrition is a key to achieving high animal performance on our ranch," says Dan. "We provide a 32% nonprotein nitrogen (urea) and molasses liquid supplement on rangeland pastures from December 1 through March, and a complete mineral mix free choice yearlong." Replacement heifers are bred to Hereford bulls at 2 years of age and are supplemented with preconditioning and liquid feeds.

The Childs' animal health program reflects a knowledgeable, thorough and practical approach. Cows are vaccinated against reproductive diseases before the breeding season, sprayed in June to control flies and wormed in spring and fall. They receive ownership and year brands. Calves are vaccinated, castrated, and dehorned, and heifers are ear-marked for easy identification. The 2S ranch brand is put on all calves. "We get repeat customers for our calves, and the 2S ranch brand helps them know where to come", explains Dan.

Repeat customers and a good reputation for producing quality calves are worthwhile goals for any Florida rancher. Their achievements are a tribute to the management ability and progressive attitudes of the Childs family.

A Different Sort of Sheep

Richard Reiner and Fred Bryant

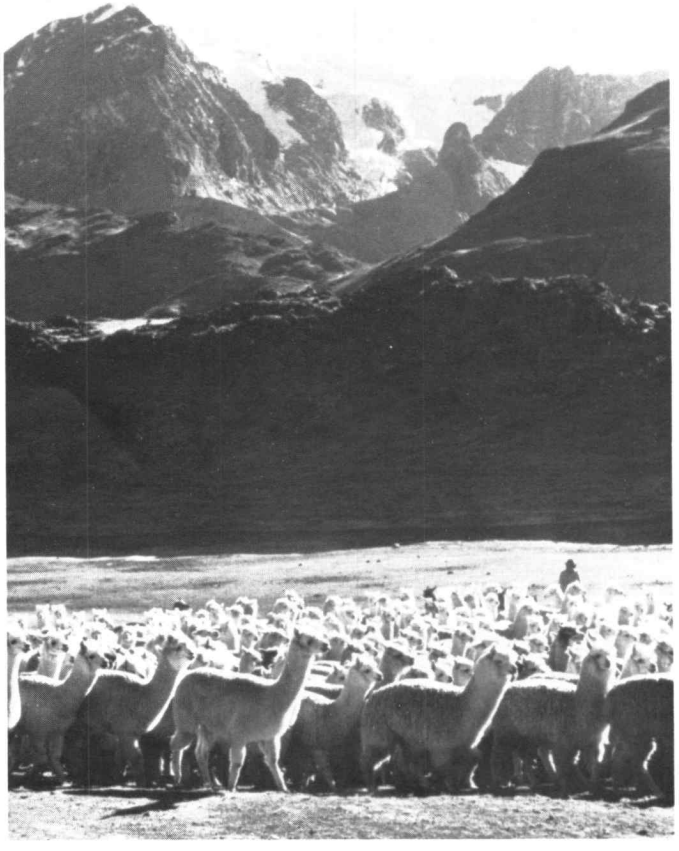
The morning frost is just beginning to melt from the yellowing grass tops. A lone Peruvian herder, bundled in wool, pushes his animals down a steep rocky trail. The animals have been pastured at 17,000 feet for the last 3 months. The rainy season begins soon and they must be driven to lower pastures near the village at 14,000 feet. At these extreme elevations, little cultivation of crops is possible, thus highland Indians depend primarily on a special breed of "sheep" for their livelihood.

The high mountain "sheep" of South America are a unique domestic breed. In fact, alpaca are not really sheep at all! They are members of the camel family, which consists of the genus *Lama* in the New World and the genus *Camelus* in Asia and North Africa. Alpacas, along with llamas (pronounced ya-ma), are the only domestic ungulates native to South America. They are grazed primarily in the high Andean mountain region of Peru and Boliva known as the "Cordillera."

Paleontological finds indicate the common origin of the South American Camelidae and their humped-back relatives was probably 16 million years ago in North America. During the late Pliocene, ancestors of the Dromedary and Bactrian camels migrated north and crossed the Bering land bridge to the Old World. With the coming of the Pleistocene ice age, North America lost its camels, yet the "Hemiauchenia", ancestor of today's genus *Lama,* escaped extinction when it migrated across the Panamanian isthmus into South America where relatives survive today. At present, all llamas and alpacas are domesticated, but the other members of *Lama,* the guanaco and the vicuna, still exist in isolated wild populations.

Selective breeding of alpacas and llamas by native South Americans may have occurred as early as 4,300 B.C. Certainly by 550 B.C. alpacas were being bred for wool production and alpaca textiles were transported from the mountains to the southern cost of Peru. The culturally advanced Inca empire (1,200-1,532 A.D.) relied extensively on the llama and alpaca for transportation of armies and goods, and for fiber production. Today nearly 2.5 million alpacas graze South American highlands.

There are two distinct breeds of alpaca: the "huacaya" and the "suri." Huacaya, the more common breed, has highly crimped wool similar to that found on Lincoln sheep. By comparison, suri wool is relatively straight with little crimp. Selective breeding favoring one breed over the other is rare,



Alpacas grazing at 14,000 feet in the Andean mountain region of Peru. (photo by Brad Wilcox).

although huacayas are more common, especially in colder climates. Huacayas may be better adapted to cold because in the suri breed, the fleece hangs from the body, thus exposing the back.

Both alpaca breeds are similar in size. The average height is about 39 inches at the withers with males (machos) weighing around 155 pounds; females (hembras) average 132 pounds. Alpacas, because of their small size, are never used as pack animals.

Alpaca Products

In 1980, over 3,400 metric tons of alpaca wool were produced in Peru. The wool is incredibly soft and fine, the normal range for adult wool being about 22 microns in diameter. In comparison, Lincoln sheep wool averages 35 microns in diameter. Wool colors range from black through beautiful intermediate shades of brown and rust to pure white. Diversity of natural colors and superb insolation make alpaca woolens world renowned.

Peru exports about 80% of its alpaca fiber. England, Italy, and West Germany are the major buyers. Traditionally, white wool has had higher market value because of its dyeing versatility. The average price for white alpaca wool in the 1980 Santa Lucia, Peru, market was 6 times that paid for sheep wool.

Along with the importance of alpaca wool production, a

The authors are with the Department of Range and Wildlife Management, Texas Tech University, Lubbock. Research in Peru is supported by the U.S. Agency for International Development, Title XII, Small Ruminant Collaborative Research Support Programs, under Grant DSAN/XII-G-0049.

Editor's Note: Many feel that international development is an important extension of the Society's interest. This article should add to that interest.

major food for highland Indians is alpaca meat. Around 10,000 metric tons of alpaca are consumed yearly in Peru. When cooked with alpine potatoes, the major Andean vegetable, alpaca makes a delicious and nutritious dish.

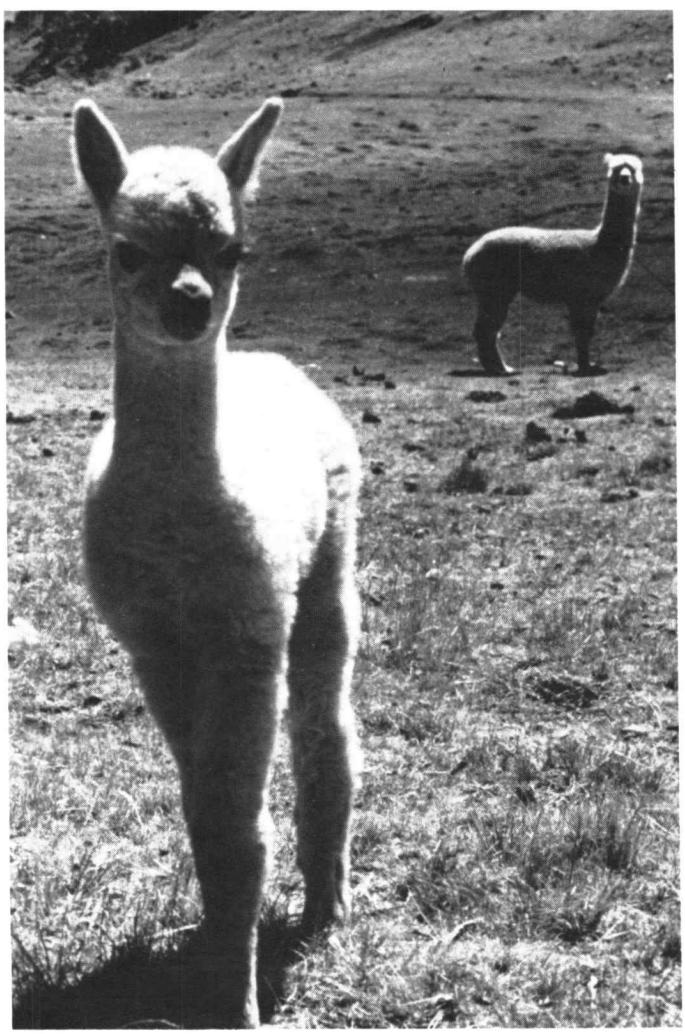
A third product of alpacas is "taquia," dried camelid dung. Since most of the alpacas and llamas range is treeless grassland, dung is an important fuel source for cooking and heating. The excrement is pellet-shaped and can be gathered efficiently because alpacas and llamas "thoughtfully" use common voiding places. With forced air, alpaca dung fires can even reach sufficient temperatures to forge metals.

Adaptations to High Altitudes

Animals living in alpine environments must be able to survive extreme conditions such as radical temperature fluctuations, low food quality, dehydration, and lower oxygen. It is not surprising that South American camels have adaptations for dealing with life nearly 3 miles above sea level.

Circulatory System

Low oxygen of high altitudes is thought to have brought about specialized adaptations within the circulatory system in alpacas. The red blood cells of all camels have unusually concentrated hemoglobin, are smaller in size, and are more elliptically shaped that those of other ungulates. This arrangement increases the surface to volume ratio of the cells, allowing for greater binding of oxygen. The blood of llamas was found to saturate with 30 percent more oxygen than that of man at high elevations. Packed with loads of over 75 pounds, a llama will untiringly climb steep alpine trials with surefootedness and grace.



Young "crias" are usually born in the early morning, after daybreak. The above are 10 days old. (Photo by Brad Wilcox).

Digestive System

Peruvian alpine forages such as *Calamagrostis vicunarum* and *Festuca rigescens* are generally poor in quality due to high lignin concentrations. Lignin, mostly a nondigestible substance, is an important component of a plant's defense against harmful ultraviolet radiation of high elevations. Animals grazing alpine pastures must be capable of processing coarse, heavily lignified material. Due to the distinct Andean "wet" and "dry" seasons, alpacas must cope with dry mature forage for over 6 months of the year.

Several studies indicate that alpacas are more efficient digestors of this type of vegetation than either sheep or cattle. A digestibility trial conducted with 3 sheep and 3 alpacas showed digestion coefficients of 29.7% and 36.3%, respectively, for animals eating *Scirpus* sp., a coarse aquatic sedge.

A number of studies describe morphological and physiological differences between camelids and other ungulates which may help explain why camelids appear to be superior digestors of forages. Alpacas are ruminants in the strict sense of the word, that is they chew a cud; however camels evolved separately from other ruminants and their stomach is not clearly divided into four separate compartments. Camels have only 3 major stomach compartments.

Further, the stomachs of camels appear to function similar to other ruminants except that in camels, the muscular contraction cycles of the stomachs "stir" digesta more frequently. Another significant difference is that the first stomach of camels is lined with specialized glandular pouches. The function of this lining has been suggested as a site for rapid absorption which could act to increase digestive efficiency.

It is believed that South American camels consume less forage per body weight than sheep or cattle. In a study where llamas and sheep were fed alfalfa ad libitum, llamas consumed 2.1 percent of their body weight per day and sheep consumed 4.3 percent. Lower consumption per body weight is likely related to slower passage of ingesta through the alimentary tract of alpacas. The average passage time for marked digesta through the gastrointestinal tract of alpacas in one study was 50.3 hours compared to 43.2 hours for sheep.

Reproductive Peculiarities

Alpacas are polygamous, but unlike sheep they are copulation-induced ovulators (as are rabbits and cats). This means that the female has no defined estrual cycles but will ovulate 24-36 hours after copulation. Females can give birth at any time of the year but breeding seasons are timed with the short "wet" season. Alpacas are well adapted to this wet season phenomenon with a gestation period of roughly 1 year (340-350 days). This enables births to occur when forage is green, nutritious, and plentiful.

Alpacas are not usually bred until they are 2 years old, although they are sexually receptive at 1 year. Breeding ratios are normally between 5-10 females per male. Following copulation and subsequent ovulation, estrus disappears

within 5 days. If fertilization does not occur, follicles again become active and estrus can be observed within 13 days. The absence of estrus is a diagnostic sign of fertilization.

Although alpacas have bi-chornate uteruses, 98% of all pregnancies are carried in the left uterine horn. There are no records of twins. As in humans, the placenta is diffuse and is expelled 2 or 3 hours after parturition. Unlike sheep, alpacas do not eat the after birth and seldom clean the embryonic sac off their young. The young (crias) are well developed and can walk shortly after birth. Mothers are not very attentive of their young but they will become aggressive when the young are interfered with. Like the Old World camel, her major weapon is to spit with great accuracy and velocity.

Amazingly, birth almost always occur in daylight hours! Sleepless nights our ranchers face with midnight calving or lambing is unheard of in the Andes of Peru. Even more incredible is that most crias are born in the morning rather than the afternoon and seldom during bad weather. Apparently, alpacas are able to delay the act of delivery under unfavorable conditions. Daylight parturition is likely an adaptation to avoid giving birth during the freezing nighttime temperatures of high altitude regions.

New Research

Up to this point, we have painted a fairly bright picture of truly unique wool-producing animals. Unfortunately, the highland Indian populations of South America are rapidly growing and are economically some of the poorest inhabitants of the continent. Alpacas, over much of their range, suffer from disease, impaired wool production, and low fertility. These conditions are commonly attributed to poor nutrition due to overgrazing and improper herd management.

Improving alpaca nutrition appears to be the key to improving animal production. Adequate nutrition must first be present before improvements in herd genetics or advanced disease control would have substantial effects. Surprisingly, range nutrition has been largely ignored in past research efforts.

In 1978, Texas Tech University, in cooperation with U.S. Agency for International Development and Peruvian universities, began a project to investigate ways of increasing alpaca production. An important phase begins in 1983 with an effort to collect information on the nutrition of free-ranging alpacas in Southern Peru. It is hoped that cooperation between North and South American scientists will improve production guidelines for this different sort of sheep.

SOCIETY FOR RANGE MANAGEMENT

yards now meters
academia rules
none of this
will help me
run my ranch

science is weak
not quantitative
still descriptive
after all these years
ranchers run the society

we need
to influence policy
become politically involved
we must
be scientists
analysts not advocates

we cannot agree
but the land
unites us

16 February 1983

CONVENTION PROGRAM

i search for me
among forage alternatives
promising range grasses
performance of range cows
a rangeland model
burning of sacchuista
and orange sneezeweed
do not reveal me
seasonal use of tobosa
stocking rate predictions
morphological considerations
of brush control
i am not there
i'm listed
on page seventeen
for opening remarks
in the Lisbon Room
i still can't find me
even though
i'm scheduled to perform
on Tuesday afternoon.

16 February 1983

REUNION

familiar faces
obscured by
beards
bags
wrinkles
glasses
name tags
print
I cannot read
memories
of dogma taught
trivia not trivial
I try to recall
events
people
places
things
I stare
at a man
they think I was
try to explain
who I think
I am
wonder when
where
or even if
we went astray.

16 February 1983

Editor's Note: We don't print much poetry in *Rangelands*, but I thought the three poems written by Thad Box, 1977 SRM president, while attending the 1983 meeting in Albuquerque, were worth consideration. Any comments from readers?

Grazing Land Stewardship—Our Performance and Our Image

John L. Merrill

Stewardship has several definitions, and, like beauty, as many interpretations and connotations as there are eyes of beholders. Synonyms of steward include director, manager, custodian, caretaker. Most definitions of stewardship include management or administration, and some include "of others' property." In the case of public lands or lands leased from private owners, that literally is true. Applied to both publicly and privately owned land, stewardship acknowledges taking care of land for future generations in the full realization that "you can't take it with you."

"Husbandry" is a good word, now fallen into disuse, that might well be revived. Its definitions include "the application of scientific principles to the cultivation of plants or the raising of livestock" and also "the careful management of resources; conservation."

It is in these positive contexts of stewardship and husbandry that I should like to pursue this discussion and in which I have tried to fulfill the two commandments my father added to Moses' ten: "Rear your family carefully and well, and leave your land better than you found it."

There are several logical steps that must occur in any constructive action process. If short-circuited, the results will vary from less than the best to total disaster. The process of improvement and good stewardship begins with *awareness.* We can be surrounded with needs, great and small, that remain uncorrected and often worsen until noticed, recognized, and identified. "Only that day dawns to which we are awake," someone said.

The second step is *concern,* for if no one cares, no action is taken. If concern is true and real enough, it will be followed by the acquisition of *knowledge,* facts and principles pertinent to the problem. The next step in progress is development of *understanding* and *judgment,* the ability to apply knowledge to practical problem solving. Without judgment and subsequent sound action, knowledge is only of abstract value.

The next logical step is *analysis of* all *alternatives* for meeting the need. We tease about persons whom we describe as "playing with a short deck," but anyone who fails to examine alternative courses of action is falling into that trap. Then comes *decision,* or selection of the most ecologically and economically sound alternative, placed in context of the situation with all needs and resources considered and *prioritized.* Violation or even infringement of ecologic and economic principles by ignorance or poor judgment means results will be less effective and/or more expensive. Failure to prioritize soundly equates to "majoring in the minors" or "fiddling while Rome burns," while greater needs go unmet.

Sound *planning* involves integrating and coordinating people, activities, and resources into reasonable time frames for accomplishment. Plans must be based on averages and assumptions, but good planning provides *flexibility* to accommodate variables, unforeseen events, and human foibles which cannot be predicted accurately but can be expected certainly.

These simple steps will avoid short-sighted activity by persons and organizations whose concern exceeds their knowledge, which has resulted in environmental degradation rather than the intended environmental protection. One quick example is barring control of feral horses and burros, which allowed proliferating populations to decimate fragile ranges that had supported healthy numbers on a continuing basis. More than one lifetime will be required to restore those ranges to their previous level of health and production.

Another example is developing permanent water sources in the Sahara region so that arid ranges, which had been grazed seasonally for generations due to the lack of water, could be grazed yearlong. Continuous grazing converted the grazing lands into desert. I say again that violation of ecologic and economic principles, whether from ignorance, neglect, or intent, yields numerous ill effects.

When soil and water conservation needs were first widely recognized and addressed in the early 1930's, the first impression and attempt was that federal government should plan and carry out the work. Almost immediately, it became obvious that even with abundant help from the Civilian Conservation Corps, the conservation job was too great for any or all levels of government to undertake successfully.

Much has been said of the greed of landowners, which led them to mine their lands without regard for basic capability and needs. Most degradation was the result of lack of knowledge, rather than greed. What father would want to bequeath his children rocks, gullies, and brush rather than fertile, productive land? Stewardship of grazing lands probably has lagged most and not only from lack of knowledge. Our European heritage values land that can be cultivated and gives it more attention than the "wasteland" not suitable for cultivation. Ranking a distant second have been the tame pastures developed on lands marginal for field crops. Dead last came the grazeable woodlands and forested range of the East and South, the prairies of the Plains, and the mountains, deserts and other grazing lands of the West.

Private landowners were anxious to conserve and improve their lands, but lacked the technical assistance to assess capability, needs, and alternatives for meeting them. The Soil Erosion Service, later the Soil Conservation Service, was established to provide the assistance on privately owned lands, consistent with Lincoln's philosophy that government should do for the people only that which needs to be done in

National Leaders Workshop-Grazing Lands and People, Denver, Colo., July 15, 1982. John Merrill is Director of the Texas Christian University Ranch Management Program.
Merrill is also a rancher and past president of SRM.

the public interest that the people cannot do for themselves.

Another historic step was taken in the late 30's and early 1940's. State after state enacted laws creating Soil and Water Conservation Districts made up of landowners and operators to encourage good stewardship of soil and water resources and assure that conservation planning and application would be accomplished at the most local level. Land owners worked with S.C.S. personnel on the ground to develop and apply technically and economically sound coordinated conservation plans based on careful inventories of soil capabilities and needs.

Working closely with District leaders, individual cooperators, and other agencies, the S.C.S. developed the new technology required and assembled a dedicated group of field technicians with minimum administrative personnel required to afford an efficient and effective delivery system. Through memoranda of understanding with other agencies, Soil and Water Conservation Districts could muster additional assistance, which is especially helpful in coordinated planning of ranch units that include associated public lands.

The Division of Agrostology was the first federal agency to approach grazing land management technically before the turn of the century. By the 1920's, the U.S. Forest Service was leading in range management. Since that time all the agencies have gained and shared grazing land technology freely. Research,extension, universities, and professional societies have performed vital functions in gaining knowledge and educating land managers and *other* professionals. The term "professional" absolutely should include land managers who have prepared themselves by learning and experience.

The partnership of land managers and technicians working together on both private and public lands produced dramatic conservation gains until the 70's, when born-again environmentalists discovered the world beyond city limits and clamored with more sound than sense for new legislation and regulation which strangled the conservation effort instead of expediting it. Most of these persons, in and out of government, ignored the working professionals and 40 years of preparation and progress to assert themselves as new leaders in reinventing a less workable wheel.

Funding for field personnel and activity was diverted to increasing layers of agency administration and central direction which have generated endless intramural activities, planning and paper work that in turn increased the unproductive work load on field people and decreased conservation on the ground. Astonishingly, the resulting decrease in conservation accomplished has caused the same people who caused it to call for more new programs and planning, claiming the old programs have not worked.

This is a watershed time of decision for land management and conservation. The choices are rather clear and really rather easy, based on historic evidence in the United States and elsewhere. Should government do the conservation work? It is physically and fiscally impossible. Should government tell farmers and ranchers what to do, when to do it, how it will be done and require them to do it? Who in government is so omnisciently wise to make those decisions well? Who will pay for it? Government cannot. If the producer pays for it, the government has seized authority without responsibility, which is immoral. Varying degrees of all of the above have been tried here and abroad with dismal failure. We are sending food from our system to support theirs. Will more regulation result in more conservation? It has not, will not, and cannot.

From Biblical times and before, there never has been a substitute for "the eye of the master fattens his cattle"—the persons who live on the land, love it, and learn to care for it to the best of their increasing ability for themselves and future generations. The system that works best is individual stewardship of the resident land manager, using his own knowledge, experience, and enlightened self interest with technical assistance available from qualified technicians of S.C.S. on private and state lands and Forest Service or B.L.M. on associated public lands. Soil and Water Conservation Districts are the best medium or channel for coordination, cooperation, and arm's length transaction among producers and agencies to assure a technically sound national program of conservation based on thousands of individual, most local, timely decisions and actions built from the grassroots up, not from Washington down, to attain the most conservation applied at least cost. There is a strong continuing role for federal agencies in providing technical assistance, because conservation concerns and technology do cross state lines, and a confusing and inefficient proliferation of new state agencies and funding not now in place would be required to replace them. The federal agencies in place, if cut severely in unproductive programs and administrative positions and returned to main mission priorities, have been and can be an efficient and effective technology delivery system to the land manager. This is one of the few legitimate functions of federal government.

The role of research, extension, universities, and professional organizations is greater than ever today in two facets. At one time the minister, school teachers, and county agent were the best educated people in town and automatically esteemed. It is not uncommon now that the technican who comes to advise the professional land manager (rancher or farmer) is less well prepared than the one he is to help. All of us on the land management team are limited everyday by our lack of knowledge and understanding, including all that is not yet known and all that is known that we do not know. We need new knowledge generated and disseminated more than ever to meet increasing needs for food and fiber and demands of sophistication and efficiency.

The second facet is in education of increasing numbers of the general public. One generation ago, most of the U.S. population was not more than one generation removed from rural life and an understanding of and appreciation for the production of food and fiber. I find urban citizens deeply interested in the people and resources that produce their food, but they are poorly informed. The lack of knowledge and understanding on the part of urban voters is extremely detrimental in legislation, funding, recognition, and appreciation for agriculture and natural resources.

With a nationwide communications network in place, Extension is the logical medium for two-way communication and motivation between consumers and producers and between researchers and producers with tremendous benefit to all concerned. New approaches must be devised, both to compete for attention with the high quality of television and other media and to make maximum use of them. I hope Extension at every level will seize these increased opportunities and responsibilites and fulfill them as a strong part of the agricultural and natural resource team.

Several times I have used the term "land manager", where some say "land user." There is a distinct difference. Land managers are those including owners, lessees, and permittees who come and stay year after year, have a definite stake

in continuing productivity, and must live with the consequences of their decisions and actions. Land users are those who come, use, and leave such as hunters, skiers, off road vehicle enthusiasts, and other recreationists. I hope in the future we will be careful to distinguish between land managers, who are stewards, and users, who are not.

Will nonprofessional environmentalists learn and understand before they speak and wreak havoc? Will producers accept and fulfill their role as good stewards and true environmentalists, benefit by the results, and control their own operation and destiny, or will they ignore that opportunity and responsibility until someone else does it for them or to them? Will agencies get their priorities straight to get conservation on the ground with the fewest, best qualified personnel possible? Will Soil and Water Conservation Districts step up in their rightful role of leadership and self government to plan and coordinate conservation activities from the most local level?

Will all true conservationists be much more careful to acquaint the general public with the value of our land and water resources, especially of grazing lands which have been held in lower esteem and priority, and with conservation needs and accomplishments to gain much needed public support and recognition? Grazing lands are of more value than ever before because of their extent and multitude of concurrent, compatible uses in energy-efficient production of food and fiber, water, wildlife, and recreational opportunities. Thus far, our performance far surpasses our image. Both can and should be improved. There are countless unheralded examples of excellent conservation effort and results with related gains in productivity. With good stewardship, we can have conservation and improvement *with* production, rather than preservation without production, which is sinful in a needy world.

These are the challenges and opportunities we have as individuals and organizations. We have most of what is needed in terms of people and funding, *if* we get our priorities straight, talk less, and do more. Good personal stewardship of available soil, water, people and dollar resources by producers and qualified technicans on the ground, making good decisions and taking timely, effective action is by far the most effective mechanism and motivation ever devised. It also is the most personally, professionally, productively, profitably, and publicly rewarding. It is for these reasons that I welcome the opportunity to discuss stewardship with you, commend it to you, and hope to join with you in fulfilling its best meaning and connotation.

Editor's Note: We all know about land stewardship but a healthful reminder once in a while as Merrill's article is refreshing and gets the adrenal juices going again.

Range Improvements—Constraints of the 1970's

Lars L. Rasmussen and John F. Vallentine

Properly designed range improvements can benefit broad segments of rangeland resources. Improved forage production and utilization, wildlife habitat, water quality and yield, and reduced soil erosion are some of the most recognized benefits of range improvement work. Nevertheless, "Environmental and economic constraints brought improvement of sagebrush range to a virtual standstill during the 1970's," according to Nevada scientists (Young et al. 1981). Range improvements were brought to this downturn in the 1970's by various legal, social, physical, financial, and educational constraints. These interrelated constraints have not gone away, but have lingered on into the 1980's.

It is generally concluded that the low point in condition of forested western grazing lands was about 1900. This point was as late as the 1930's on lower elevation, unallocated public domain where grazing went uncontrolled prior to passage of the Taylor Grazing Act. Subsequently, range condition trends began slowly to climb until accelerated by more intensive grazing management and range improvements after World War II.

The 1950's and 1960's were the great decades for range development and improvements as they became the tools to accelerate a return to favorable range conditions and production. This upturn was fueled by new technology and special appropriations. But as the 1970's rolled in, range managers seemingly became baffled and even buffaloed by the barrage of constraints aimed at range improvement work, and the stagnation of the 1970's set in.

Range improvements in Utah basically followed the national downward trend in the 1970's. Bureau of Land Management summary data (Rasmussen 1981), based on acreages of range seedings and brush management-control practices, reveal that improvement work completed in Utah during the 1970's was only 48% of the amount completed during the 1950's and a mere 17% of the amount completed during the 1960's.

Available data from Soil Conservation Service summaries (Rasmussen 1981) also indicate a downward trend through

Authors are range conservationist, Soil Conservation Service, Richfield, Utah; and professor of range science, Brigham Young University, Provo, Utah.

the 1970's in range improvement work on private lands. Range seedings and brush management-control practices completed on private lands in 1975 were only 54% of the amount completed in 1972. However, in 1980 this increased to 32% over the acreages treated in 1975. This stabilization of the downward trend appears due, at least in part, to the Utah State legislation bringing about the Rangeland Development Fund for improving private rangelands.

Greater emphasis on grazing management systems for improving federal grazing lands in the 1970's is apparent. The need for accelerated management of both private and federal grazing lands is obvious, but as a companion effort rather than as a replacement for intensive range improvements. Either approach to range improvement is apt to be rather unrewarding unless combined with the other.

Review of Constraints

A closer look at these lingering constraints on range improvements is helpful in pinpointing some of the problems. **Political-judicial-legislative constraints** have been serious, particularly on public lands. Political pressures and law suits by special interests groups have resulted in red tape, delays, and diversion of finances. The diversion of funds and manpower into court-directed environmental impact statements—the value of which has often been questioned—has seriously impacted range improvement work on public lands. The judicial decisions of some judges have seemed to favor range management by attorneys rather than trained range managers.

Legislation by a well-meaning Congress during the 1970's has resulted in a maze of new laws and regulations governing federal rangelands. Many have been single-purpose legislation, and some have proven conflicting and unrealistic in their application. Some have, in fact, been based on concerns that intensive range improvement may harm the environment. The few passed specifically to enhance range improvement work seem never to be fully funded or only after great delay.

Achterman (1980) lists the following single-purpose laws and executive orders that have limited federal lands available for intensive range management: Endangered and Threatened Species Act, the National Historic Preservation Act, The Wilderness Act and related wilderness review requirements, Wild and Free-Roaming Horses and Burros Act, EPA regulations and restrictions on the use of pesticides, executive orders restricting predator control methods, and executive orders on wetland and riparian zone protection. Achterman further suggests that some laws have seemingly taken qualified range specialists off the range and put them in the office, i.e. The National Environmental Policy Act of 1969, The Federal Land Policy and Management Act, and The National Forest Management Act.

An even greater obstacle faced by progressive range managers than the laws, according to Achterman (1980), is the effect of legal attitudes toward problem solving on range management decision making. She concludes that the legal approach—a cookbook approach relying on a set of computerized planning steps—only promotes weak management and managers who are unwilling to make difficult decisions.

Social constraints to range improvements are interrelated with legal and political constraints. Extremes in conservation and environmental thought continue to surface. In these groups the pendulum has seemingly swung from man-made, accelerated approaches back to simplistic natural approaches, frequently slow by themselves and of uncertain direction and results. Simplistic notions of "turning it over to mother nature," "getting the livestock off the range," and "manage by legislation" have surfaced. A few groups seem only to be looking for new radical causes to attract attention, and thus more members.

Social constraints are not infrequently the result of misunderstanding climax communities or their import. One example is mistaking juniper, actively invading a sagebrush-grass community or having already converted it into a closed, stagnant juniper community, as the true climax species. Even when the pristine climax has been accurately determined, must range managers be confined in their objectives to the potential natural community, which by definition excludes anthropic manipulation of the range ecosystem? Is not the management site potential more realistic, thereby permitting the full use of advanced, accelerated range development techniques in maximizing sustained yields from grazing lands?

Physical-biological constraints contributed to the lull in range improvement work during the 1970's, both on public and private rangelands. Much of the easy range improvement work had already been done; but many high-potential, low-production sites still await intensive range improvements. Nevertheless, it is also apparent that many ranges remaining in poor and/or deteriorating conditions are those for which cost-effective, reliable, and environmentally acceptable technology is not available (Smith 1980).

Smith (1980) has concluded, "Since about 1965, progress in acquisition and application of physical-biological knowledge has been less spectacular than before. [One reason] is that research money has been diverted away from production-oriented range and wildlife research into research on nongame wildlife, range hydrology, endangered species, and the like. No matter how valid this type of research may be in mitigating side effects of range improvements, it contributes little or nothing to more economical or effective methods of manipulating range vegetation."

Educational constraints—or rather lack of know-how—have compounded the problem. During recent years, many of the expert range improvement personnel have been drained into other areas within their respective agencies. Their education and training have made them attractive and well qualified for assignment in preparing EIS's, land use planning, strip mine reclamation, and related areas (Box and Sisson 1975). Past Civil Service standards have encouraged second rate range management education and have permitted agencies to replace expert range specialists with personnel who have weak educational background and minimal or no experience in range management and improvement practicums.

When combined with the above constraints, the crunch of **economic constraints** in both the private and the federal sectors has recently greatly limited or even halted some types of range improvements. Many once attractive, intensive methods of range development are currently marginally feasible due to increasingly high labor, machinery, and fuel costs. This is compounded by diversion of federal range improvement monies into other areas and the disastrous cash flows currently being realized even from many well-managed range livestock operations.

High interest rates are a heavy burden to the rancher anticipating range improvements to an extent unknown for decades, reaching 13-15% on long term loans and 16-18% on

short term loans by mid 1982. The present cost-price squeeze has become critical to ranch income. Low or negative returns to operator's combined labor and management have been common since 1973 but critical during 1981 and 1982. Long-range improvements have given way to short-run survival on many ranches.

Summary

The benefits from range improvements are very broad. Thus, the constraints to the completion of such work must be dealt with directly rather than avoided. Part of the answer to the present dilemma may be found in the following conclusion by Achterman (1980), "Range scientists today have the scientific tools to improve the condition of public rangelands and the legal tools to achieve good results. What is needed now is bold use of these new tools rather than legalistic paperwork." And the opportunities to improve privately owned rangelands are just as great or greater.

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(A companion paper entitled "Range Improvements—Getting Going Again" will explore the ongoing urgency for range improvements and possible ways of overcoming some of the present constraints.)

Range Improvements—Getting Going Again

John F. Vallentine

Range improvement techniques in recent years have provided the basis of meeting the national consciousness for rehabilitating devastated sites, i.e. mine spoils, transportation rights-of-way, natural disasters, etc. After modification and intensification, they have admirably met these new needs but often after siphoning existing expertise, research, personnel, and equipment away from the development of the range forage base. Seemingly forgotten in this reclamation fever is that these special treatments, developments, and structures collectively referred to as range improvements were originally assembled and developed (1) to increase the quantity and quality of our range forage resources and (2) to facilitate their utilization by grazing animals.

Range improvements are not merely means of restoring or rehabilitating ranges in low condition but have application to top condition ranges also. Waterspreading, fertilization, herbicides and other pesticides, and the introduction of new forage species and cultivars provide the tools for increasing productivity beyond even pristine conditions. For some range ecosystems, climax falls short of the ultimate that can be obtained by applying range development expertise.

Range Improvement Needs

Higher priority must be given range improvement work if future needs are met for the livestock industry, game animal habitat, production of human food, stimulation of the national and local economy, and meeting basic stewardship responsibility over renewable natural resources.

The national FRES report (Forest-Range Environmental Study 1972) projected that the demand for livestock grazing from U.S. ranges would increase by 2000 A.D. from the 1970 base of 213 million AUM's to 300 or perhaps 450 million. This report estimated that 317 million AUM's could be achieved even by application of extensive methods by 2000 A.D., but 455 million was achievable by maximizing intensive methods while maintaining environmental standards. From the FRES report data the USDA Interagency Work Group on Range Production (1974) estimated a three-fold increase in red meat production from U.S. rangelands possible while simultaneously increasing other rangeland uses. However, when Congress rewrote the RPA (Resources Planning Act) statement in 1980, they stated that U.S. ranges should be improved to provide 310 million AUM's of livestock grazing (De La Garza 1981). Even this reduced grazing capacity objective will require a return to former levels of range improvements.

Range improvements on individual ranches are a means of internal expansion in grazing enterprises, balancing seasonal forage needs, improving livestock gains, and meeting special needs. More and better game animal habitats can provide not only more hunting but landowner returns as well; returns of $1 to $5/acre annually have commonly been realized through game ranching in Texas. Increasing ranch incomes have expanded benefits since for every $1.00 thus generated the local economy experience $2.50 to $3.00 in added household incomes (Gray 1979). Expanded range

The author is professor of range science, Brigham Young University, Provo, Utah.

animal production carries with it an advantage of reduced use of fossil fuels and fertilizers required per unit of red meat produced. Each AUM or range capacity for livestock production releases 8 bushels of corn for human food production and an improved balance of trade for the U.S. And last but not least, range improvement including livestock grazing itself can be an important means of environmental enhancement and multiple use coordination when properly planned and managed.

The benefits from range improvement work are obviously broad based, and the constraints to the completion of such work must be dealt with directly rather than avoided. It is obvious that range scientists today have the scientific tools to improve the condition of both public and private rangelands, but this will require the bold use of these tools in breaking through the present constraints.

Breaking through the Constraints

Higher priority must be given to teaching range improvement principles and skills and providing more on-the-ground experience through university curricula, in-service training, and extension education. Putting the range science practicums back into their training becomes even more important as fewer range science students have farm or ranch backgrounds. Civil Service requirements now include courses both in range improvements and in grazing management. However, many skills will be perfected only through on-the-job training and practical experience after graduation. Agency in-service and extension continuing education programs must consider these needs.

The problem of training and updating agency personnel in range improvement techniques has been pointed out by Leavell (1980). "The experienced project work force of the fifties and sixties dwindled. The faces have changed at the field level in those jobs that carried out the range improvement program on the ground. We find today that only 24% of BLM's present employees were with us in 1965 and only 22% of our range conservationists go back more than 10 years... I am convinced that many managers in the position to allocate funding for rangeland improvement through better or more equipment, better technology, or better plant materials are just not up to date as to what options are available to them... There is quite likely a great lack of experienced people in our field offices who are trained and ready and able to carry out an accelerated program of range improvement practices throughout the West."

The Vegetative Rehabilitation & Equipment Workshop program has played a prominent role during the seventies in maintaining a nucleus of interest and expertise in range improvement work. Its efforts should be expanded to reach range technicians at the field level and administrators allocating funds. Expanded emphasis on range improvements could be given in range and ranch tours, experiment station field days, extension shortcourses, and many other ways.

An example of a highly effective range improvement workshop was held September 1981 at Twin Falls, Idaho, and coordinated by the Intermountain Forest & Range Experiment Station. This 3-day workshop combined classroom instruction and field trips to examine and be instructed in the field operation of range improvement equipment. The present interest in range improvement know-how by field personnel was exemplified in that the workshop had been conservatively planned for 250 people but 500 attended from the ranks of federal, state, and private industry and many more were turned away.

Technology transfer must play an ever greater role in locating, assembling, and distributing range improvement data. All too much technology is still locked up in files, books, reports, and heads of experienced technicians. Society for Range Management (SRM) is playing a major role in developing the range section of a new data base called CORR (Communications on Renewable Resources) and is investigating a new current awareness service for SRM members and others in the applied range sciences. New textbooks, state-of-the-art productions, review papers, and bibliographies are coming out on range improvements, but more are needed. A major need is a concerted effort to provide more economic and statistical intelligence for planning, initiating, and executing range improvement principles and practices.

Customized, on-the-ground planning, installation, and maintenance of range improvements is a necessity for success. Elucidating objectives clearly, prescribing to specifics, using proven practices (except on small-scale trial basis), and being beware of cure-alls are a few good rules to follow. Whatever happened to the basic range improvement principle of putting the money where the potential is rather than invariably only where the problems lie? Maintenance of valuable range improvements is a must and is too frequently forgotten. Whose job is maintenance in cooperative projects on state and federal lands? This must be clarified and enforced.

The BLM has proposed to transfer to permittees the maintenance of all structural improvements on BLM grazing allotments constructed to facilitate the management of livestock; and the permittees would be duly rewarded (Rangelands 3:246; 1981). The proposal also specifies that the BLM would pay for reconstruction of structural improvements and provide maintenance on all non-structural improvements. If the rancher is to be designated as the ultimate range improvement technican on both private and public grazing lands—and this has some positive aspects—then a big training and education job is ahead for Extension, Soil Conservation Service, livestock association leaders, and federal land management agencies. An observation frequently made—and this with obvious exceptions—is that ranchers seem to adopt livestock improvement techniques faster than range improvement practices.

Although there is a backlog of unused range improvement research, this backlog is rapidly dwindling in the absence of emphasis on applied grazing management and range development research. More research should be directed to new methodology and equipment, new herbicides, insecticides, and cultivars, renewed emphasis on difficult sites with good forage potentials, and more economic guidelines. Intensive application of the latest research technology is essential for achieving the potential productivity of rangelands. Demonstrations of achieving site potential through intensive range improvements and accelerated management should be used more fully by research, extension, and service personnel.

More money must be allocated to range improvements by federal and state agencies as well as ranchers as an investment in the future. This higher priority must include technical personnel, equipment, seed, chemicals, and materials. Agencies must be freed from the pressures of well-meaning, technically incapable publics and get on with the work. Self-imposed restrictions, such as the area of herbicides for brush management, should be lifted to provide greater flexibility in planning. Range scientists and SRM should unite behind

efforts to free some pesticides critical for range use from unwarranted EPA restrictions and red tape.

Specialized range improvement equipment must be made more widely available. The high purchase cost of heavy duty equipment will often make leasing more realistic than owning. Arrangements to pool equipment between districts and even between agencies through interdepartmental loans has many advantages. Such as agreement is now in effect between the U.S. Forest Service and the BLM in Utah. More equipment could be made available to ranchers on a lease or loan basis by federal and state agencies, soil and water conservation districts, equipment dealers, and conservation contractors. The benefits of contracting out range improvements requiring specialized, heavy equipment should also be considered.

Greater financial assistance is needed for range improvements in the private sector. Chief among the problems is the high interest rates on borrowed money; a hopeful sign is the lowering of interest rates during the last half of 1982. Providing low-interest, revolving range improvement money has been provided by some state legislatures, but more such ear-marked funds are needed from both state and federal sources. Intermediate-type loans matching repayments to slowly increasing returns are needed from commercial sources. Tax incentives for range improvements on private range might be considered.

Enhancing or redirecting cost sharing programs such as ACP and Great Plains into long-term agreements for range improvements is another need. With the return of improved ranch profits, incentives for rancher cost-sharing in improving federal rangelands should be more fully investigated also. "There is no substitute for individual stewardship and economic incentive to stir effective action" (Merrill 1979).

Summary

The benefits of intensive range improvements when properly applied and coordinated with management systems can be realized by a wide spectrum of rangeland user groups. Achieving maximum sustained yields on both private and public rangelands will require this combined approach.

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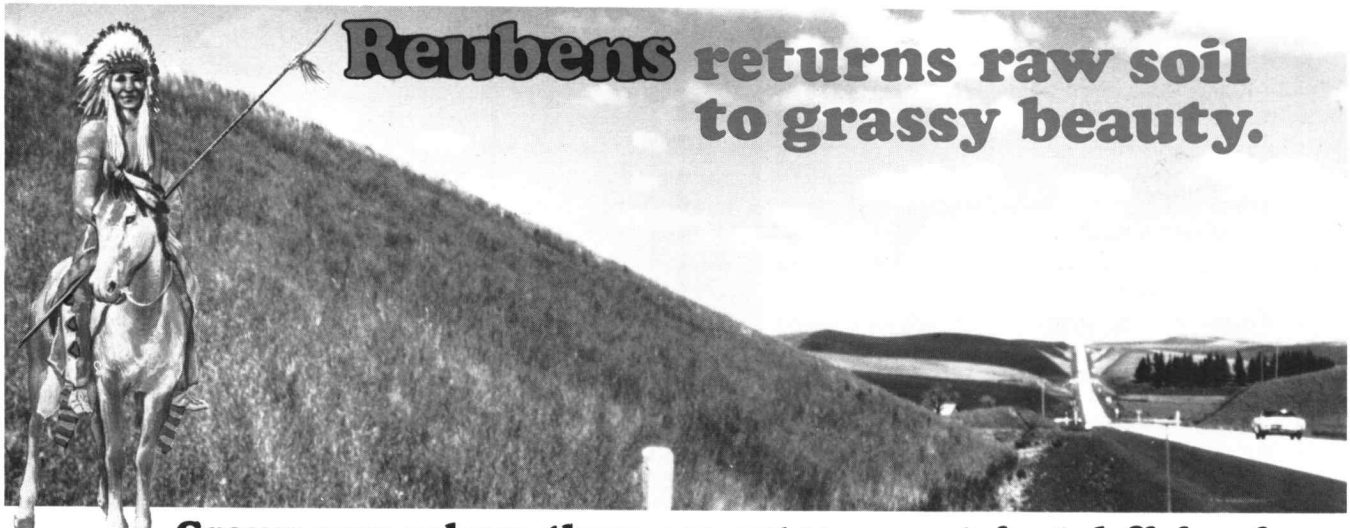

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Is a shack at the edge of a stream a watershed? Can you eat at a water table? Find out by reading. . . An Essay on Rangeland Watershed Management

John C. Buckhouse

Range watershed management involves the coordination of land management objectives within a given basin or watershed in such a manner that the clarity, quantity, and timing of the water yield is optimized while at the same time providing maximum productivity of other products of the land.

Interest in management at the basin or watershed level is growing. The public agencies all recognize the importance of water as a natural resource, and in many cases they are managing the lands under their jurisdiction from a regional watershed, rather than an arbitrary political boundary point of view.

Definitions of watershed management vary in exact wording, but they generally focus on the importance of *management* in order to optimize sustained production and control of water yields in conjunction with the other usable resources produced on the land.

Watershed management is the foundation of soil and water resources. Land and water resources are interdependent and must be used in a complementary manner. There seems to be little point in trying to prevent floods, erosion, siltation, and droughts in the valley if the headwater regions are abused and neglected. To paraphrase an ancient Chinese proverb: "To rule the mountain is to rule the river."

The objectives of watershed management which can be used toward practical application are:

I. Control of Quantity of Water Yield

Increased amounts of *usable* water may be possible. I emphasize *usable,* for the resource will lose its practical value if there is no consideration as to its management once it becomes available.

Increased usable water can be very important for onsite vegetation productivity, downstream irrigation, increased aesthetic values, and native and domestic animal maintenance.

Water yields can be partially controlled through vegetative manipulation and small, on-site engineering structures. Vegetation type conversions may be considered where "wasteful" vegetation is using most, or all, of the available water. This might involve the removal of riparian (streamside) or phreatophyte (water-loving) vegetation such as willows, cottonwoods, or salt cedar and subsequent replacement with grasses. It could also be done by removing long-term, low producing perennials such as scrub oak, chaparral, big sagebrush or juniper and then revegetating with more productive grass or browse species. Some small, on-site engineering structures may also be employed to increase usable water. Small catchment ponds may trap water which might otherwise be lost to the site. Gully plugs, soil pitting, contour trenches and furrows, and water spreaders all serve to catch and delay runoff. By doing so, they allow additonal time for the soil to absorb the moisture and may increase on-site productivity.

The author is with the Department of Rangeland Resources, Oregon State University, Corvallis 97331.

An eroding meadow before a water control structure was constructed.

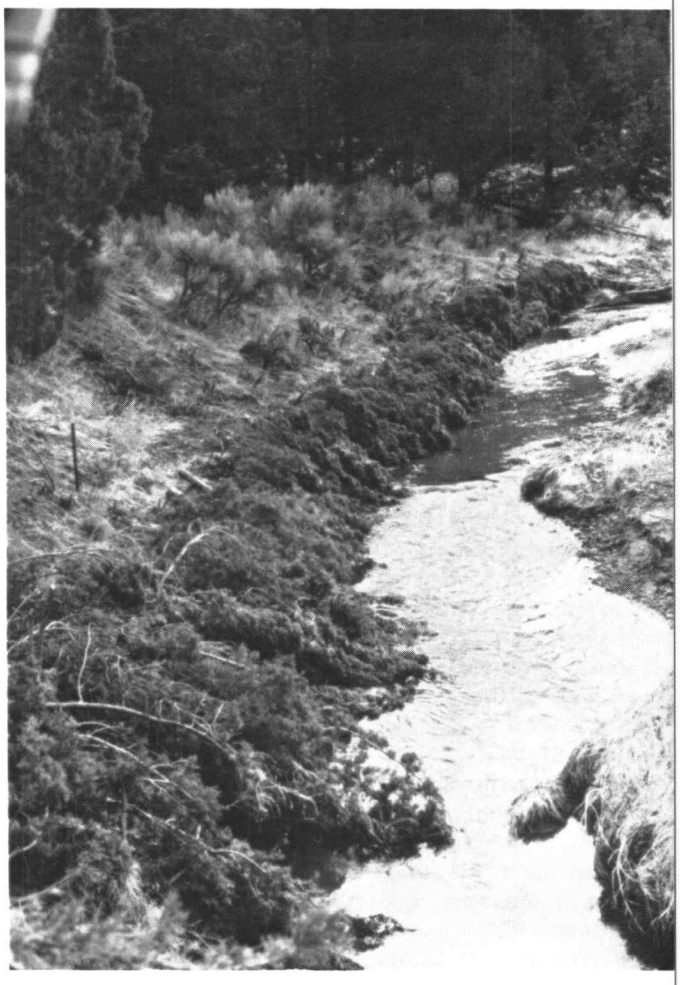
II. Control of Quality of Water Yield

a. Ensure clarity. (Sediment is our number one water pollutant.)

b. Guard against other pollutants entering the stream.

All of us are interested in high quality water. It is not only important to the recreationist and municipal user, but it affects local interests as well. Sediment-choked spawning grounds destroy the "redd" or egg-laying and fry-nurturing habitat of salmonoid fishes and represent an economic as well as an aesthetic loss. Clogged irrigation canals and ditches are not only nuisances, but can be damaging to crops, pumping machinery, and flow capacities. Other pollutants may relate to eutrophication and algae clogged reservoirs, decreased production due to toxic concentrations of heavy elements, and gastrointestinal outbreaks.

Headwaters watershed management can be very important in the quality of the flowing streams. It is imperative that



Vegetative riprap made by suspending and securing cut juniper against an eroding streambank.

road construction, logging practices, grazing schemes, and cultivation techniques employ the foresight and management principles which minimize the negative impact which they could potentially have on the watershed resources.

Lush meadow after construction of a water control dam.

III. Control of Time and Duration (Regimen) of Water Yield

If we had absolute control of this, we would be able to avoid the extremes of floods and droughts and could provide steady, uniform flows all season long. This is not completely possible, but steps can be taken to move toward this end. Soil and vegetative mantels can be managed to maximize water-holding effectiveness. Snowpacks at higher elevations can be controlled by snow fences and vegetative cutting patterns which help regulate accumulation and melt rates. Small engineering structures can be employed to slow runoff, encourage soil/water infiltration and promote sub-surface flow.

In range watershed management we frequently deal with low precipitation regions and high intensity storms with flashy runoff periods. Frequently the watersheds we work with are ephemeral—carrying water in the stream courses only during rainy or spring seasons. It may well be possible only to redistribute this water on-site leading toward increased on-site vegetation production, rather than to increase downstream, off-site streamflow from many of these regions. However, in addition to providing increased on-site productivity, one can justifiably hope for decreased erosional losses and increases in soil productivity through a conscious program of range watershed management.

Attention 1984 Annual Meeting Exhibitors:

Commercial firms and organizations seeking exhibit space at the 1984 Annual Meeting of the Society for Range Management are requested to contact:

Connee Quinn
Elanco Products Company
Route 1, Box 45
Whitney, NE 69367
(308-667-2712)

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John Kitchell
Range Specialist
DOW Chemical USA
P.O. Box 455
Spearfish, SD 57783
(605-642-7513)

The Annual Meeting and associated activities will be held at the Civic Center in Rapid City, South Dakota, February 7-12, 1984. Adequate space for both booths and equipment displays is available.

Rough Fescue in Oregon

E. William Anderson and David L. Franzen

Rough fescue *(Festuca scabrella)* grows in southeastern Oregon on Hart Mountain in Lake county at about 42° 28′ N latitude and on Steens Mountain in Harney county at about 42° 35′ N latitude. We know of no other location in Oregon where this species grows.

Hodgkinson and Young (1973) reported the specific occurrence of this species in Washington as being primarily north of 47° N latitude and east of the Cascade Mountains. Other studies indicate that the main range of occurrence of rough fescue is in comparable northern latitudes on both sides of the Rockies and north into Canada. Several plant manuals report the species to be in Wyoming and Colorado; others specifically for Utah, Nevada and California do not include it as occurring there.

Is Hart Mountain the most southerly occurrence of rough fescue west of the Rocky Mountains?

On Hart Mountain rough fescue occurs as individual plants or in small sparse stands on north exposures above 6,000 feet elevation. The most extensive occurrence is above 7,000 feet elevation on the undulating mountaintop. The soil of this site is Hapgood very gravelly loam which is very dark brown in color and has an effective rooting zone of more than 40 inches. The climate on Hart Mountain is cold in winter and relatively cool in summer with a 10 to 50 day frost free period. Based on indicator plant species and observed summer and winter storm patterns, annual precipitation is probably about 12 to 15 inches in the area where rough fescue occurs on north (cool) exposures and about 15 to 18 or more inches on the mountaintop. Based on local weather data, about 40% of this precipitation occurs during the growing season.

The best stands of rough fescue on Hart Mountain occur in patches which appear as if they might be related to past lightning-caused fires. This concept is supported by controlled burning studies on rough fescue plant communities in Alberta by Bailey and Anderson (1978). They reported that burning did not harm rough fescue as long as the plant was dormant. They also reported (1980) that, in spite of high burn temperatures, rough fescue initiated green shoots which became conspicuous on the burn about a week after the fire. Late summer or autumn lightning fires may have actually encouraged the growth of rough fescue on top of Hart Mountain.

Authors are Certified Range Management Consultant, 1509 Hemlock Street, Lake Oswego, Ore. 97034 (503) 636-8017, and Range Conservationist, U.S. Fish & Wildlife Service, Box 111, Lakeview, Ore. 97630 (503) 947-3315.

In a good stand of rough fescue on top of Hart Mountain, it dominates the canopy cover—up to 25% has been observed—and, because of its size, it also dominates the aspect or physiognamy of the plant community. Associated species are the same or similar to those reported from more northern latitudes and include Idaho fescue *(Festuca idahoensis)*, Sandberg bluegrass *(Poa sandbergii)*, prairie junegrass *(Koeleria cristata)*, Douglas sedge *(Carex douglasii)*, redball avens *(Geum ciliatum)*, arrowleaf balsamroot *(Balsamorhiza sagittata)*, wyeth buckwheat *(Eriogonum heracleoides)*, pearleverlasting *(Anaphalis margaritacea)*, and yarrow *(Achillea lanulosa)*. Mountain big sagebrush *(Artemisia tridentata vaseyana)*, low sagebrush *(A. arbuscula)*, lanceleaf green rabbitbrush *(Chrysothamnus viscidiflorus lanceolatus)*, and prickly gilia *(Leptodactylon pungens)* are common in the stand.

Hodgkinson and Young (1973) suggest that rough fescue should be managed as the key species when it comprises 15% of the total forage yield. Stout, McLean and Quinton (1981) make the same recommendation with 15% of the total plant composition being the criterion. We think that on Hart Mountain, which is within the Hart Mountain National Antelope Refuge, rough fescue is such an important species ecologically and from a forage standpoint that special care is needed to encourage its expansion to whatever extent can be attained as dictated by site capability. This does not mean eliminating livestock grazing. But it does require the application of a grazing system that takes into account the physiological requirements of the species as reported by Stout et al. (1981). The current rotation of deferred grazing system, which takes these requirements into account, involves alternate year early-summer/late-summer grazing coupled with moderate utilization. This system appears to be expanding the occurrence of rough fescue on Hart Mountain. A trial is being contemplated to determine if planned autumn burning will accelerate this process.

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Food from Rangeland

Harold F. Heady

Subtitle M of the Agriculture and Food Act of 1981 intends to promote the general welfare of those dependent on the Nation's rangelands through improved productivity. Those lands, where the natural vegetation is grassland, open forest, woodlands, or shrublands, comprise more than 60% of the 48 states. Nearly two-thirds of these rangelands are privately owned and all are grazed by domestic and/or wild animals. Rangelands are unsuited for cultivation but produce a great volume of forage that ruminant animals convert into high quality food protein. While this paper is directed toward domestic livestock and food production, let it be abundantly emphasized that rangeland management simultaneously aims for enhanced wildlife populations, covered watersheds, recreational opportunities, aesthetic values, protection of threatened and endangered species, and reduced hazards from erosion and flooding.

Rangelands contribute to the food producing system in intimate association with other agriculture. Livestock harvest some 100 million animal-unit-months (AUM) of rangeland forage each year. An AUM is the amount of forage needed by a mature cow for one month or an equivalent amount for other animals. Western-wide statistics are unavailable but the California example typifies the importance of rangeland grazing. It is estimated that 69% of the state's stocker cattle, 61% of its breeding beef cattle and 51% of its sheep are produced on rangelands. Most beef cattle production in the west seasonally uses rangelands combined with periods on planted forages, crop aftermath, harvested feeds, and agricultural by-products. Many animals are fattened on feed grains before slaughter. Thus, range animal production is closely linked to cropland agriculture.

One frequently hears about the deteriorated condition and low productivity of both public and private rangelands. Private groups and even the land management agencies sometimes state that western rangelands are in poor condition and getting worse. Data from recent studies indicate otherwise. Between 1935 and 1976 the percentage of excellent and good condition range increased from 16 to 31% while fair and poor condition ranges made a corresponding decrease. Condition ratings evaluate the current status of the resource in relation to its productive potential. Much less range is in poor condition now than in 1935. A 1980 inventory found that about 7% of the western rangelands had critical and severe erosion while three-fifths were stable or with slight erosion. Clearly, more, much more, range conservation needs to be accomplished, but just as clearly, improvement is more prevalent than deterioration. Many in the range profession believe that livestock carrying capacity can be doubled from what it is today when the ranges reach full productivity under intensive management. They also believe that range sites and habitats can be improved for all the multiple uses at the same time. Large scale examples of successful range improvement programs exist in the western states. They have taken time, financial support, application of considerable scientific knowledge, and common sense. However, constraints of considerable magnitude continually increase the time and costs for range improvement. Some of these constraints, which limit even more progress, and that need examination in the governmental arena are as follows:

First, increased intensity of rangeland use and management must look ahead to declining inflation, increasing real growth in the national economy, and more competition for available resources. Tight money forces both government and the range grazing industry into application for cost-effective practices. Unfortunately, much remains to be learned and understood in this area. The costs and returns to produce an AUM of grazing can be reasonably determined, but the costs and benefits of a visitor day, the value of one more deer, or an acre-foot of quality water are less readily determined. When these multiple resources are considered in trade-offs with each other, it oftens seems that little gets done to enhance the total value of the resources. Although of unquestionable value, the preparation of environmental impact statements on rangeland use and management has also drained funds away from managing the resources. Governmental support funds have decreased and ranchers are in a situation where production costs increase faster than prices of livestock products. There is no question that people have suffered but so has the land resource improvement program. It is time for action to increase the real productivity of rangelands.

My second point is that expensive energy will encourage more effective grazing management on the nation's rangelands. It is well established that the land used for cultivated pastures is being converted to crop production and the remainder receives less fertilizer and irrigation than formerly, hence a lower grazing capacity than a few years back. High land and production costs, most energy and equipment, simply force cultivatable land to be used for the crops of greatest income. Fossil energy in the beef production system primarily produces feed to be fed mechanically to livestock through the use of farm and feedlot equipment. The production of rangeland forage uses less fossil energy than any other type of animal production and takes place on land unsuitable for crops. Ruminant animals convert low value rangeland forages into high quality human foods. Therefore, an increasing competitive advantage of rangeland grazing versus other forages is predicted. This will require more

The author is professor, University of California, Berkeley.

intensive land management and animal husbandry than decades of teaching and preaching have accomplished in the past. If this prediction comes trues, much research and organization of knowledge are needed to attain low energy costs and profitable food production from rangeland.

The third point is the need for mitigation of the impacts on local people when public decisions result in net gain for the public as a whole. This principle, when applied to the shifts in uses of rangeland, states that the gainers can compensate the losers and still be better off. An example of this problem is illustrated by the gains to the public and the losses of livestock when control of predators was restricted. Another recent example is the controversy over jackrabbit control to reduce damage to crops and range vetetation. Almost everyone accepts the principle of equity but few agree who should pay how much to whom and often disagreements occur over who has the rights in the first place. This issue should be decided based on comparative valuation on forage for livestock, water used off site, wildlife, and recreational experiences. Such a mixture of values cannot as yet be precisely determined or fairly compared. These complex pricing problems require the best of research from the biological and social scientist, a spirit of compromise from the users, and full exposure in political discussion. The nation's political bodies have a high stake in these controversies through passage of laws and regulations, and support of management and research dealing with complex mixes of land ownership.

Lastly, I want further to **emphasize the needs for rangeland research.** Since 1976, 15 different documents that recommend research priorities for rangeland problems have come to my attention. One has only to examine an environmental impact statement to realize that our knowledge is inadequate to prepare for the kinds of problems currently faced by rangeland managers. People demanding use of rangeland resources have increased in numbers, but the bulge in rangeland research following Sputnik has tapered off. For example, the number of scientist years devoted to forestry, range, wildlife, and water research in California was 143 in 1958, 205 in 1968 and 155 in 1977. It is still less today. The cost per scientist year has doubled since 1958. There is less land, less water, less energy, and less food on this earth for each of us than just a year ago. The current federal budget further reduces our ability to produce food at some later date by restricting research support now.

The environmental syndrome, above all, has increased the unknown part of our knowledge storehouse because it asks for information we don't have. Oversimplified, it is as fundamental as changing the emphasis from research making the cow more productive to research also finding how the cow can be used to make the whole rangeland more productive. Much remains to be done to make rangeland produce the food that it can and the amenities that it also can provide.

Editors Note: "Food from Rangelands" was one of eight papers requested as background material for consideration by the Western Governors' Conference in their 1982 program "Food in the West."

BRANDAIDS Needed?

Copies of BRANDAIDS, the booklet developed by the Society for Range Management to help ranchers weather the difficult financial climate, are available from the Society headquarters, 2760 West 5th Avenue, Denver, CO 80204. A single copy per individual for a single instance is available free of charge. Two to 100 copies may be purchased @75¢ each, postpaid; more than 100 are 50¢ each. Please allow 2 weeks delivery after receipt of your order.

Economics as a Tool for Natural Rangeland Managers

Fred J. Wagstaff

Introduction

The successful rangeland manager must be able to recognize the need for information of various kinds and make provisions for obtaining it in a timely manner. With range management problems becoming more complex, the requirements for information are growing in both amount and type.

Economic information should be considered in all rangeland planning and management actions because the economic impacts of the rangeland manager's actions will be felt regardless of whether economics was considered prior to taking the action. Managers of public rangeland are being held more accountable for their decisions.

If better decisions are to be made, it would seem desirable to consider the economic impacts of decisions before the actions take place. This would allow for choosing the alternative which would either enhance an outcome—say profits—or minimize adverse impacts.

The underlying concerns about rangeland economics can be stated in general terms through the concepts of supply and demand. We are all aware of the limited supply of rangelands and also of the increased requirements being placed upon them. Certainly no one would argue that our rangeland base is unlimited or is of low value. We can expect more debate about the allocation of our public rangelands among various uses.

We must also be alert to changes in technology that might expand our production capability and any changes that would affect demand for various uses. This classic economics situation leads to changes in value due to changes of supply or demand, or both. For example, the expected population growth in the West and Southwest will increase demand for recreational uses of public rangelands. The important point is that beyond certain levels not all uses can be accommodated simultaneously. Something must change. Either the resource must be made more productive (supply increased), allocation of uses changed, or demand decreased (permit or quota imposed).

Production Economics

All managers must be concerned with production economics. Owner-managers are concerned with costs of production, sale prices, cash flows, net returns, debt servicing, and other financial factors. Public rangeland managers need also be concerned with production costs and economics of the firms they deal with.

Public resource managers are often given goals or objectives in the form of laws or regulations. They need to be concerned with how they can achieve these targets at minimum cost.

An example of why we need to be concerned about economic impacts of our decisions on the budgets of others comes from the typical public rangeland improvement project. Ranchers involved in this type of program need to make improvements on private lands to provide forage during the time their stock are off public lands. The improvements cost money, and we all know that borrowed money today is very expensive. Even if money is not borrowed, the alternative investment opportunity of treasury certificates, for example, offers high interest yields that should be equaled by investments in rangeland improvements.

Ranchers and agencies should coordinate their development plans to minimize impacts on total livestock grazing; but, if either the agency or the rancher cannot provide his share of the funding, the project gets out of synchronization. This means that nonuse required after a public rangeland seeding may mean actual herd reductions or expensive forage replacement, both of which will reduce ranch income. We must be aware of these impacts on others or we may find our efforts hurt rather than help.

All public rangeland managers, as well as private ones, are concerned about operating budgets. It would be rare today to hear of a program or project being funded without some type of formal economic analysis. Bankers are not widely known to lend money without collateral and an analysis of revenue that shows repayment capability. Increasingly, these same principles are being applied to public budgets for natural resources. Program planning and budgeting are now major functions of public land management agencies. The Office of Management and Budget, the agency which implements the President's budget decisions, is requiring more justification and special studies to support agency budget requests.

A case in point is the new study of grazing fees on public lands initiated because of the Administration's concern with the level of returns to the Federal Treasury from grazing in light of apparent significant resource values. Many in the Reagan administration believe that grazing fees are too low. This promises to be a long and difficult study with highly significant economic implications to agencies, the livestock industry, and public land states. This entire study will be dealing with economic issues from the ranch to the national level.

Critical issues in the grazing fee study are the rancher's ability to pay and value of the forage to the stockman in his operation. The basic economic issue underlying the entire grazing fee study is the value of public range forage. The value of forage should reflect a value or price at which supply and demand would be in balance.

Welfare Economics

Welfare economics is a fancy term for public economics or public concerns with economic effects. In welfare economics, the main concern is the impact on a group or society rather than the individual or business firm. This field of economics deals with two primary areas: 1) economic impacts of actions on people—jobs, personal income taxes, intrastructure costs, etc.; and 2) economic impacts of people on resources. This area of economics translates legislation, regulations, and other group actions into what the impacts on resources might be. For example, our societal decisions on family size, home ownership, life style, etc., easily translate into demands for beef, minerals, water, and other materials. In our society, we are greatly concerned with questions of equity and protection of individual rights and life style. Many things we do as resource managers are for social or cultural reasons. We must be certain that our actions are having the intended impact upon the target group.

Examples of programs or policies designed for specific groups are the small operator set-aside program of public timber and upper limits on national forest grazing permits. Our involvement in some other programs such as the Civilian Conservation Corps and, more recently, the Young Adult Conservation Corps and Job Corps programs has been primarily to change the economic status of a target group.

There has been considerable discussion by agencies about including secondary benefits (those which accrue to the general public) in project analysis. Most agencies now include these benefits as a matter of policy, and we find many range projects being partly justified on the basis of these local economic impacts. If other things remain equal, we can predict the outcome of such projects and see the impacts on the local economy. A major problem occurs when other things do not remain static.

A prime example is the Intermountain Power Project in Millard County in western Utah, currently under construction. This project will have tremendous impacts on the local area. The impacts on the lifestyle and economic structure of the area will be great. This country will move from being a rural agrarian-based economy to an industrial economy in just a few years. The cultural and economic shock to the residents is bound to be large.

Rangeland managers in the area will be faced with increased demands for new uses of public lands formerly used for grazing. There will also be pressure to use the public lands to maintain stability of the local economy. In fact, such a major change will force managers to redefine what is normal, desirable, or possible.

Current agency policy allows agencies to undertake economically marginal projects (where direct user benefits do not equal project costs) that meet some social or economic stability goal. Nevertheless, this is uncommon. Typically, agencies will be concerned about whether a proposed project is the least costly or most effective way of achieving an objective.

Summary

Economics, as a discipline, uses structured, objective-oriented thought processes that formalize the analytic process. This formal structuring of the problem or objective and the formal analysis leads to formulation and consideration of alternatives which otherwise may be overlooked. The field of economics deals with people: their wants, desires, and how they get what they want. The use of economic analysis will help the resource manager determine how the public wants their resources to be used. The most successful manager is the one who can foresee what is needed and can most efficiently meet the needs of the public.

We can all see the increasing pressures to make more goods and services available from our forests and rangelands. To do so, we must find efficient means of bringing our resources into full productivity. Since there will be more people wanting more things from our resources, we must have a means of weighing or comparing the various alternatives. But, this does not mean monetary benefit will be the only deciding factor.

It does not take much imagination to see the resource manager of today and tomorrow being faced with more difficult and complex decisions. We must manage physical resources within the total social and economic context. Accommodating more uses on a fixed land basis is a real challenge which necessitates using new knowledge and techniques.

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SRM Policy on Section Affiliation: When a member moves from one Section to another, he automatically becomes a member of the Section where his new address is. If the member desires to remain a member of his previous Section, he must submit that request in writing to the Denver office.

A member may belong to more than one Section by paying the Section dues for each Section he wishes to be a member of. This must be sent to the Denver office in writing.

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Livestock Grazing Impacts on Watersheds

W.H. Blackburn

What impact does livestock grazing have on rangeland watersheds? Range scientists with the Texas Agricultural Experiment Station are conducting long-term research in the Edwards Plateau and Rolling Plains of Texas to find the answer.

Livestock grazing affects watershed properties by altering plant cover and by the physical action of their hooves. Reductions in the vegetation cover may: (a) increase the impact of raindrops, (b) decrease soil organic matter and soil aggregates, (c) increase surface soil crusts, and (d) decrease water infiltration rates. These effects may cause increased runoff, reduced soil water content, and increased erosion.

Grazing impacts will vary naturally from area to area and over time due to the normal variability of climate, vegetation, intensity and duration of livestock use. Few studies have attempted to account for these natural variations. Documentation of the intensity and duration of livestock grazing has been poor or completely ignored in most studies. Only for the ponderosa pine/bunchgrass and Great Plains rangelands do we have a sufficient data base for evaluation of the hydrologic impacts of proper livestock grazing.

The literature is filled with examples of the adverse impact of heavy or abusive grazing on watersheds. However, few research projects have studied seasonal or long-term hydrologic impacts of grazing systems or proper vegetation management. The impact of livestock vegetation on watershed parameters has, in recent years, become a national resource management issue. Often the information used is based on emotion or misinterpreted data.

Heavy Grazing Or No Grazing

Grazing, whether by insects or livestock, has an impact on watersheds. The goal of range management is to harvest the forage resource in such a manner as to keep the impacts consistent with sustaining the total resource base of rangelands. The question should not be, "Should rangeland be grazed?", but "How can we better manage the grazing animal to minimize its impacts?" Most livestock grazing studies have compared the impacts of heavy grazing with no grazing. These studies tend to indicate that heavy grazing is a viable management objective or that livestock grazing is the same as heavy grazing; however, no such oversimplification is justified. It has been recognized for 70 years that heavy continous grazing accelerates erosion and runoff. The literature is filled with examples of the adverse impacts of overgrazing on watersheds. In 1958 Love wrote, "There is a large body of information leading to the conclusion that heavy grazing has had bad hydrologic consequences. It is doubtful that more investigations are needed to emphasize this conclusion." For the most part, grazing exclusion and heavy continuous grazing are questioned as management objectives. Scientists, however, need to study the extremes for the same reasons that ecologists study successional and climax vegetation—to develop sound management practices.

Light or Moderate Grazing

Available information on the hydrologic impacts of light or moderate grazing intensity strongly suggest there are few hydrologic differences between pastures continuously grazed lightly or moderately. Some studies have failed to show a difference in soil loss, infiltration rates, or soil bulk density among light, moderate, and ungrazed pastures. Watershed research data strongly suggest that watershed condition can be maintained or improved under moderate grazing intensity.

Grazing Systems

Much interest has been generated by grazing systems and their potentials. Little information is available, however, to support many of the claims concerning grazing systems impacts on watersheds. Gifford and Hawkins (1976) found

Livestock grazing—Southern Great Plains range watershed.

Author is professor of watershed management, Department of Range Science, Texas A&M University, College Station 77843.

Livestock grazing—high elevation range watersheds (photo by U.S. Forest Service).

no published evidence to show that any single grazing system consistently or significantly increased plant and litter cover on watersheds.

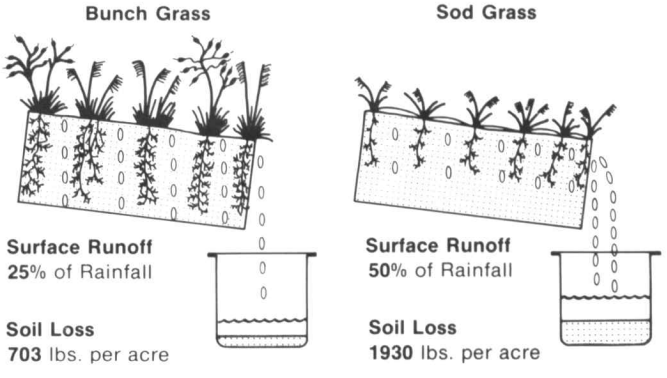
Most of the information on the impacts of grazing systems on watershed characteristics comes from studies conducted in the Rolling Plains and Edwards Plateau of Texas. Results of these studies indicate that pasture grazed under a four-pasture three-herd deferred-rotation system were hydrologically similar to those of livestock exclosures. Pastures grazed under a high intensity, low frequency grazing system (eight-pasture one herd with 17-day graze and 119-day rest) were better or similar hydrologically to moderate continuously grazed pastures. Conversely, short duration pastures (14-pastures one herd with a 4-day grazed and 50-day rest), stocked at double the recommended rate, was similar hydrologically to heavy continuous grazing (McCalla 1982). The hydrologic parameters responded favorably during average or above average precipitation years; however, during droughts the short duration system rapidly displayed adverse impacts on infiltration rates, sediment loss, grass cover, grass standing crop, surface roughness and soil aggregates. After 2 years of above average precipitation, hydrologic parameters of the short duration pasture have not recovered from the 1980 drought. Results of this research strongly suggest that if most of the additional carrying capacity with a short duration grazing system can not be picked up by increased livestock distribution as a result of fencing and water development, then extreme caution should be used in adjusting stocking rates upward.

Bunchgrasses or Sodgrasses

Bunchgrass-dominated areas are consistently characterized by: (1) higher infiltration rates, (2) lower sediment production, (3) more total vegetation cover, grass standing crop, and mulch accumulation (4) higher soil organic matter content and aggregate stability, (5) a rougher soil surface, (6) less bare ground, and (7) lower bulk density, than sodgrass-dominated areas. Based on 4 years of data from the Sonora Research Station in Texas, runoff from sodgrass dominated areas was twice that of bunchgrass-dominated areas. Thus, less water infiltrated sodgrass soils and is available for plant growth. Almost three times more soil was lost from sodgrass areas than from bunchgrass areas. A decrease in bunchgrasses, regardless of the cause, will eventually result in a lower hydrologic condition of the site. Livestock grazing potentially has the greatest impact on

EFFECT OF TYPE OF GRASS ON RUNOFF AND EROSION

(4 inches of rain in 30 minutes)



Average runoff and soil loss from bunchgrass and sodgrass dominated areas, Sonora Research Station, Texas. Based on 4 inches of simulated rainfall in 30 minutes, applied 22 times over a 4-year period.

bunchgrasses. They are usually the better forage species and are generally more sensitive to abuse than low-growing sodgrasses. It was only in the bunchgrass-dominated sites at the Texas Experimental Ranch in the Rolling Plains of Texas, that grazing treatments were hydrologically different. Heavy grazing at the Sonora Research Station in the Edwards Plateau of Texas eliminated the positive influence of bunchgrasses on watershed characteristics after 22 months. Short duration grazing, stocked at double the recommended stocking rate, significantly reduced the bunchgrasses.

Bunchgrasses are easily destroyed by overstocking and should be monitored closely when: (1) stocking rates are changed, (2) new grazing systems are initiated, or (3) during drought.

Soil Crusts

A crust commonly developed at the surface of rangeland soils differs considerably from that of the underlying material. It is characterized by a high bulk density, few large pores, platy structure, stratification, and orientation of the different sized materials. The layer or crust is often harder than the rest of the soil, has low infiltration rate and is a prime factor causing runoff and erosion. It often becomes hard enough to prevent seedling emergence. Soil crusting is commonly associated with low organic matter, high silt content, and low aggregate stability (Blackburn 1975, Wood et al. 1978).

One suggested way to improve crusted rangeland soils is to concentrate a herd of cattle on the affected area for a very short time (2 to 3 days) to churn up the soil surface (OTA 1982). Livestock trampling may incorporate mulch into the surface soil or act as an aid to seedling emergence in a similar way a cultipacker is used on agricultural and to break up crusts over emerging seedlings. This "churned" soil, however, will not remain beyond the first rainstorm nor will infiltration rates be increased. The impact of falling raindrops, a few minutes into a storm, effectively destroys the modified surface. Soils that are susceptible to crusting are poorly aggregated; soil particles are easily detached by raindrop impact and flow together when saturated.

To modify the negative influence of soil crusts, livestock grazing systems must address the causes of crusting, mainly low organic matter and poor aggregate stability. Livestock grazing systems that promote plant and mulch cover will modify soil crusts the most.

Water Quality

The major pollutant from rangeland watersheds is sediment. Moderate continous grazing or grazing systems should reduce sediment losses to a minimum from most watersheds. However, if watersheds have been severely overgrazed, instituting moderate continuous grazing or a specialized grazing system, may not reduce sediment losses. Bacteria or nutrients as potential pollutants from livestock grazing do not appear to be a problem on areas other than riparian zones.

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If you need a room for a Society committee meeting or Society activity at the SRM 1984 Annual Meeting, contact:

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Notify Jim by July 1, 1983. State size of room preferred, number of people expected, date(s) and time needed, committee or activity involved, and name/address/phone of individual responsible for meeting.

Reprint from the **Grazier,** *December 1982*

Review and Comparison

John Buckhouse

Article Review: A long-term infiltrometer study in southern Idaho, USA.
G.F. Gifford. 1982. Journal of Hydrology 58:367-374.

Dr. Gifford is Chairman of the Watershed Science Unit, College of Natural Resources, Utah State University, Logan, Utah 84322. He has conducted infiltration investigations into a big sagebrush *(Artemesia tridentata)* site in southern Idaho over a 12-year period. The site was plowed and seeded in the fall of 1968.

Plowing apparently caused an initial significant decline in infiltration rates. Grazing, which began in 1970, did not further reduce infiltration but seasonal trends were eliminated and there was no recovery of infiltration. Exclosures which were built on-site indicate that, in this instance, it would take at least six years for complete recovery of infiltration rates, assuming no grazing.

Dr. Gifford's report is interesting and informative and should be helpful in predicting hydrologic response to certain rangeland use practices.

It is particularly interesting to me to compare Gifford's results to those which several of my graduate students and I have found in the sagebrush country of eastern Oregon.

Among other things, we have attempted to determine hydrologic potential as based upon the subspecies of *Artemesia tridentata.* We have found that differences do exist, but that they are variable with site and location. A tendency toward increased hydrologic hazard (lower infiltration rates and increased potential sediment production) exists on the *A.t. wyomingensis* sites with a slight reduction of hazard in the *A.t. tridentata* and *A.t. vaseyana* sites. Our conclusion is that subspecies identification is not adequate, by itself, to identify hydrologic hazard; other factors including soil structure (particularly platyness and vesicular porosity), organic matter, and existing vegetation must be considered if one wishes to make predictions.

We, like Gifford, have noted an initial decline in infiltration rates following land treatment. Seemingly, this decline is brought about primarily through an increase in bare ground and a destruction of soil structure. When this occurs, rain drop splash rearranges small soil particles and often forms a soil crust which "seals" the soil surface making it less permeable to infiltration. This may be compounded by soil compaction caused by the treatment itself, particularly if heavy equipment was involved.

Interestingly, we have frequently observed a decline in potential sediment production from the same sites which are experiencing a decline in infiltration. This apparent anomaly can be explained by an increase in vegetation which frequently accompanies the disturbance. We believe that the success of the "catch" of seeded or released vegetation will determine the sediment load from the site. Thus, a good "catch" will experience less erosion than will the same site with a poorer vegetation establishment—even though infiltration rates may be the same in both cases.

We, like Gifford, are also finding that time is critical. While we have no data which would compare to his six-year recovery period, we are aware of the effects of time. It is our impression that time can either work for your or against you. It seems that two factors are at play here: soil and vegetation.

The soil factors deal with wetting/drying, freeze/thaw, root penetration, and biotic activity in order to bring about infiltration rate recovery—and these things take various lengths of time depending primarily on climate. In addition, vegetation response is time determinant. If a stand thickens with time, it will be a hydrologic plus, if it thins—for whatever reason—it is a hydrologic debit.

It is apparent from Dr. Gifford's Idaho study and from our work in the sagebrush region of Oregon that a number of complex factors are at play when one attempts to quantify the hydrologic characteristics of the landscape. Equally as apparent is the significant role that human beings and our management practices have on these parameters.

(John C. Buckhouse, Associate Professor, Dept. of Rangeland Resources, Oregon State University, Corvallis).

Editor's Note: Occasionally, I think reviews of articles appearing in other magazines and journals are appropriate in *Rangelands.* They add spice and variety and sometimes bring about thought and action which is good. Hope you enjoy this one.

Ranching, Energy Development and Eminent Domain

Ronald R. Weedon and Patrick E. Reece

Discovery and utilization of coal and oil resources in the West have led to an aggressive development of energy transportation systems. This type of activity is not without precedent. Over 100 years ago railroads played a key role in the settlement of our western states. However, this process developed under a system of government rather than private land ownership. Land was given to railroad companies as inducement to construct transportation facilities which would in turn encourage settlement and provide a badly needed means of shipping livestock products to market.

Development of today's energy resources has stimulated a new wave of land development which may be in direct conflict with established ranch operations. Land ownership in most plains states is no longer dominated by the federal government. Consequently, methods of land acquisition used during the last century are no longer available, and a new approach based upon an old concept is now being utilized, eminent domain. There are potential threats in the current process of eminent domain which all range livestock producers should understand.

Present Legal Conditions

Eminent domain is defined as the power of the nation or sovereign state to take or authorize the taking of private property for public use without the owner's consent. The power of eminent domain is based upon a political right founded on the common necessity of appropriating the property of individual members of the community for the benefit of the whole community. Power of eminent domain has not been directly granted by the Constitution. Rather, it is inherent in the concept of sovereignty. Property acquired through this process may be used by the state, public or private corporations, or by a private citizen for the welfare of the public.

Unless a state constitution provides otherwise, the legislative branch of the government possesses sole authority to exercise the power of eminent domain or to legislate the power to another body. Exercise of the power of eminent domain is subject to all the prohibitions found in the Constitution of the United States and the several states. These prohibitions are that property shall not be taken for public use without due process of law. Condemning more property than is needed for public use is held to be a denial of due process. Any person whose property is taken by eminent domain is assured an opportunity to present objections and claims.

The authors are professor of agriculture and biology, Chadron State College, Chadron, Neb. 69337; assistant professor, Department of Agronomy, University of Nebraska Panhandle Station, Scottsbluff 69361.

The power of eminent domain arises only when a governmental agency cannot acquire land by negotiation or purchase. Common uses of eminent domain include the construction of public buildings, military camps, sewage systems, streets, highways, bridges, railroads, canals, reservoirs, slum clearance, and urban development. Courts have also determined that condemnation of the land for the construction of pipelines and powerlines may also be conducted through the power of eminent domain. The interest taken in land by eminent domain may be an easement or fee interest. Courts have generally detemined that the condemner is not entitled to the minerals underlying the land condemned.

Compensation

As a general rule, the owner is permitted to show evidence of all the uses for which the land is suitable, including the highest and most profitable commercial, industrial, or agricultural use for which there is or will be a demand. Owners may show their intended use or improvement of the property, or the probable value of future use of the property if it is practical and actually influences the present market value. A purely speculative or imaginative value can not be considered. Landowners may not object merely because another location might have been more suitable or just as suitable for a given purpose. Proof must be limited to the present conditions of the property and the uses of which it is currently adapted. Maintenace of complete ranch production records is a critical issue in documenting real estate value. The rancher needs to closely examine the total and real value of land based upon the market value of resources involved in all types of uses. As an example, ranchers who allow hunting on their property should consider that this form of recreation enhances the actual economic value of the ranch.

Evidence of rental income or value may be admitted and considered in determining the value of condemned land. It is proper to consider the value of crops growing on the land at the time of the condemnation. It is also proper to consider the value of mineral deposits and buildings and other improvements. Where only a portion of the property is taken, the owner of the property may be entitled to severance damages, that is, the difference in a fair and reasonable market value of the remainder of the land, before and after the taking. Evidence of every element of annoyance and disadvantage resulting from the improvement which would influence a prospective purchaser, including, smoke, noise, soot, cinders and vibrations, may be considered. However, temporary inconveniences caused by construction are not compensable provided the inconveniences are "reasonable."

Under an easement interest, the measure of damages is the difference in the reasonable market value of the land before and after the taking. Additionally, when real property has been condemned, the cost of removing personal property may be compensable.

Condemnation Process

There are similarities in the condemnation procedures among the Western states. Once condemnation has been initiated, the condemner, generally, may examine and survey land to determine the correct legal description, by court order if necessary. A petition is then filed in the court. However, the condemner must attempt to negotiate with the owner prior to filing a petition. Once a condemnation petition has been filed, the court appoints appraisers who then give notice to all concerned that they will view the property at a certain time to discuss the matter of damages. The appraisers then make a written report to the court and a certified copy of the condemnation award is forwarded to the Register of Deeds. The condemner deposits the amount of the award in the court, and thereafter, the court provides the condemner with evidence of ownership. If either the condemner or owner is dissatisfied with the award, an appeal must generally be made within 30 days. If the landowner intends to appeal, statutes should be examined to determine if there is a level of adjustment under which the landowner must pay legal expenses even though a change in the award is granted. In Nebraska, the condemner is required to pay the landowner's expenses only if the award is increased 15% or more. Payment of legal expenses includes not more than two expert witnesses.

Rancher's Position

Early in the process, a great deal can be accomplished through negotiations. Landowners should be encouraged to seek the assistance of a professional negotiator as soon as possible. The benefits of a professional negotiator could be substantial. Once condemnation proceedings have started, however, the situation becomes much less flexible.

Negotiations are much more effective when landowners organize and unite in their cause. Organization provides an opportunity to develop more publicity and pressure than as individuals. It is also much easier for a condemner to take one person to court than a group of individuals. Condemners may not be anxious to appear before juries if they are neighbors and friends of the person whose property is being taken. It is a common habit of developers to keep their plan as quiet as possible for as long as possible to play upon the inertia of people and the inherent individuality of ranchers. Ranchers need to stay alert, initiate teamwork and seek the best possible legal counsel in environmental law.

If an easement is sought, coercion can be put on a condemner to locate the easement along property or section lines. Powerlines or pipelines which cross a piece of property may have an effect on farming and ranching operations. The width of an easement is a matter of negotiation. Condemners should be left with the narrowest possible strip of land for their purposes, thereby minimizing the potential damage from construction and maintenance crews. Condemning organizations have commonly been given the initial authority to decide what land is taken within the framework of nonexcessive abuse. Because the interpretation of nonexcessive abuse is relative to the parties involved, ranchers need to examine the legal restraints on land condemnation for their respective states.

When facing condemnation proceedings, the rancher may seek help from environmental organizations. These groups are experienced, have access to excellent legal counsel on a national level, and can often help with the cost of litigation. They may also have access to experts in environmental inventory and assessment.

If a proposed project is federal in nature or involves a federal agency, an Environmental Impact Statement (EIS) must be prepared in accordance with the National Environmental Policy Act. This statement must include a detailed discussion of the environmental impact of the proposed action. It must include alternatives to the proposed action and a discussion of the action's potential impact on long-term productivity. Irreversible commitments of resources involved in the proposed action must also be included. These statements are often inadequately prepared by consultants hired by the condemning agency or corporation. Ranchers should insist that the EIS be thoroughly prepared. Legislation such as the Endangered Species Act of 1973 may also be used to a rancher's advantage should the habitat or individuals of an endangered species be present.

Adequate legal protection may not be provided to landowners where energy transport systems cause extensive vegetation and soil disturbance or create barriers to the movement of livestock and equipment. The control of public service commissions and interstate commerce commissions over revegetation, fencing and construction and location of crossings for livestock is often limited by incomplete legislated guidelines. Issues frequently beyond the current authority of these commissions with regard to railroad construction include the ability to mandate revegetation or the time frame and methods of revegetation. While railroads must generally build legal boundary fences on each side of their right-of-way, completion of fencing is frequently not required until six to nine months after the completion of the railroad. Consequently, ranchers may find it necessary to build fences at their own expense or lose the potential livestock production from the affected pastures during the railroad construction.

Conclusions

Payments to ranchers for the impacts of condemnation should represent true compensation. The value of the standing forage or current cattle production does not provide a fair assessment. Compensation should be based upon prices determined for several years, rather than a single year because of the impact of inflation and variation in the market and weather conditions over time. Just compensation should also reflect the inherent productivity of the land through time, especially with regard to rangeland.

Natural resources are the foundation for both the range livestock and energy industries. Beyond this similarity, there are few aspects in common. Fossil fuel industries practice removal of a limited resource, while the range livestock industry practices the long-term maintenance and utilization of a renewable resource. Furthermore, energy transportation industry has been heavily favored by legislative action. Consequently, strong antagonism frequently arises. Still the range livestock industry must deal with the issues at hand in order to reach the best possible compromise. The sovereign power of eminent domain is at times necessary, and the rights of the individual must at times be subordinated for the good of the whole. However, eminent domain laws and the responsibilities of the condemner and associated agencies need to be critically examined by the range livestock industry. In principle, current laws generally seek only to compensate, not to replace. Eminent domain laws must be modified to more adequately reflect the expenses of replacing needed real estate within a range livestock operation and the legal and professional expenses of the landowner in arriving at a fair and just compensation.

We express our gratitude to Steve Waller, Jim Stubbendieck, Darrel Cruea, Bridget Nollette and Donna J. Norton for their help in reviewing this manuscript.

Renewable Resources Inventory Conference

Four hundred scientists and inventory specialists are expected to gather in Corvallis, Oregon, August 15-19 to attend an international conference on Renewable Resource Inventories for Monitoring Changes and Trends. The conference is sponsored by several professional societies and international organizations, including the Society for Range Management.

Four keynote speakers will be featured. They will present their views on the managers need for information on changes and trends in renewable resources. Gerd Hildebrandt, Professor of Forestry at Albert Ludwigs University in Freiburg, West Germany, will give a global perspective to the subject. Robert E. Buckman, Deputy Chief of Research, USDA—Forest Service, Washington, DC, will present the national perspective; H. Mike Miller, State Forester, Salem, Oregon, will cover the State perspective and W. Lee Robinson, Vice President, Longview Fiber Company, Longview, Washington, will discuss how industrial decisions are affected by changes and trends information.

Specific details of field trips and mini-workshops are offered in the registration packet that is available from the Conference Assistant, School of Forestry, Oregon State University, Corvallis, Oregon 97331.

Range and Pasture Seeding in the Southern Great Plains

A symposium on the most promising new grasses for western Oklahoma and north, west and south Texas; the latest technology on seedbed preparation, planting methods, seed harvesting, seed processing (modification/coatings) and seed testing; and a panel discussion by ranchmen will be conducted October 19, 1983 in Vernon, Texas, at the Wilbarger Auditorium between 8:30 a.m. and 3:30 p.m. You will see the newest equipment for planting, harvesting and seed processing/modification. Keynote speaker is past-president of SRM, John "Chip" Merrill.

The $10.00 registration includes a printed proceedings and catered lunch. Pre-registration is requested. The sponsors are Texas A&M University Agricultural Research and Extension Center at Vernon, TX; Southern Plains Range Research Station at Woodward, OK; SCS Plant Materials Center at Knox City, TX; SRM in Texas and Oklahoma; and others.

For further information contact Harold T. Wiedemann, Texas Agricultural Experiment Station, P.O. Box 1658, Vernon, TX, phone (817) 552-9941.

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The 2nd International Rangeland Congress Adelaide, Australia • May 13 – 18, 1984

The 2nd International Rangeland Congress, under the auspices ot the Australian Rangeland Society and the Australian Academy of Science, will convene in Adelaide, Australia.

Adelaide is located at the foot of the Mount Lofty Ranges and adjacent to the wide sandy sweep of St. Vincent's Gulf. The city and its suburbs - separated by a green belt of parks and gardens - blend old colonial Australian architecture and housing styles with modern city buildings and arcades of boutiques, eating spots and antique shops. The outstanding Barossa Valley and the southern district wine areas are a short distance from the city. To the north of Adelaide are the Flinders Range and to the south Kangaroo Island, Australia's largest fauna reserve.

All sessions will be held at the University of Adelaide, with the opening ceremonies on Sunday, May 13, and concurrent symposia from Monday, May 14 through Thursday, May 17. Symposia topics include: Dynamics of Range Ecosystems, Grazing Industries, Range Resource Monitoring and Administration, Ecophysiology of Rangeland Plants, Mining and Rangelands, Conservation and Wildlife, Fire in Arid and Semi-arid Regions, Technological Improvements of Arid Rangelands, Animal Production, Management of Grazing Systems, Developing World - Challenges and Opportunities, Man and the Biosphere, and Primary Producers. In addition, there will be lunchtime lectures, publications, displays, and Associate and Social Programs.

The firm of Travel Planners, Inc., specialists in South Pacific Conferences, has been appointed as the Official Coordinator for North Americans attending the Congress. Travel Planners will facilitate your registration - offering air reservations and ticketing, housing, sightseeing, pre and post tours - all through **one central office**. You will have the advantage of prompt communication within the U.S. for all of your requirements.

Exclusive trips have been developed to offer U.S. and Canadian attendees special low air fares and ground arrangements through group travel. Highlights of these trips are shown below.

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- 2 nights accommodations in Melbourne
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The official Congress airlines are **Qantas**, the designated international carrier, and **Ansett**, the domestic airline. **Special Air Fares will be offered at a savings of 30-40% as compared to normal tourist class fares.**

All of the above programs, as well as important information on the Congress Scientific Tours and the necessary reservations forms, will be included in the Travel and Housing Brochure, which will be available in September 1983. To receive your copy, please fill in the form below and return to:

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Current Literature of Range Management

This section has the objective of alerting SRM members and other readers of *Rangelands* on the availability of new, useful literature being published on applied range management. Readers are requested to suggest literature items—and preferably also contribute single copies—for including in this section in subsequent issues. Personal copies should be requested from the respective publisher or senior author (address shown in parentheses for each citation).

Approaches to Plant Community Classification for the Range Manager; by Ramond D. Ratiliff and Rex D. Pieper; 1982; J. Range Mgt. Mono. Ser. I; 10 p. (USDA, For. Serv., Pacific Southwest For. & Range Expt. Sta., Fresno, Cal. 93700) Describes the seven major systems used to classify plant communities and the principles on which they are based.

Characteristics of Grazing Systems; by James R. Gray, Carl Steiger, Jr., and John M. Fowler; 1982; N. Mex. Agric. Expt. Sta. Res. Rep. 467; 16 p. (Agric. Expt. Sta., N. Mex. State Univ., Las Cruces, N. Mex. 88003) Describes the basic livestock grazing systems, reviews previous studies, diagrams and evaluates selected specialized grazing systems, and concludes that no system is always superior.

Control of Sand Shinnery Oak *(Quercus harvardii)* with Pelleted Picloram and Tebuthiuron; by Pete W. Jacoby and Cecil H. Meadors; 1982; Weed Sci. 30(6):594-597. (Tex. Agric. Expt. Sta., P.O. Box 1658, Vernon, Tex. 76384) This study quantified the response of sand shinnery oak to several rates of picloram and tebuthiuron pellets in the Rolling Plains of Texas.

Drought Survival of Selected Forage Grasses Commonly Seeded in the Northern Great Plains; by Pat O. Currie and Richard S. White: 1982; Can. J. Plant Sci. 62(4):949-955. (USDA-ARS, Livestock and Range Res. Sta., Route 1, Box 2021, Miles City, Mon. 59301) A study of the effects of prolonged drought between 1979 and 1981 on newly planted and previously established grass species and cultivars.

Effective Nitrogen Fixation by Legumes in Cool Season Grass Mixtures; by Earl M. Kroth, Louis Meinke, and Richard Mattas; 1982; Mo. Agric. Expt. Sta. Res. Rul. 1047; 20 p. (Agric. Expt. Sta., Univ. Mo., Columbia, Mo. 65211) Determined the amount of nitrogen fixed by legumes in pasture mixtures and their replacement value of nitrogen fertilization under different levels of P and K.

Evaluation of Grasses for Selected Sites in South Texas Plains; by Marshall R. Haferkamp and J.L. Mutz; 1982; Tex. Agric. Expt. Sta. Misc. Pub. 1507; 25 p. (Agric. Expt. Sta., Tex. A&M Univ., College Station, Tex. 77843) Compared the establishment, production potential, and forage quality of cultivars of several selected warm-season grasses.

Forage Yield and Other Traits of Six Tall Wheatgrasses; by Ferdinand A. Quinones; 1981; N. Mex. Agric. Expt. Sta. Res. Rep. 460; 5 p. (Agric. Expt. Sta., N. Mex. State Univ., Las Cruces, N. Mex. 88003) Evaluated cultivars of tall wheatgrass for yields, protein content, greenness, and spring recovery, with suggestions for their future use in grass breeding programs.

Forage Yield and Quality of Indigenous and Introduced Grasses at Palmer, Alaska; by W.W. Mitchell; 1982; Agron. J. 74(5):899-905. (Dept. Agron., Alaska Agric. Expt. Sta., Palmer, Alaska 99645) Study to judge the merits of the respective grass species for further research and north-latitude applications.

Grazing-Land Values in New Mexico; by John M. Fowler and James R. Gray; 1981; N. Mex. Agric. Expt. Sta. Res. Rep. 456; 10 p. (Agric. Expt. Sta., N. Mex. State Univ., Las Cruces, N. Mex. 88003) Compiled data on appraisal values per animal unit from 1964 to 1979 of BLM, Forest Service, and private lands, singly and in combination, and evaluated the variables affecting these values.

Guarding Dogs Protect Sheep from Predators; by Jeffrey S. Green and Roger A. Woodruff; 1983; USDA Agric. Info. Bul. 455; 27 p. (USDA, Office of Info., Washington, D.C. 20250) Provides recommendations on species and sources of guarding dogs—in contrast with herding dogs—selecting individual animals, their development and training, and use on range and pasture.

A Guide to the Identification of Plants Poisonous to Livestock of Western Texas; by Chester M. Rowell, Jr.,; not dated (abt 1982); Angelo State Univ., Management, Instruction, and Res. Center Pub. B-2; 36 p. (Request from author; Angelo State Univ., San Angelo, Tex. 76901) Provides plant descriptions and illustrations for use by farmers and ranchers in identifying poisonous plants. (A companion Pub. B-1 covers poisonous plants of central west Texas around San Angelo).

Influence of Managed Pine Stands and Mixed Pine/Hardwood Stands on Well Being of Deer; by Lowell K. Halls and Charles E. Boyd; 1982; USDA, For. Serv. Res. Paper SO-183; 18 p. (USDA, For. Serv., Southern For. Expt. Sta., T-10210 Fed. Bldg., New Orleans, La 70113) An evaluation of forage and deer production in pine and mixed pine-hardwood stands, with observations on the effects of prescribed burns and timber thinning.

Livestock-Poisoning Plants of California; by Murray Fowler, Arthur L. Craigmill, Ben B. Norman, and Paul Michelsen; 1982; Univ. Cal., Div. Agric. Sci. Leaflet 21268; 24 p. (Agric. Bul. Room, Univ. Cal., Berkeley, Cal. 94720) Briefly describes the principal poisonous plants of the state along with their distribution; provides a special section on animal symptoms and treatment for each plant.

Management of Beef Herds; by John R. Dunbar, Dan Drake, Reuben Albaugh, Kenneth W. Ellis, et al.; 1981 (Rev.); Univ. Cal., Div. Agric. Sci. Leaflet 2933; 9 p. (Agric. Bul. Room, Univ. Cal., Berkeley, Cal. 94720) Emphasis given to the development and management of breeding stock for effective reproductive performance through selection, feeding, and herd health.

Mt. St. Helens Ash: Considerations of Its Fallout on Rangelands; by Forrest A. Sneva, Carlton M. Britton, H.F. Mayland, John Buckhouse, et al.; 1982; Ore. Agric. Expt. Sta. Spec. Rep. 650; 27 p. (Eastern Ore. Agric. Res. Center, Burns, Ore. 97720) Evaluated the short term effects of volcanic ash on soil characteristics, seed germination, seedling emergence, watershed values, and forage digestion.

Persistence of Sainfoin *(Onobrychis viciifolia Scop.)* in the Semiarid Prairie Region of Southwestern Saskatchewan; by M.R. Kilcher; 1982; Can. J. Plant Sci. 62(4):1049-1051. (Res. Sta., Agric. Can., Swift Current, Sask. S9H 3X2) Sainfoin did not persist well when seeded in mixture with Russian wild ryegrass and only slightly better in alternate rows.

Project Bold: Alternatives for Utah Land Consolidation and Exchange; by Utah Natural Resources and Energy; 1982; Salt Lake City, Utah; 265 p. (State of Utah, Dept. Natural Resources & Energy, 1636 W. North Temple, Salt Lake City, Utah 84116) Utah's proposal, with alternatives, to consolidate its state lands by exchanges with the federal government.

Public Policy and the Future of Alaska's Reindeer Industry; by Wayne C. Thomas and Edward L. Arobio; 1983; Agroborealis 15(1):61-65. (Mailing Room, Agric. Expt. Sta., Univ. Alaska, Fairbanks, Alaska 99701) Considers such factors as reindeer-caribou range rivalry, divided federal and state land management responsi-

Compiled by John F. Vallentine, professor of range science, Brigham Young University, Provo, Utah 84602.

bilities, and Native ownership and management of the reindeer herds.

Russian Thistle and Barbwire Russian Thistle Seed and Seedbed Ecology; by Raymond A. Evans and James A. Young; 1982; USDA Agric. Res. Results ARR-W-25; 40 p. (Renewable Resources Center Univ. Nev., 920 Valley Road, Reno, Nev. 89512) Studied seed germination, seedbed ecology, seedbed environment, seed production, and seedling competition in relation to the inherent capabilities of these two taxons in establishing in arid and semiarid environments.

Seeding Grassland Ranges; by A. McLean and A.H. Bawtree; 1982; British Col. Min. Agric. & Food Pub. 82-3; 19 p. (The Publications Office, Min. of Agric. & Food, Parliament Bldg., Victoria, B.C. V8W 2Z7) A practical guide to rangeland seeding in British Columbia and management of seeded stands.

Sod-Seeding Perennial Grasses into Eastern Nebraska Pastures; by John F. Samson and Lowell E. Moser; 1982; Agron. J. 74(6):1055-1060. (Dept. Agron., Univ. Neb., Lincoln, Neb. 68583) Investigated the use of paraquat and atrazine to suppress weedy bluegrass pasture vegetation as a means of seedbed preparation for drilling perennial forage grasses.

Using Goats to Control Brush Regrowth on Fuelbreaks; by Lisle R. Green and Leonard A. Newell; 1982; USDA, For. Serv. Gen. Tech. Rep. PSW-59; 13 p. (USDA, For. Serv., Pacific Southwest For. & Range Expt. Sta., P.O. Box 245, Berkeley, Cal. 94701) Summarizes knowledge and experience gained in southern California; considers effectiveness of control, environmental considerations, goat management, and economic returns from goats.

The Voluntary Forage Intake of Heifers Grazing a Diminishing Supply of Crested Wheatgrass; by Kris M. Havstad, Anastasios S. Nastis, and John C. Malechek; 1983; J. Anim. Sci. 56(2):259-263. (Dept. Anim. & Range Sci., Mon. State Univ., Bozeman, Mon. 49717) Utilizing crested wheatgrass pasture in central Utah, this study was made of the relationship between daily voluntary intake and declining quantity of available forage.

Wildlife Habitats in Managed Rangelands—The Great Basin of Southeastern Oregon: Mule Deer; by Donavin A. Leckenby, Dennis P. Sheehy, Carl H. Nellis, Richard J. Scherzinger, et al.; 1982; USDA, For. Serv. Gen. Tech. Rep. PNW-139; 40 p. (USDA, For. Serv., Pacific Northwest For. & Range Expt. Sta., P.O. Box 3141, Portland, Ore. 97208) A summary publication describing the optimum habitat for mule deer and providing information on the effects of range management alternatives on mule deer; one of 14 publications in a series.

Woolly Locoweed and Forage Response to Herbicides in West Texas; by M.R. Freeman, D.N. Ueckert, and J.T. Nelson; 1982; Tex. Agric. Expt. Sta. Bul. 1398; 9 p. (Agric. Expt. Sta., Tex. A&M Univ., College Station, Tex. 77843) Evaluated several herbicides applied at different seasons for consistent and extended control of woolly locoweed along with response of associated forage species.

Books in View

Procedures for Evaluating Predation on Livestock and Wildlife

by Dale A. Wade, Extension Wildlife Specialist, Texas A&M University, San Angelo, Texas, and **James E. Bowns,** Range Ecologist, Southern Utah State College, Cedar City and Utah State University, Logan, Utah.

This 40-page bulletin, B-1429, containing 114 professional-type colored photographs is worthy of anyone's library for personal use and reference. This bulletin briefly describes the evidence left by a variety of predatory mammals and birds of the United States when preying upon livestock and game animals. Their methods of attacking, killing and/or feeding on livestock and wild prey animals are reviewed, in addition to the type wounds they cause, their tracks and other evidence they may leave. The bulletin covers predation by coyotes, dogs, foxes, cougars, bobcats, bears, hogs, eagles, scavenging birds and snakes.

The bulletin is intended primarily for those who do not have experience with predator and livestock behavior, predation, and other causes of livestock losses. Other factors, such as malnutrition, parasites, poisonous plants, diseases, etc. which must also be considered in determining the cause of injuries and death are reviewed.

Bulletin B-1429 in single copies or small numbers is free, while large orders may carry a cost figure. These bulletins may be obtained from: *Norman C. Johnson, U.S. Fish and Wildlife Service, Animal Damage Control, Box 1306, Albuquerque, New Mexico 87103, Telephone 505/766-2839.*

The authors have also produced and educational slide series which provides more specific detail about predation on livestock and game animals, predator sign and evaluation.

The slide set includes 240 slides, taped narrative and typewritten script. Cost of the set, postpaid, is $85.00.

Inquiries should be directed to: Dale A. Wade, Extension Wildlife Specialist, Texas A&M Research & Extension Center, Route 2, Box 950, San Angelo, Texas 76901: Orders should include check, money order or purchase voucher for $85.00 payable to: Texas Agricultural Extension Service, Room 100, Nagle Hall, Texas A&M University System, College Station, Texas 77843.

Guarding Dogs Protect Sheep From Predators

by **Jeffrey S. Green** and **Roger A. Woodruff.**

This 28-page, interesting and well illustrated, Bulletin 455 was published by USDA in January 1983. It is a general guideline on the use of guard dogs.

The bulletin is divided into four main sections: ownership responsibilities; selecting the right dog; from puppy to guarding dog; and range and pasture.

Bulletin 455 may be obtained by contacting Jeffrey S. Green. U.S. Sheep Experiment Station, Dubois, Idaho 83423.

Classified Bibliography on Native Plants of Arizona

by **Ervin M. Schmutz.**

This is the most comprehensive, useful, up-to-date guide to vegetation in Arizona that has ever been published. It contains 160 pages of more than 3,000 references segregated into 30 bibliographic categories.

This book, whether for studying or working in Arizona or the Southwest, is indispensable to ranchers, state and federal agency, people, researchers, teachers, students, and all those involved in range management, forestry, and ecology.

Entries cover plant species and communities, with special subject categories including the effects of grazing and burning on plant composition and distribution.

The author is a native of Arizona and for the past 23 years has been a teacher and researcher in range management at the University of Arizona.

This very valuable reference book was developed in cooperation with the Natural Vegetation Committee, Arizona Chapter of the Soil Conservation Society of America. It may be obtained from the University of Arizona Press, Tucson, Arizona 85721 for $6.50 or clothbound for $12.00.

Legislative Log

The 98th U.S. Congress has been faced with many time-consuming subjects. Debates on the jobs bills, budget reconciliation overall, foreign relations, differences in the Environmental Protection Agency, and Social Security revisions, just to mention a few examples.

The $4.6 billion jobs bill signed by the President on March 24th contained about 25 percent allocated for natural resources.

A few of the more important natural resource bills follow.

Proposed Bill	Description of Bill	Status as of May 9, 1983
S-663 Senator Armstrong for himself and 20 other Senators. H.R. 1077, Congressman Brown, Colorado S-457	To prohibit the payment of certain agricultural incentives to persons who produce certain agricultural commodities on highly erodible land. Commonly called the "Sodbuster Bill." Bill precludes any person producing an agricultural commodity on highly erodible land from obtaining—(1) Any price support assistance on such commodity. (2) Loans for construction of storage facilities; (3) Crop insurance; (4) Disaster payments; (5) Farmers Home administration loans. Bill does not place restrictions on what a land owner can do with his own land. It merely prohibits incentive payments if he does farm highly erodible land.	A hearing was held by the Senate Committee on Agriculture, Forestry, and Nutrition on April 19th chaired by Senator Jepson. Senator Armstrong testified in support of his bill. He also introduced into the record a statement by SRM supporting S-663 and enclosing the symposium summary given by the Colorado Section as well as their resolution. The Farm Bureau, National Farmers Union, SCS, ASCS, Soil Conservation Society, Colorado Cattlemen, National Association of Conservation Districts and Colorado Association of Conservation Districts all gave testimony supporting the bill. Leon Silkman, President of the Colorado Association of Conservation Districts, also filed SRM's support. No one appeared in opposition to S-663. SRM filed a support statement. A House hearing was held on May 4. The Senate committee forecasts passage of the bill in this session.
Senator McClure for himself and joined by Senators Symms, Laxalt, and Wallop H.R. 1675 Congressman Bolkmen (D), Montana.	Amendments to the Wild Horse and Burro Act of December 1971, Public Law 92-195. The proposed amendments include: the principle that a healthy, free, wild roaming horse and burro population will be managed under a multiple use principle, provides for cooperation with appropriate state and local agencies, provides for an advisory council, ties management into land use plans for the area, establishes the principle that adoption fees shall be such as to discourage speculation and after adoption demands are met if there are additional surplus animals, they should be sold at public auction.	Hearings were held at Rock Springs Wyoming on March 29th and in Washington, D.C., on April 11th. The hearings were chaired by Senator Wallop. SRM testified at both hearings with testimony prepared for the Wildlife Society and our Society. Approximately 100 individuals and organizations have expressed support for the proposed amendments and more is expected. There is opposition to several of the amendments and some compromise is likely. The bill is expected to pass this session with some revisions.
S-1025 Senator Mark Hatfield H.R. 2491. Congressman Ottinger (D) New York	These generally identical bills may be cited as the "Global Resources Environment, and Population Act of 1983". These bills (1) Call for achievement of balance between population characteristics, the use of natural resources, and environmental change. (2) Require that all federal agencies assess the impact of population trends on public policy to effect more efficient policy planning and implementation. (3) Promote safeguards to the environment and the supply of natural resources in order to preserve our way of life. (4) Establish an interagency council—as a foresight capability—to project short and long term national and global trends on population, the environment and natural resources. (5) Provide a framework for intergovernmental cooperation—federal to state and local—to enhance total planning efforts.	Hearings are expected later this session. Thirty two organizations have endorsed action on these bills. They include the American Public Health Association, the Isaak Walton League of America, National Audobon Society, National Wildlife Federation, Sierra Club, the Society of American Foresters as a few examples. There are two or more thrusts to these bills at this time. One of the most compelling is the U.S. government has for many years advocated the adoption of policies for population control by most other countries of the world. The second reason is the large immigration both legal and illegal. These bills would look at this problem along with other aspects. The bill is expected to receive considerable support and has a chance of passage.

Six Million Forest Acres for Sale?:

The U.S. Department of Agriculture's land sales team now is focusing on six million acres of national forest land to determine whether to sell all or part of it, the Wildlife Management Institute reports.

The public, however, is no less irate with six million acres near the auction block than it would have been with 18 million. The National Forest System is a valuable recreational resource to the American people and they will object to any significant parcels of their land being traded away.

There will be ample opportunity for the public to state its views on any of these properties that eventually may be offered for sale. U.S.D.A. currently does not have the legislative authority to sell National Forest System lands. That authority must be given by Congress. U.S.D.A. is preparing a bill that would give it that authority. It will then be introduced in the House and Senate for rejection or passage.

Budgets:

Budget hearings in both the House and Senate have been completed for most of the land management and natural resource agencies. It is expected that there will be delays in the budget process again this year.

Viewpoint: The Coyote-1080 Conspiracy—an Aborted Attempt to Drive Livestock Off Federal Lands

Walter E. Howard

Compound 1080, a toxicant that was used for many years to poison coyotes, was banned for this purpose by the Environmental Protection Agency (EPA) in 1972, and this is one example where the press failed to investigate government irregularities that many people reported at that time. The great coyote-1080 conspiracy that was perpetrated during the "Coyotegate Years" of 1971-73 still continues today. Perhaps the press was too involved in Watergate matters to take notice of the conspiracy. Anyway, it has taken an extensive Ph.D. thesis (Angus A. MacIntyre, "The politics of nonincremental domestic change: major reform in federal pesticide and predator control policy," University of California, Davis, 876 p. 1982) to fully document how this conspiracy was orchestrated primarily by one individual in the President's Council on Environmental Quality (CEQ). His principal collaborator was the assistant secretary of the Department of the Interior (USDI). This well-documented and scholarly thesis provides fascinating reading on how the Environmental Protection Agency (EPA) and President Nixon also were tricked into assisting in the conspiracy.

I think the main reason EPA foolishly joined in the conspiracy was, as biology officials in EPA told me (3/21/73), they reasoned that since the U.S. could import all the livestock products needed from Argentina, Australia and New Zealand, why protect them from coyotes on federal lands in the West? There was a movement at that time to remove livestock from all government lands. They overlooked or didn't care, that sheep and cattle are also grazed on private lands, that coyotes do not recognize property boundaries, and that these lands have been designated by Congress for multiple use, including grazing.

Many innocent people and organizations, including the White House staff, EPA, and Congressional leaders, became entrapped in the conspiracy, and the general public and scientific community were equally fooled by the hoax that Compound 1080 was such a terrible poison. Even though EPA's hearings (FIFRA Docket No. 502) held March 30 to August 6, 1982 (which probably cost several million dollars) clearly proved that the earlier claims against 1080 were not true, the politics have not ended. It is going to be interesting to see if EPA can make a clean break from the conspiracy in its 1983 decisions.

The central question at issue is do coyotes have to be controlled? All sides now seem to agree in the affirmative. Next, are poisons still necessary? For those who have studied the matter, the answer, unfortunately, is clearly yes. There are many coyotes that cannot be controlled by any other means. Then, if poisons are stil required, is 1080 the best toxicant to use, except for cyanide in the M-44 devices? The following is an attempt to clear the air on these matters.

The author is professor and vertebrate ecologist, Wildlife and Fisheries Biology, University of California Davis 95616.

As a faculty member of the University of California and a highly concerned resource person, environmentalist and conservationist, I have been researching 1080 (sodium monofluoroacetate) for the control of rodents for 35 years and the control of coyotes for a decade; but, of course, I speak for myself and not for the University of California.

As my more than 300 research papers and reports will testify, my research goal, i.e., the applied aspects of my research, is to develop the most selective, safest, efficacious, humane, and environmentally desirable way of controlling wildlife that are pests to homeowners, farmers, ranchers and foresters, and I consider poisons a last resort. It is a pity that we can't all work together to benefit the environment by developing better alternative control methods. I take great pride in having probably saved more nontarget wildlife in nature than most environmental organizations, for they must create money-soliciting bonfires directed toward "anti" control legislation rather than seek better alternative solutions, which is the constructive approach that is needed.

When individuals and organizations began to object to the killing of any animal, it was only natural that they chose 1080 as a local target, since the Fish and Wildlife Service (FWS) of the U.S. Dept. of Interior had already frightened most of its own personnel about 1080. And for the last 30 years or so, Interior has not permitted its own animal control research branch, the Denver Wildlife Research Center (DWRC), to carry out research on how to use 1080 for rodent and predator control in a more efficacious and safe way. The only research on 1080 that Interior has permitted is its use in the "toxic collar," a device placed on sheep to control coyotes. The reason for this is that the assistant secretary of USDI responsible for animal control is also in charge of National Parks, a hopeless conflict of interest.

The controversy about 1080 continued to smolder, with the Washington office of USDI never permitting the DWRC to keep the public properly informed about this toxicant, so it became a natural target for "anti" groups to exploit when the ecology movement started with the establishment of the National Environmental Protection Act of 1969 (NEPA), signed in 1970.

Actually in the late '60s and early '70s, few people really understood the true ecology of coyotes control with 1080, and most of those who did were in the FWS and not allowed to speak out. In the late '60s and early '70s, it became politically possible for a new breed of environmental lawyers to maneuver public view—with intrigue and tacit actions from some officials in CEQ, USDI, and EPA—so

that the public, including most biologists and conservationists were convinced that 1080 was an uncontrollable control, an indiscriminate toxicant that concentrates in food chains, causes mass secondary and direct slaughtering of nontarget species, and that it is one of the most toxic chemicals known to man, thus posing a serious human hazard. None of this is true.

The primary orchestration of this conspiracy occurred in CEQ (MacIntyre 1982). It was so successful that without justification Administrator William D. Ruckelshaus banned 1080, claiming that imminent hazards were so great there was not time to hold a public hearing which, of course, would not have supported CEQ's claims. Why this sudden urgency? Compound 1080 had been in use for about 27 years. Compound 1080 and other predacides were banned on the basis of two emotional petitions by environmental groups playing the advocacy game, but these petitions contained no objective evidence against 1080. EPA stated the decision was also based on recommendations of the Cain Report (Predator Control-1971. S.A. Cain, et al., Report to CEQ and USDI, 1972, 207 p.). It is now known that the 15 "Recommendations" in the Cain Report were not written or approved by the distinguished authors of the report. Also, the National Academy of Sciences—National Research Council withdrew joint sponsorship of the Cain Report study because the key individual in the CEQ insisted on selecting the participants.

Let's take a look at the "evidence" EPA used to justify its highly irregular and indiscreet cancellation of all registrations of poisons (predacides) for the control of coyotes and, in particular, 1080. EPA was the final conspirator, for its cancellation of 1080 was clearly unjust and done without adequate or proper analysis and by not insisting that the USDI assistant secretary release the environmental impact statement concerning 1080 and coyote control. All the incriminating evidence against 1080 used by the EPA Administrator has proved to have been false or based only on hearsay without direct evidence.

It is possible to cause secondary poisoning with many toxicants, but there is no bona fide evidence of endangered species being killed by 1080, yet congressmen were falsely told by personnel from CEQ and USDI that 1080 had even exterminated a number of species in the United States.

The hazard of 1080, when used as a rodenticide, is minor with birds, as they are much more resistant to 1080 than the target animals. No endangered bald eagles have been killed by 1080, but eagles have been killed with thallium sulfate. It is practically impossible for another animal to be killed by feeding on the carcass of a coyote killed with 1080 unless it is another coyote cannibalizing it.

The claim was made that continued use of 1080 would result in irremediable and incorrectable losses, particularly of endangered species. No evidence was offered as to how this might happen. Of course, with high enough concentrations of 1080, it is possible to kill anything. The point is that, as used for coyote control, this claim cannot be substaniated. EPA's 1982 hearings exposed the falseness of the many charges against 1080.

Another statement against 1080 was that its use "conferred only ill-defined and speculative benefits." In 1971 and 1972, many in USDI and CEQ were inferring that most coyotes would not kill sheep, claiming they were only scavengers of sheep that had died from other causes. It has now been clearly shown that the coyote has put many livestock operators out of business and that coyote depredations are a serious economic problem—costing California alone nearly $75 million a year.

Many different methods of coyote control are needed because of the great diversity in coyotes and in the physical environment. The ecology of coyote depredations to livestock is highly variable in different situations. Control methods that do offer varying degrees of predator protection include herders, improved husbandry techniques, guard dogs, llamas, repellents, frightening devices, aversive conditioning with lithium chloride or other agents, electric fencing, gassing pups in dens, trapping, shooting, shooting from the ground or aircraft, hunting with dogs, snaring, and M-44's that eject cyanide. So far, at least in many parts of the West, no single or combination of these methods have been able to adequately protect livestock from coyotes. (Dale A. Wade, "Impacts, incidents, and control of predation on livestock in the United States, with particular reference to predation by coyotes." Council for Agricultural Science and Technology (CAST), Special Publication 10, 1982.) It is these situations where 1080 is still biologically the most desirable approach because it can be used without adversely affecting the environment or creating much hazard to man and other nontarget species.

Dogs are the principal nontarget hazard that must be considered when using 1080 to control coyotes, but other carnivores such as badgers, skunks, and foxes are vulnerable to 1080, so care must be exercised. Nontarget animals are largely protected by the way baits are formulated, lure used, season, and the manner in which baits are exposed in the field.

Coyotes can cohabit—live together—in some areas with large numbers of people, unlike species such as grizzly bears, wolves or herds of bison. One reason the coyote is often a pest is because it can adapt so well to these altered environments, even living as a comensal (living with man) predator and feeding on garbage, cats, and small dogs.

During the last century, coyotes have greatly increased in total numbers and extended their geographic range from just the western United States to all contiguous 48 states, north through Canada to Alaska, and south through Mexico and Central America to Costa Rica. The diet of the coyote is highly variable and includes rodents, rabbits, deer, berries, melons, etc.; however, many coyotes are also very effective predators of man's possessions. They often also readily kill cats, dogs, sheep, goats, poultry, cattle, etc.

If you do not agree that poisons are needed to control coyotes, there is no point in discussing 1080. But if you, like me, recognize that some coyotes still have to be poisoned, then let's constructively analyze the pros and cons of using 1080.

In coyotes and other carnivores death from 1080 typically results from central nervous system disorders, with the animal presumably being unconscious prior to death since they often run blindly into walls and fences. Extreme pain has never been reported as a symptom in the many human suicides in Asia from drinking 1080 rat poison, but pain in animals, unfortunately cannot be measured. Just because 1080 is slow in taking effect does not mean it is less humane than faster-acting poisons. And, of course, in nature, no animal has a nice death, including the sheep disemboweled by coyotes.

No one knowledgeable aout 1080 denies that if it is used carelessly, it can become lethal to all species, but there are no data that show that the proposed future uses of 1080 to control coyotes pose any significant effects on the environment, other than removing individual and highly localized populations of troublesome coyotes. There is no field evidence indicating that animals which consume a sublethal dose may suffer deleterious effects such as occurred with thallium sulfate, which is now banned.

If a chemical is to be used for coyote control, I contend that 1080 is by far the best chemical to use from the point of view of the welfare of the environment and safety. To oppose the consideration of new registrations of 1080, with adequate use restrictions that will be required before registration is granted, means you may be encouraging increased use of less-selective poisons to protect livestock. If anyone has reliable evidence of significant secondary poisoning by 1080, please share it with me. Also, if you know of a poison that is more desirable than 1080 for controlling coyotes, I would sure like to learn about it. Better yet, do you know of an effective nonlethal approach that has not been tested that could make poisons unnecessary?

As a highly concerned resource person I have followed this matter very closely from the beginning and hope this new evidence about the conspiracy will stimulate others to ferret out the specifics of the hoax that 1080 is so dangerous.

Editor's Note: The author is a highly respected zoologist and this VIEWPOINT was suggested by Theodore Adams, California Extension Wildlands Specialist.

Only excerpts selected by the review and editor are published here. The entire article can be obtained from the author, Walter Howard.

President's Notes

With the advent of summer, our Society is becoming more visible. The schedule for field tours and summer meetings by the Sections are impressive. This is the best way to tell our story and recruit new members. Discussion out in the pasture with the livestock producers, in the mountain ranges with wildlife in the distance, or on the watersheds as we face the early runoff are far more effective than most meetings in the office or around the conference table. Let's get our members out in the field to interact with more users of rangelands!

The Washington scene is also changing as Congress attempts to struggle with huge national deficits. We see threats of cuts in some of the most vital research and technical service programs relating to range conservation. Fortunately, we have some good SRM members monitoring federal actions—and we have some good friends "on the hill" to help us maintain support for the Nation's largest land area—our billion acre range resource!

All members have received copies of the *"Survival Paper"* in the last issue of *Rangelands.* This is an excellent document *but it won't do ranchers much good unless we can place it in their hands.* Please help distribute this important publication. Order extra copies and deliver them to your friends in the livestock sector. Also, this *Rangelands* has some good practical information for professional and technical rangemen.

I am pleased to report to our membership that the Denver staff is doing a great job for the Society. Pete Jackson has initiated many new ideas to give SRM more visibility. We have developed letters to Governors and Legislators pointing out the values of grazing lands in their districts and emphasizing that SRM has the expertise to help them with range problems and improvements. We are still emphasizing research, understanding, and "management" rather than "protection" *per se.* SRM is indeed playing a most important role in the nation's future. Thanks for your help.—**Gerald W. Thomas,** President, SRM

The Executive Vice - President Report

I've been in the saddle for two and one half months already and my opinion of the Society has not changed. If I thought the depth and width of our activities were large when I took office, frankly I hadn't seen anything and I'm even prouder to be a part of these exciting programs and projects.

My priorities have not changed—exposure and involvement still rank Number 1. Therefore I will continue my efforts to attend every Section meeting possible as well as meetings and conferences organized by other groups whose direction parallels our own. With all this in mind, don't be suprised if I'm not in the office when you call—in fact chances are good it will be the last place you will find me. I have continued to find the staff very competent and it would be a waste of time for me to be sitting behind my desk looking very official while the truth of the matter is I'm probably only in their way. So, if you have a problem or concern simply call the office or better yet drop in and I am sure you will be taken care of in a most professional manner. But please don't take me wrong. If I'm needed the staff knows where I am at all times and I will be in touch at the earliest possible time.

Well, where have I been? It's even hard for me to comprehend how far a person can go with the help I've had to date. Roughly and not in detail my travels have taken me to Salt Lake City and Orlando, Fla., for Annual Meeting planning sessions. My only comment on both is *excellent.* When a planning meeting is so well attended that extra chairs had to be found at least twice, and when volunteers were asked for by the President of the Florida Section and the entire front row raised their hands, things are looking good. Incidentally, you can put your fears to rest. The facilities in Utah are spacious and the air fares to Orlando could be a bargain.

In addition I attended the National BLM Advisory Council meeting at Grand Junction, Colo., and the Colorado Section meeting in Fort Collins. Both were very educational and I was able to keep my costs down, due to the generosity of our members who supplied transportation.

Please remember my travel budget is very tight and I need all the help I can get.

Without question, my trip to Washington, D.C., was the highlight of my time with the Society to date. Clare Hendee, our Washington, D.C., Representative, took five full days of his valuable time and escorted us to as many Federal offices, private associations and other functions as could possibly be squeezed into that short period of time. One common factor: Clare was always greeted with great respect and our reason for the appointment was given the highest priority. He is truly a man of action. My only misgivings were as to how we could supply him with the necessary assistants to gain our goals and objectives. Two very special highlights of the trip were supper at the Hendee home and the National Capital Section Bar BQ at Doug Sellars' home in Virginia. I can only say *thank you;* it was grand to say the least.

SRM was very prominent at the Agriculture Research Fair in Washington. In front of a very prestigious crowd of Congressmen and reseach people, Clare Hendee performed the honors in an award presentation to Congressman De La Garza for his hard work in support of Range Management in the Congress. It was appreciated greatly by the Congressman.

After reading my report you might think I'm seeing the world through a giant-size pair of rose colored glasses. Believe me I'm not. We need membership and everyone has to face up to their own personal responsibilities. We need to ask, promote, and, yes, just plain sell our Society. I personally feel it's not too much to set a goal of a member a month as an objective, for each member in 1983 and to put my money where my mouth is, I will host each person who gains that

goal to dinner or a social of some kind at our Annual Meeting and frankly I hope it costs me money.

Well, meanwhile back at the ranch. We are working hard on the Canadian Mailing situation. I have mailed a list of members to persons in the Sections encompassing parts of Canada, asking them to check for errors, and the Journals have been hand mailed by the staff (a tough job) to see if that will help. We're going to have an answer but it may take time. If you are not receiving your Journals, don't just sit there and do a burn. Let us know and we will do something—that's a promise.

In conclusion I've got a lot more to say, but there's no more room in my share of *Rangelands.* Except to compliment the supporters of the Mexico Project. We have passed $3,100 in the fund and that is tremendous, but we still need more. Those folks are hurting and we need them as the active International members they have always been.

Please bear with my mistakes. It really is a privilege to be your Executive Vice-President. See you on the trail soon.—**Pete Jackson,** Executive Vice-president, SRM.

Notes from Denver

Summer Meeting

The Southern Section, SRM invites you to attend the Summer Meeting, July 17-21. If there is such a thing as Southern Hospitality, it will be evident in Long Beach, Mississippi. The Southern Section meeting Chairman, Ron Thill, and his helpers are literally cooking up real treats for those attending. Southern dishes, I've never heard of, and me coming from Arkansas.

The distance may seem far, the humidity may be high, yet these two negatives should not stand in the way of your going to a fantastic meeting, one which will be remembered for a long time. . . .

Summer Section Meetings

The year is almost at the half-way mark. Almost time to think about membership renewal for 1984. One of the best ways to feel like this is your Society is to take advantage of the Section Summer tours. Many tours will be held in July and some in August. The best way to get involved and share with fellow members is on the Section level by attending Section meetings. If you have any questions about your Section and when meetings are scheduled, contact your Section President or call the Denver office and the staff will assist you. Idea exchange, along with the association of those interest in promotion of proper range management is one of the strengths of your Society.

The following Sections have provided the Denver office with their Summer Section meeting dates and location:

Utah Section Tour
June 30-July 1
Rich County, Utah

Northern Great Plains
July 7-8
Havre, Montana

PNW Section
July 6-8
Kamloops, B.C., Canada

Idaho Section
July 7-8
Moscow, Idaho

Wyoming Section
July 8-9
Circle J Camp
Tensleep, Wyoming

New Mexico Section
August 4-6
Carlsbad, New Mexico

International Mountain Section
July 21-23
Bozeman, Montana

Colorado Section
August 5-6
Gunnison, Colorado

Nevada Section
July 29-30
Sheldon Refuge, Nevada

What is going on in the Denver office? This is the time of year for preparation: Summer meeting plans, dues notices are being prepared, the 1984 Budget, just a lot of catching up time. Several staff members are planning vacations and should return relaxed and rested. I sincerely wish a happy, funfilled summer for each and all of you. Pete, Jacki and I hope to see you at the Summer Meeting in Long Beach.—**Jan Duck,** Administrative Assistant

Freeman's Gripes and Remarks

I have been asked why the President's Address is not in *Rangelands.* That's a good question. The fact of the matter is that from the beginning the President's Address has been published in the March issue of the *Journal of Range Management.* That's where it will be found this year.

To you committee chairmen out there—I'd like to have a short progress report from one or two in each issue of *Rangelands* telling what the committee is doing, not necessarily of what has been accomplished, but just what you are doing. This will provide the membership information of what the Society is doing. This information will be especially beneficial to those who do not regularly attend the annual and summer meetings. A page or two, double space, will be fine. Think about it! And you committee members, get on your chairman to do this.

Wilderness Fire Symposium

A symposium at the University of Montana, Missoula, November 15-18, 1983, will discuss major wilderness fire management issues such as what is "natural," relevance of past Indian burning, role of lightning versus human ignitions, fire size and intensity considerations, visitor safety, air quality, and economic criteria. Planning considerations and operational techniques will be discussed along with park and wilderness fire case studies. A workshop aimed at resolving park and wilderness fire management issues will round out the program. The symposium is sponsored by the Intermountain Forest and Range Experiment Station, the National Wildfire Coordinating Group, the Society of American Foresters, and the University of Montana.

Contact Center for Continuing Education, 125 Main Hall, University of Montana, Missoula, MT 59812, telephone (406) 243-2900.

Summary of Meetings of the Board of Directors

Following is a brief description of actions taken and assignments made by the Board of Directors (BOD) at the Meeting in Denver, January 5-7, 1983; and the 1983 Annual Meeting in Albuquerque, N.M., February 15-17.

Minutes of the Special Meeting have been approved by the Board of Directors and are, therefore, official minutes. Minutes of the Albuquerque meeting of the BOD are unofficial and unapproved.

Meeting of the Board of Directors January 5-7, 1983, Denver, Colorado

- Approved minutes of the 1982 Summer Meeting.
- The Board went into Executive Session to select an Executive Secretary.
- A Response to the Office of Technology Assessment (OTA) report, "Impacts of Technology on U.S. Cropland and Rangeland Productivity", through the authors of the report, will be coordinated and sent to OTA from the Public Affairs Committee.
- The Redd Foundation display will be made available for use by all sections.
- Planning Committee report and proposed committee structure was studied by the Board and will be studied before the Annual Meeting.
- A Grant was extended by Elanco to continue the expansion of the *Journal of Range Management* for 1983 issues.
- Report was given from 1983 Annual Meeting Committee.
- Jan Duck reported on progress of the 1983 Summer Meeting Committee, chaired by Ron Thill.
- Established the mechanics for finding a replacement for Danny Freeman, Editor of *Rangelands*.
- Announcement was made of the selection of Peter Jackson, Executive Secretary. Board approved title change of Executive Secretary to Executive Vice President.
- The budget committee will present a proposed 1983 budget to the Board at the Annual Meeting.
- SRM will be a co-sponsor for the Soil Erosion and Crop Productivity Symposium, Soil Science Society of America, March 1-3, 1983, Denver.
- Discussed formation of a National Grazing Coordinating Council in Washington, D.C.
- Joe Schuster will be official representative for the Society at the Second International Rangeland Congress.
- Cliff Venerable, Computercraft Services, reported on status of his services to the Society and how to obtain maximum use.
- Frank Caccavallo, Boettcher and Co., reported on the Society's investments for 1982.
- Roy Roath, Student Affairs Committee, discussed plans for student activities during the Annual Meeting. A handbook is being drafted.
- A booklet will be printed to assist ranchers. Tom Bartlett gave status report of the booklet, title "Survival in Ranching; The Short Term."

Meeting of the Board of Directors February 15-17, 1983, Albuquerque, New Mexico

- Approved minutes as corrected of Meeting of the Board of Directors, January 5-7, 1983, Denver.
- President Dale Jones, The Wildlife Society, emphasized the importance of the two societies working together in areas of issues.
- Progress on the Annual Meeting Handbook was reported by Jay Bentley.
- Soil Conservation Service Chief Pete Myers visited with the Board.
- Funding for RREA was discussed.
- *Rangelands* Editor vacancy search has been assigned to a committee chaired by Bert Reid.
- Board elected not to join the the Federation of Scientific Agricultural Societies (FSAS) at this time.
- The proposal of an International Affairs Newsletter was approved with details to be decided at the Summer Meeting.
- Proposal from the International Affairs Committee was made to provide an "Annual Bound Volume Subscription" for the *Journal of Range Management*.
- Promotion of better communication between rangemen and range organizations in all countries with rangeland resources and to pursue translations of JRM articles via grants was proposed by the International Affairs Committee.
- Two resolutions pertaining to the Renewable Resources Extension Act (RREA) were proposed by the Public Affairs Committee.
- Sponsorship of membership in the Mexico Section was approved.
- Section Producer Affairs Committee Chairmen will be ex-officio members of the Producer Affairs Committee.
- There will be a meeting in the Spring of the Grazing Lands and Coordinating Council.
- Survival paper is in process to be distributed to ranchers.
- Revisions were made in the Accreditation Standards for re-examination procedures of universities.
- The RISC report was accepted by the Board with amendments.
- Distribution of the RISC report will be done by the Denver staff.
- RISC participation in the 2nd International Rangelands Congress was accepted.
- *JRM* Editor Pat Smith reported on the progress of the *Journal*. Tom Bartlett was appointed to the Editorial Board.
- An Endowment Fund brochure is to be printed. The SRM dues notice will include a line for Endowment Fund contributions.
- The Planning Committee's report on Membership Categories was considered with no changes in structure at this time.

- Board accepted the Planning Committee's report with changes to be made in an appropriate fashion and at an appropriate time with I&E and Public Affairs Committees as the exceptions.
- Long-range plan is to be continued.
- 1986 Annual Meeting will be in Orlando, Florida.
- 1983 budget was approved.
- Survival paper will be published as an insert in *Rangelands*.
- The Employment Affairs Committee will continue through 1983.
- Student Affairs Handbook will be presented to the Board during the Summer Meeting.
- An annual award for excellence in teaching is being considered to be given by the Range Science Education Council.
- Professional Affairs Committee may be abolished in 1984.
- Danny Freeman, Editor of *Rangelands*, recommended the information on candidates for election be in the October *Rangelands*.
- I&E Committee Handbook was approved.
- An I&E brochure will be printed.
- Publications Policy was approved.

Resolutions of the Society for Range Management

Revision of Funding for RREA

RESOLUTION

WHEREAS: Range constitutes more than 40 percent of the land area of the United States; and

WHEREAS: The Renewable Resources Extension Act (RREA - PL 95-306) was signed into law in June, 1978; and

WHEREAS: The purpose of this legislation was to provide an expanded and comprehensive extension program for forest and rangeland renewable resources; and

WHEREAS: The Society for Range Management was an active supporter of the legislation and an active partner in subsequent program development; and

WHEREAS: The funding formula for distributing RREA funds adopted by Extension gives only 11 percent of its appropriated funds to rangeland factors; and

WHEREAS: Several of the major range states would not be funded under the current proposal; and

WHEREAS: Those states who receive funds under the formula are not directed to target these funds for range work.

NOW, THEREFORE, BE IT RESOLVED THAT, The Society for Range Management urges the Cooperative Extension Service to revise its funding formula for RREA to target a minimum of 50 percent of appropriated funds to range states and range work.

Passed this 15th day of February 1983, by the Board of Directors, Society for Range Management, meeting in Albuquerque, New Mexico.—*Peter V. Jackson,* Executive Vice-President

Support of Experimental Stewardship Program

RESOLUTION

WHEREAS: The Experimental Stewardship Program was authorized by Congress within Section 12 of the Public Rangelands Improvement Act of 1978 which is supported by the Society for Range Management; and

WHEREAS: The Program provides incentives to, or rewards for, the holders of grazing permits and leases whose stewardship results in an improvement in the condition of the rangelands under permit and lease; and

WHEREAS: The Program results in increased communication and cooperation among various land management agencies, local livestock operators and other resource interest groups.

WHEREAS: The program results in the increased flexibility which would allow the participants the opportunity to improve the quality of the overall operation.

NOW, THEREFORE, BE IT RESOLVED THAT, The Society for Range Management supports the Experimental Stewardship Program and the subsequent coordinated management of the Rangeland Resources.

Passed this 15th day of February 1983, by the Board of Directors, Society for Range Management, meeting in Albuquerque, New Mexico.—*Peter V. Jackson,* Executive Vice-President.

Plowout

RESOLUTION

WHEREAS: Millions of acres of rangelands are being plowed for conversion to cropland, and

WHEREAS: Much of this conversion is occurring on fragile soils and marginal soils unsuitable for sustained crop production, and

WHEREAS: This erosion is degrading the productive potential of these lands, increasing sediment pollution of receiving waters, threatening the economic future of America's agriculture and reducing the quality of associate life

NOW, THEREFORE, BE IT RESOLVED THAT, The Society for Range Management urges the Secretary of Agriculture to develop and implement policy which will discourage the conversion of rangeland to cropland when such conversion would result in excessive soil erosion or loss of water quality, and

BE IT FURTHER RESOLVED THAT, SRM supports legislation which will ensure that tax dollars are not used to further damage to or loss of our Nation's soil and water resources.

Passed this 17th day of February 1983, by the Board of Directors, Society for Range Management, meeting in Albuquerque, New Mexico.—*Peter V. Jackson,* Executive Vice-President

Permanent Position of Extension Program Leader

RESOLUTION

WHEREAS: The Renewable Resources Extension Act (P.L. 95-306) was enacted to place program emphasis on Forest and Range renewable natural resources; and

WHEREAS: Rangeland constitutes about 40% of the United States; and

WHEREAS: The Cooperative Extension Service assists land users and managers in education, research, and demonstrations to better utilize and protect rangelands; and

WHEREAS: the multiple use management of the range resource for watershed protection, and production of red meat, recreation, and wildlife products is essential to the well-being of the United States.

NOW, THEREFORE, BE IT RESOLVED, The Society for Range Management recommends that the Cooperative Extension Service fully fund and implement the permanent position of Extension Program Leader for Rangeland Management to:

1) Provide leadership at the National level for programs which enhance the management of the rangeland resource

2) Coordinate programs between states, and with other agencies to insure continuity and avoid duplication of efforts

3) Act as a liaison with organizations involved in rangeland management to identify education, research, and demonstration needs of the managers of this natural resource.

Passed this 15th day of February 1983, by the Board of Directors, Society for Range Management, meeting in Albuquerque, New Mexico.—*Peter V. Jackson,* Executive Vice-President

Condensed Minutes from the Advisory Council Meetings

Albuquerque, N.M., February 13-15, 1983

All items outlined below were approved by the Advisory Council and taken to the Board of Directors. Unless otherwise noted, they were accepted by the Board officially or approved for implementation if no formal motion was required.

Meeting Sites

The Texas Section was approved to host the 1985 Summer Meeting (at Amarillo) and the 1988 Winter Meeting (site to be determined). The Advisory Council approved the International Mountain Section to hold the 1989 Winter Meeting at Billings, Montana. The Board delayed action until a later meeting. The Wyoming Section was approved to host the 1986 Summer Meeting (site to be determined).

The AC recommended that the regional structure and scheduling of meetings be published in *Rangelands* each year as part of the mini-directory. (This was published on page 86 of the April issue of *Rangelands*.) Publication of an abstract of the Advisory Council meetings and Board of Director meetings in *Rangelands* was approved.

Committee Structure

Bob Williamson outlined his report on the revised SRM committee structure being recommended by the Planning Committee. The AC recommended that the report be accepted with the exception that the I&E Committee be retained in its present format. The Board dealt with this issue later and results will be in the BOD minutes.

Membership Items

1) Concern was expressed at the lack of increased membership over the years.

2) *Net* costs of providing journals to members had been investigated and the current cost is $8.20 per year for *Rangelands* and $4.10 per year for the *Journal of Range Management.*

3) In a workshop session, each Section identified (to the best of the knowledge of the Section members present) the employment classification of both current and dropped members. This information will be compiled by the Denver SRM staff and Art Armbrust, Membership Committee Chairman, and will be reported later.

4) Instead of the current practice of sending membership lists to the Sections on January 1 and July 1, it was approved to have printouts sent of the January 31, March 31, and July 1 membership.

5) As an aid in membership recognition and retention, the Board was asked to consider re-instating the membership certificate with spaces for the yearly membership stickers. The BOD will report on this at the summer meeting.

Other

1) The "Experimental Stewardship Resolution" was approved.

2) A report on establishing an "Annual Meeting Contingency Fund" was presented to the Board of Directors for their consideration.

3) Sections are urged to keep the Denver SRM office informed about section meetings and other activities.

4) *Section officers handbooks:* Each Section was asked to send copies of any Section Officer or Committee handbooks to the Chairman of the AC. These will be examined and copies of the better ones will be made available to all sections. (NOTE: So far, only New Mexico has provided this material).

5) Pat Willems of the Denver staff took notes at all of the AC meetings, typed them, and made them available to AC members before the end of the Albuquerque meeting. Many thanks, Pat, for the long hours and the excellent set of minutes.

New Officer

Tommy Welch, Texas Section, is the new chairman-elect of the Advisory Council.

Art Armbrust-Past Chairman
Bill Laycock-Chairman
Tommy Welch-Chairman-elect

The Trail Boss's Cowboy Cookbook—Progress Report

Progress continues to be made on an SRM project that has the potential to raise tens of thousands of dollars for the Society for Range Management, reports Doug Sellars, chairman of the Trail Boss's Cowboy Cookbook Committee. Continued study on the project shows that various organizations are raising thousands, some even hundreds of thousands of dollars with such projects.

SRM has the potential to have the most successful cookbook project of all, says Sellars. He cites the following reasons as the basis for his claim: (1) No one has yet produced a Trail Boss's Cowboy Cookbook, (2) Western trivia is a big fad all over the U.S. and in many other countries, (3) We have members in 50 states and 38 other countries to form a network for distribution and sales, (4) Cookbooks are the best selling, most widely read and used of all books, and (5) This book will be a collector's item because of the kinds of information and artwork contained in it. Also, it will be moderately priced and popular as gift item.

Business people are becoming interested in this book, too, reports Sellars. Food processors, i.e. beans, barbeque sauces, seasonings, etc., are interested in its promotional potential. Manufacturers and merchandisers of western wear and western paraphernalia are also expressing an interest in its sales and promotional potential. It is an exciting project that will draw support and involvement from many people.

The book will contain recipes from present day and historic ranches as well as the "Trail Drive Era." The following list shows a recent contribution from 9 ranches in the state of Washington and 2 recipes from a ranch in Nebraska.

To day, there are 175 recipes from 17 states and 4 countries. This is about one fourth of the number needed for the first edition. Only 4 states have sent more than 10 recipes. Six major range livestock states have not sent any recipes yet. While the cookbook will include some recipes from other countries which produce livestock on rangeland, only the United States, South Africa, Botswana, Kenya, and Trinidad have contributed recipes. Hopefully, recipes will be sent in from Mexico, Canada, Australia, New Zealand, Brazil, Argentina and other countries that have rangelands.

These recipes need to be received by August 15, 1983, in order to have the book ready for sale at Christmas time. *Send your recipes to Don Pendleton, Chief Range Conservationist, Soil Conservation Service, P.O. Box 2890, Washington, D.C. 20013.*

Forms for recipes may be obtained from SRM Section Officers, Don Pendleton, or the Denver office of SRM. If you don't use a form, please include the following information:

- Ranch Name, Ranch Location, Brand, Recipe Name
- Information about the ranch or recipe (if there is something of a unique or historical nature).

However, any good recipe is welcome. We need your recipes even if the ranch information is not available.

PILOT WHEEL RANCH, Tanasket, Washington
Diane Fancher
Baked Lasagna
Oven Bar-B-Q Beef and Beans

M HANGING SEVEN RANCH, Loomis, Washington
Vickie and Monte McPeak
Easy Enchiladas

QUARTER CIRCLE A RANCH, Havillah, Washington
Dale and Kathy Duchow
Open Face Hamburgers

WILSON RANCH, Chewiliken Valley, Tonasket, Washington
Albert and Ruthann Wilson
Wilson Ranch 100% Whole Wheat Bread

WILSON RANCH, Chewiliken Valley, Tonasket, Washington
Mike and Joy Wilson
Cowboy Finger Steak

HAEBERLE RANCH, Conconally, Washington
Mr. and Mrs. Rod Haeberle
Chinese Beef

ELLIS-BARNES LIVESTOCK CO. RANCH, Tonasket, Washington
Vic and Nancy Barnes
Polynesian Short Ribs

ELLIS-BARNES LIVESTOCK CO. RANCH, Tonasket, Washington
Bob and Nancy Barnes
Pizza Casserole

ELLIS-BARNES LIVESTOCK CO. RANCH, Tonasket, Washington
Bill and Betty Barnes
Ranch Beef Breakfast Sausage

UTT RANCH, Riverside, Washington
Melvin and Violet Utt
Ranch Meal-in-a-frying Pan
Utt Ranch Tamale Pie
Bunkhouse Stroganoff

SCHOLZ RANCH, Pine Creek, Tonasket, Washington
Mrs. Madeline Scholz and Gerald Scholz
Ground Beef and Zucchini Casserole

SEELY RANCH, Halsey, Nebraska
Pat Seely
Mom's Easy Rolls
Branding Casserole

Student Winners

Student winners from the AM in Albuquerque are as follows:

Plant Identification Contest: *TOP INDIVIDUALS*—(1) Gregory Huber, Texas Tech, 1,193; (2) Javier Espinosa-Aldeco, Universidad Autonoma Agraria Antonio Narro, 1,182; (3) Donald Devine, Montana State, 1,178. *TOP THREE TEAMS*—(1) Texas A&M, James Terrell, Ray Ullrich, Stephen Zuberbueler, 3,465, Robert Knight (coach); (2) Universidad Autonoma Antonio Narro, Javier Espinosa-Aldaco, Luis Ceballos, Jaima Galindo, 3,456, Lucio E. Rodruiquez (coach); and (3) Montana State, Donald Devine, Jeanne Keller, and Lynn Robertson, 3,422, Carl Wamboldt (coach).

Range Exam: *TOP INDIVIDUALS*—Steve Chadde, U. of Wyoming, 248; Mark Stackhouse, Utah State, 228,; and Jack Alexander, Texas A&M, 215. *TEAM WINNERS*—Steve Chadde, Roger Dunn, and Terry McDill, U. of Wyoming, 620, Bill Pincheck (coach); Jack Alexander, Mike Schumann, and Chuck Coffey, 607, Texas A&M, Joel Brown (coach); and Mark Stackhouse, Calvin Bagley, and Connie Roberts, Utah State, John Workman (coach).

Student Displays: Range management from its beginnings to the 1980's was the theme for the display contest. The *first place winner, receiving $100, was Brigham Young University.* Their display was titled, "Intermountain Range Management", and with old black and white photos along with color photos contrasted the past with the present ways of range management. *University of Wyoming took second place and were awarded $50.* Their display consisted of an old pioneer wagon wheel mounted on a stained display board. The board had the title "Range Management in Wyoming", branded along the top and various interesting photos relating with the theme were placed on either side of the wheel. *Montana State University, receiving $25, placed third in the contest.* They also used a rustic wagon wheel to correlate with the theme. Placed along the spokes of the wheel were many informative black and white photos, showing a wide view of range management.

Youth Range Forum

The top three presentations at the Albuquerque meeting. They are, left to right: **Mark Francis,** *representing the Texas Section, placed second. Topic: "Finding a Home in LBJ Country—Grassmaster Cattle". Mark was elected president of Youth Range Forum and will preside at the 1984 YRF meeting in Rapid City, S. Dak.* **Brenda Munday,** *representing the International Section, placed first. Her paper will be published in* Rangelands. *Topic: "Trouble Makers at Large on the Range".* **Lance Wenmohs,** *representing the Texas Section, placed third. Topic: "Juniper Control Methods on the Lampasas Prairie".*

This is an organization of high school students interested in range management. Individual members are sponsored by the various Sections to attend SRM Annual Meetings to participate and present papers prepared by themselves. The papers are judged by range management authorities who are in attendance. Twelve youths attended the Albuquerque meeting representing six Sections.

Group Picture Taken in Albuquerque: Back row left to right: Mark Francis, Texas; Katy Garren, Texas; Della Keeter, Nebraska; Mark Kozeal, Nebraska; Cary Berry, Wyoming; Brenda Munday, International Mountain. Front row left to right: Kristy Silman, Utah; Paul Haugen, International Mountain; Mary Raymer, Nebraska; Lance Wenmohs, Texas; Bobbi Varlo, Utah. Not pictured Robert Montoya, New Mexico.

First Call for Questions for Undergraduate Range Management Exam for the 37th Annual SRM Meeting

Questions are now being solicited for the Undergraduate Range Management Exam to be administered at the 1984 Annual Meeting of the Society for Range Management in Rapid City. Four-option multiple choice questions (with one correct answer) may be submitted for the following subject categories:

1. Range Ecology
   a. ecosystem structure and function
   b. succession/retrogression
   c. autecology/synecology
2. Grazing Management
   a. range animal nutrition
   b. forage allocation
   c. grazing systems/planning
   d. grazing animal interaction
3. Range Improvements
   a. vegetation manipulation
   b. range seeding/revegetation
   c. land renovation
   d. facilities/developments
4. Range Regions (as delineated by Vallentine, 1980; i.e. Pacific Coast, Intermountain, Southwest, Northern Great Plains, Southern Great Plains, Midwestern U.S., Southeastern U.S.)
   a. physiography
   b. characteristic range plants
   c. characteristic climate
5. Range Inventory and Analysis
   a. range site concept—condition, trend
   b. methods of determining cover, biomass production, frequency, species composition, etc.
6. Multiple-Use Relationships on Rangelands
   a. watershed management
   b. wildlife interactions
   c. recreations

In addition, practical and scientific problems may be submitted for the grazing management, range improvements, and range inventory and analysis categories. University faculty members, government agency personnel, industry personnel and private ranchers are encouraged to submit questions and problems before December 15, 1983. There is no limit on the number of questions and problems submitted—the more the better. Please indicate correct answers to questions and include solutions to problems.

Send questions and problems for the Range Management Exam to: *C.A. Call, Department of Range Science, Texas A&M University, College Station, TX 77843.*

RANGE POSITION ANNOUNCEMENT

Texas Tech University is seeking a Range Research Scientist for the Department of Range and Wildlife Management, one of eight academic divisions in the College of Agricultural Sciences. This is a 12-month teaching and research position with summer salary dependent upon teaching and research grants.

This 12-month appointment will be supported in part by USAID Small Ruminant Collaborative Research Support Program, the Noxious Brush and Weed Control Program, and Resident Instruction. Research responsibilities will include international travel to Peru, administration, graduate student advisement, data analysis and publication writing. The applicant also will be expected to write proposals for external funding and develop his/her own research program. Teaching responsibilities will include "Ecology and Conservation of Natural Resources" (sophomore level) and the development of a course in "Range Animal Nutrition" (Graduate level).

A Ph.D. in Range Science or in a closely related discipline is required. Position available September 1, 1983. Applications accepted until July 15, 1983, or until position is filled. Salary is to be commensurate with education and experience.

Submit a resume and the names of three references to:

Dr. Henry A. Wright, Chairperson
Dept. of Range and Wildlife Management
Texas Tech University
P.O. Box 4169
Lubbock, Texas 79409

POSITION ANNOUNCEMENT ASSISTANT PROFESSOR, RANGE MANAGEMENT

The Department of Rangeland Resources at Oregon State University has a full time tenure track position for a range scientist. This is a new position that will include teaching and research. Teaching will include general range management subjects and range animal production. Research will focus on agroforestry and livestock grazing opportunities in southwestern Oregon. Applicants must have a PhD degree in Rangeland Resources and be willing to work with an interdisciplinary

team. Previous teaching experience is desirable. Rank will be at Assistant Professor and salary will be commensurate with qualifications. Submit letter of application, resume, complete transcripts and have 3 letters of recommendation sent before June 15, 1983, to: Dr. William C. Krueger, Head, Department of Rangeland Resources, Oregon State University, Corvallis, Oregon 97331. OSU is an Affirmative Action/Equal Opportunity Employer and complies with Section 504 of the Rehabilitation Act of 1973.

Hot Career?

Range manager and secretary are among the hottest career fields of the 1980s, according to the *San Francisco Chronicle*, February 12, 1983.

"Several factors create a bright job picture for the range managers of tomorrow. The growing number of large ranches, the need to increase range productivity, the need to reclaim mined-out lands and the growing use of rangelands for wildlife habitat and recreation all play a part."

ASSISTANT/ASSOCIATE PROFESSOR OF WILDLIFE MANAGEMENT. Two faculty positions, tenure trace academic year (9-month) appointment: 60% teaching, 40% research. Opportunities for summer research. Must have one degree in wildlife biology/management, and Ph.D. or near completion. Must be capable of field research and instruction, and effective in oral and written communication in English. *Wildlife Management-Mammals:* Need education and training in mammal management. *Wildlife Habitat Management:* Demonstrated substantive knowledge in wildlife habitat man-agement, forestry, and vegetation manipulation. *Appointment:* About Sept. 15, 1983, pending anticipated funding. *Closing Date:* Postmarked by June 1, 1983. *Application:* Send transcripts, resume, reprints, letter of application, and names of three persons as references to: Wildlife Search Committee, School of Forestry, University of Montana, Missoula, MT 59812. Write or call (406) 243-5521 for information. EEO/AA employer.

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Public Service Canada / Fonction publique Canada

Pasture Research Scientist

Agriculture Canada
Swift Current, Saskatchewan

Duties
The Swift Current Research Station requires a scientist to conduct research into seeded and/or native grass pasture systems to serve the cow/calf industry in western Canada. You will cooperate with grass and legume breeders in the development of suitable plant materials and their subsequent evaluation under grazing. You will collaborate with the forage agronomist in confirming the basic findings under grazing with small plot trails, and work with the animal nutritionist to develop forage quality evaluation techniques for use on pasture. Supervising sub-professional staff will also figure among your responsibilities.

Qualifications
To be considered for this position, you must have graduated from a university of recognized standing with post graduate training at the Ph.D. level, with specialization in pasture agronomy and/or range management as well as experience working in arid climates, OR you must have a combination of graduation with relevant specialization at the M.Sc. level and work experience equivalent to Ph.D. training as well as experience working in arid climates.

We offer a salary ranging from $25,315 to $47,088, commensurate with your qualifications and experience.

Language Requirements
Knowledge of English is essential.

Additional job information is available by writing to the address below.
Tout renseignement relatif à ce concours est disponible en français et peut être obtenu en écrivant à l'adresse suivante:

How to apply
Send your application form and/or résumé quoting reference number 83-AGR-RES/W-4 to:
G.E. Moore
Personnel Administration Branch
Agriculture Canada
Sir John Carling Bldg., Room 1072
Ottawa, Ontario K1A 0C5
Closing date: August 31, 1983

Please quote the applicable reference number at all times.

Canada

Requiescant in Pace

Douglas N. Bard, president of the statelands committee of the Arizona Cattle Growers Association, died as a result of head injuries suffered when his horse fell. He was 47. Doug had served as a Director of the Arizona Section and had served on various committees. He was a strong supporter of the Natural Resource Workshop for Arizona Youth, sponsored by the Arizona Section. Doug provided both practical instruction and hands-on participation to enrollees. A shining example of progressive range and herd management, the Bard Ranch was regularly included in the field experience for youth. Doug was born in Evanston, Ill., and received a bachelor's degree in animal science from the University of Wyoming. In 1957 he moved to Arizona from Laramie, Wyo. Survivors included his wife Nancy; daughters Lisa and Sharon; son Travis; and two sisters and two brothers.

The Society is saddened to hear of the passing of long-standing member **John J. Brice** who died on March 24, 1983. John was an active member of the California Section and had served the section in a number of capacities including Councilman, newsletter editor, Membership Committee chairman, and Host Committeeman for the 1980 SRM Annual Meeting. John was an animal husbandry graduate of Cal Poly San Luis Obispo. After serving for 3 years in the Navy during World War II, John worked for the Soil Conservation Service for 17 years and had assignments in Salinas, Bishop, and Lancaster, Calif. John finished out his career as a civilian Soil Conservationist for the Department of the Navy headquartered in San Bruno, Calif. This assignment included conservation planning and lease administration for grazing and agricultural leases on Navy and Marine Corps land in the nine western states. In his retirement years, since 1978, John enjoyed rock hounding and making silver jewelry. Survivors include his wife Catherine, daughter Cathy, and son John.

Members Round About

Frederic G. Renner received the degree of Doctor of Arts, *honoris causa,* on May 1 from Carroll College. The Helena, Mont., college bestowed the degree to recognize Fred's "outstanding contributions to the fine arts in Montana, for offering, with extraordinary devotion, a life-time of research whereby an invaluable segment of our Western heritage has been preserved." A past-president of the Society for Range Management, Fred funded the Frederic G. Renner Award, the Society's highest award given annually. He is internationally known for his work in collecting and recording the art of Western artist Charles Russell.

Steven Sharrow was recently honored at the Annual College of Agricultural Sciences Honors and Awards Dinner at Oregon State University. He received the Savery Award established by Grace Savery as a Memorial to the Savery family who for many years had farmed near Dallas, Oregon. It is called the Savery Outstanding Young Faculty recognition award. One such award is given each year to an agricultural faculty member under 40 years of age. Sharrow, age 34, is an associate professor of rangeland resources and is already a recognized researcher. He works cooperately with other range, soil, animal and forest scientists and has published over 35 scholarly articles in academic journals and is an associate editor of the *Journal of Range Management*. One of his more intriguing studies is of the potential of sheep in controlling undesirable brush in forest clearcut areas being seeded.

Congressman Kika de la Garza, D-Tex., (left) receives a Distinguished Service Award from Clare Hendee, representing the Society for Range Management. The award was given in recognition of the Congressman's work in support of range management. The presentation took place during Capitol Hill's first Agricultural Research Fair, Washington, D.C.

Ranching Internship Program Off and Running at Texas Tech

Four undergraduates were placed on ranches during the summer of 1981 and eight were placed last summer according to Fred Bryant, Coordinator of the Ranching Internship Program at Texas Tech. The objective is to give the student experience in day-to-day ranching operations while providing the rancher with extra labor during busy summers. "The eight interns we placed last year all benefitted greatly," says Bryant. "They are more confident in themselves, they ask better questions in class, and they seem now to have a better feel for things we talk about in class."

Ranchers are under no obligation to keep these students if they don't work out; they are expected to treat them like regular employees. Ranchers participating last year were in the McLean, Crockett, Post, Jayton, Lometa and Clarendon areas. Most are eager to have students back this year. Ranchers who might be interested in this program should contact Fred Bryant or Carlton Britton, Department of Range and Wildlife. Texas Tech, Lubbock (806) 742-2841.

The frontier spirit of America's West lives on in South Dakota. Discover it in the 1984 Annual Meeting of the Society for Range Management.

Photo credit: Ken Nogard's Canyon Camera Productions, Rapid City, South Dakota.

February 12-17, 1984, in Rapid City, South Dakota, "Heart of the American Rangelands"

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