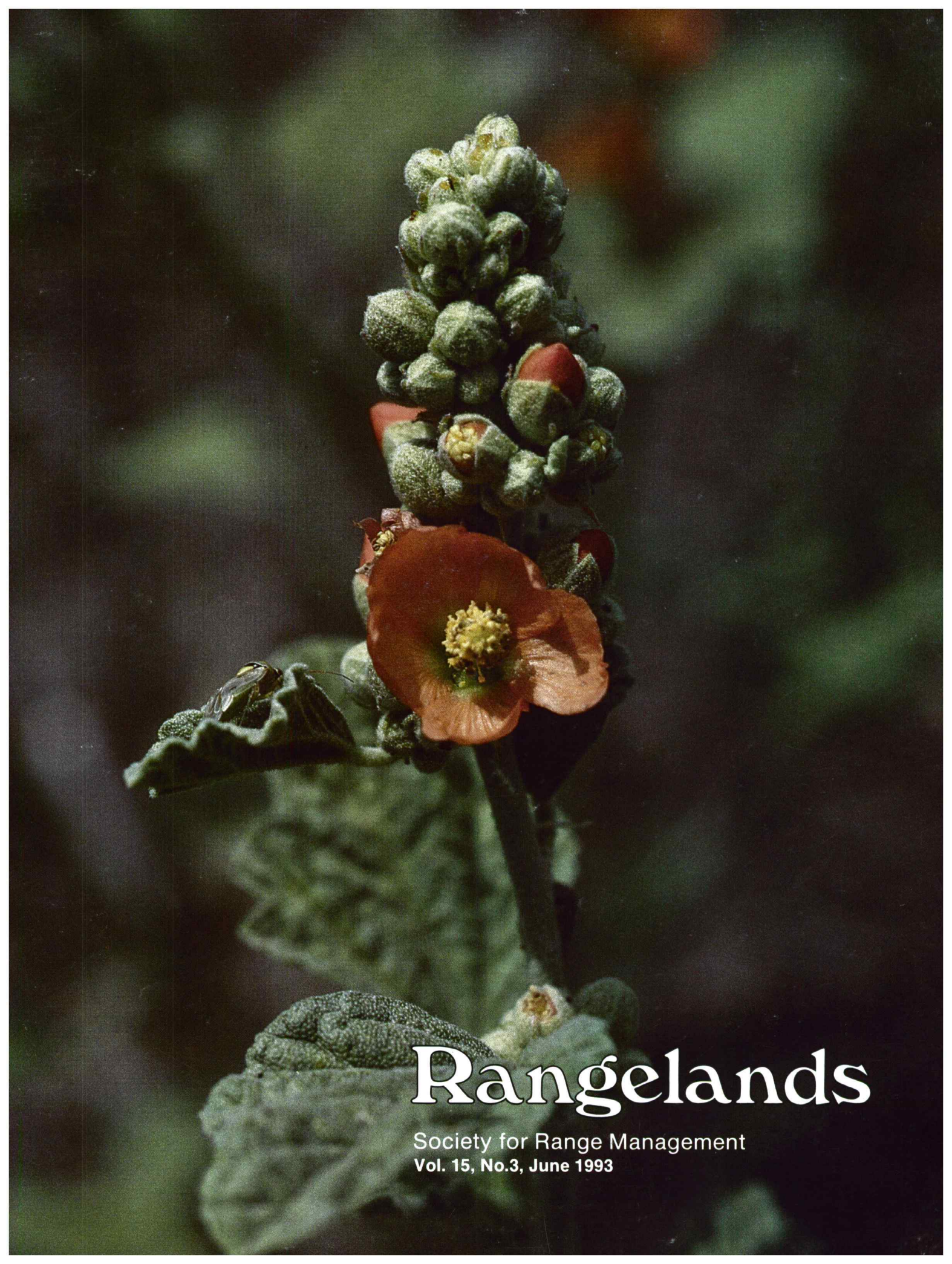

Rangelands

Society for Range Management
Vol. 15, No.3, June 1993

Rangelands

Volume 15, No. 3
June 1993

FEATURE ARTICLES

DEPARTMENTS

COVER PHOTO

FRONT: Globemallow by Melvin D. Rumbaugh, USDA-ARS (retired); BACK: Globemallow by Dr. Richard Shaw, Utah State University Photo Project. See related article on page 127.

Published bimonthly—February, April, June, August, October, December

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BUSINESS CORRESPONDENCE, concerning subscriptions, advertising, back issues, and related matters, should be addressed to the Managing Editor, 1839 York Street, Denver, Colorado 80206, (303)355-7070.

EDITORIAL CORRESPONDENCE, concerning manuscripts or other edited matters, should be addressed to the Technical Editor, 1300 Wheatridge Ct., Loveland, Colorado 80537.

RANGELANDS (ISSN-0190-0528) is published six times yearly (February, April, June, August, October and December) for $30.00 per year by the Society for Range Management, 1839 York Street, Denver, Colorado 80206. SECOND CLASS POSTAGE paid at Denver, Colorado and additional offices.
POSTMASTER: Return entire journal with address change—RETURN POSTAGE GUARANTEED—to Society for Range Management, 1839 York Street, Denver, Colorado 80206.

The Trail Boss ®

THE SOCIETY FOR RANGE MANAGEMENT, founded in 1948 as the *American Society of Range Management,* is a nonprofit association incorporated under the laws of the State of Wyoming. It is recognized exempt from Federal income tax, as a scientific and educational organization, under the provisions of Section 501(c)(3) of the Internal Revenue Code, and also is classed as a public foundation as described in Section 509(a)(2) of the Code. The name of the Society was changed in 1971 by amendment of the Articles of Incorporation.

The objectives for which the corporation is established are:

—to properly take care of the basic rangeland resources of soil, plants and water;

—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.

Membership in the Society for Range Management is open to anyone engaged in or interested in any aspect of the study, management, or use of rangelands. Please contact the Executive Vice-President for details.

Rangelands serves as a forum for the presentation and discussion of facts, ideas, and philosophies pertaining to the study, management, and use of rangelands and their several resources. Accordingly, all material published herein is signed and reflects the individual views of the authors and is not necessarily an official position of the Society. Manuscripts from any source—nonmembers as well as members—are welcome and will be given every consideration by the editors. ***Rangelands*** is the nontechnical counterpart of the ***Journal of Range Management;*** therefore, manuscripts and news items submitted for publication in ***Rangelands*** should be in nontechnical nature and germane to the broad field of range management. Editorial comment by an individual is also welcome and, subject to acceptance by the editor, will be published as a "Viewpoint."

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Executive Vice-President's Report

The Board of Directors addressed many issues at the Annual Meeting in Albuquerque, three of which have especially broad impact on members. They are use of the Trail Boss logo and other Society marks, name change for the *Journal of Range Management,* and two changes in the bylaws. I will try and keep you apprised of these issues over the next few months. Let's begin with the issue of the logo.

Background: The Trail Boss logo and SRM are not registered marks of the Society for Range Management and the Society currently has no basis for restricting the use of its most commonly used marks. However, the Society is in the process of revisiting this issue with the Commissioner of Patents and Trademarks to determine if and under what circumstances registration would be possible.

Trademarks are recognized in four separate categories: trademarks are adopted and used to identify *goods* and distinguish them from *goods* manufactured or sold by others; service marks are in most respects identical to trademarks except that they protect *service* and not goods; certification marks are those which are used to certify quality, geographic origin, required characteristics or other qualities in a *good* (associations which own certification marks can only certify the quality of goods or services produced by others); collective marks are trade or service marks which are used by members of a collective group to indicate membership in the collective group.

Two committees were asked to study the use of the Society's marks and to make recommendations on their use to the Board of Directors at the Annual Meeting in Albuquerque in 1993. The Professional Affairs Committee recommended:

> The Society for Range Management support the use of the Trail Boss logo and the name Society for Range Management (SRM) for official Society business. Other use is not supported or condoned, such use may imply inappropriate support of a practice or position and may be in violation of copyright laws."

The Range Consultants Certification Panel recommended:

> The "Trail Boss" logo by Charles Russell is to be used only for SRM official business, SRM approved activities, e.g. baseball caps with logo, programs, awards, etc. Sections or individuals should notify the SRM Denver office of any intended use of the Trail Boss logo.

The Board of Directors deferred action to the Summer Meeting and charged the Executive Vice President to develop wording. As a result, your EVP has been boning up on both legal aspects as well as the social aspects of trademarks.

Statement of Purpose: The basic purpose for having rules and regulations relating to the use of Society Marks is to avoid the perception that action taken by individuals, chapters or sections is official, based on policy or position of the International Society. Such actions, may on occasion and perhaps with justification, be in conflict with SRM policy or place the International Society in an embarrassing position.

I cannot think of any other reason for an association wanting to restrict the use of its marks among its members. The basic purpose for members, chapters and sections wanting to display the marks is to display membership in the collective group. Certainly, that is a noble purpose that benefits the Society as well as the individual.

If I were to draft wording today, the following concepts are what I believe are important.

1. The display of an association's name or marks (typical of many associations) on tee shirts, caps, bolo ties, key chains, business cards and other ornaments is pervasive. Because it is so pervasive, it seems unlikely that such display could ever be construed as representing Society action or policy. Therefore, such is to be encouraged; however, it is strongly recommended that the International Society be notified in writing and provided the opportunity to endorse the intended use prior to its application.
2. The use of the Society name and the SRM acronym are discouraged on all stationery except that printed or authorized by the International Society office, for use by that office, elected Officers, Sections, Committees and Task Groups. Use of the Trail Boss emblem on letters is permissible *with* prior approval of the International Society, providing that the letter head clearly and boldly states the name of the individual, with colors and structure that readily differentiate the stationery and envelope from the International Society's stationery and envelopes. Requests for approval must be in writing and include a copy of the stationery and proposed location of the Trail Boss.

I would like to see SRM members have a wide latitude in the use and display of Society Marks and to only guard against the most obvious situations where the use of the Marks might embarrass to the Society. Have I overlooked something? Are there flaws in my reasoning? I would appreciate your opinion on this before I draft wording for consideration at the Summer Meeting.—**Bud Rumburg, SRM Executive Vice-President.**

Editor's Note:
At the 1993 Annual Meeting of the Society for Range Management in Albuquerque, N.M., there was considerable discussion concerning the future goals and objectives of the Society. The theme for the meeting was "Expanding Partnerships and Continuing Successes." Dr. Don Dwyer in his keynote address raised some questions as to how much progress has been made in the past years. With these various thoughts in mind, it might be useful to see what what the visions and goals of the Society of Range Management were at the time the Society was formed. The following item is reprinted from page 1 of the first issue of the Journal of Range Management *(Volume 1, Number 1, October 1948). The author, Joe Pechanec, is a charter member and was the first president of the Society for Range Management. I leave it to you to decide how much progress has been made.*

Our Range Society

Joseph F. Pechanec

When the new range society was first considered, doubtless most of you thought "Why form another organization?" I'd be surprised if you didn't! Most range men already belong to so many professional societies that to participate actively in another would severely tax their personal energies and prove a financial burden.

Those active in efforts to form the society were well aware of the pitfalls and thus gave its creation serious thought. There were several objectives that most range men had in mind for a desirable society. These we gleaned from your letters and from discussions with countless numbers of range men.

1. Recognition of range management and its application as a profession.
2. Liberal membership requirements to permit professional workers with highly varied basic training to become full members with an equal voice in society affairs.
3. The publication of a journal devoted to the subject of range and pasture which would provide a medium for exchange of new developments, ideas, and for the discussion of policies.
4. Provision for meetings where range men can assemble yearly for exchange of ideas and development of unity in procedures for managing range lands.

Countless individuals in many different agencies or groups and with highly varied basic training are engaged in range and grassland work. On these workers falls the major responsibility of pointing the way toward the greatest productivity and fullest utilization of the forage resource consistent with maintenance of soil and forage. Moreover, these workers are responsible for the scientific validity of their work.

It seemed natural, therefore that range men should organize to seek unity and agreement on objectives, procedures, and professional standards.

Nowhere within the framework of existent societies did there seem to be a place for range men. Objectives desired in a range organization could not be satisfied. All existing societies had been organized for other purposes and interests. To accommodate range men any one of them would have had to broaden its scope.

Plainly, something had to be done. Our profession had no status or unity. We needed a medium for exchange of ideas and unified expression of standards. We needed also a common ground for the highly varied group in the field. But it was clear that we needed to push ourselves because no one was going to do it for us.

Out of these conditions the range society evolved. It first began in 1946 with a survey to find out what the majority of range men wanted. When it became evident that the majority desired a separate organization, a membership drive was launched in July 1947. By the time of our first Annual Meeting in Salt Lake City in January, 1948, 500 had joined the Society. At present there are more than 650 members.

Preparations are being made for our second Annual Meeting in Denver. The Society's program is taking form rapidly as a result of the activities of the Council and seven committees. Interest in the Society is widespread throughout this country, Canada, and extending into South America.

Formation of our Society came at a particularly appropriate time. There is an acute awareness of the need to conserve renewable resources. Forage is one of these. In the battle for better management of resources we must align ourselves closely with other allied societies. There will be no conflict between our Society and others in the field of conservation. Efforts of these organizations will complement each other.

Upon our stewardship, either as owners, research workers, teachers, or administrators, depend the improvement and maintenance of the range resource. Our Society through its own members and through cooperation with closely allied organizations shall strive to make these range and grassland resources serve mankind to the fullest degree now and in the future. In achieving this end, we can perform many valuable functions:

We can present the ideas of professional range men to the public, to government circles, and to other societies.

We can promote more complete and widespread education to insure the best management of our range resources.

We can sponsor application of the best knowledge available to the management of publicly and privately owned range lands.

We can encourage additional research into the fundamental principles of range management.

We can provide an avenue for exchange of ideas and experiences among range and grassland workers.

To carry out these functions, as well as to increase unity and improve professional standards, will be the objectives of the American Society of Range Management. •

Evolution of Range Ecology Practices and Policy: Back to Our Rangeland Ecosystem Roots

W.B. Kessler

Editor's Note:
This paper was published by the Society of American Foresters in a proceedings of their Annual Meeting. They have granted permission for the paper to be reprinted in Rangelands.

I believe that range ecology and policy have evolved in a big circle, taking us back to our rangeland ecosystem roots. Just pick up the early textbooks on range management, and you will find ecological treatises focusing on native plant communities. Key topics included plant composition and vigor, soil as a life support system, and ecological relationships of native and domestic animals. It was a brand of rangeland management concerned with the health and productivity of complex ecological systems.

This view of range management has been upstaged in more recent decades by an agricultural production approach. Here the main focus is the land's potential to yield commodities, with the art and science of range management directed to this end. Often commodities can be more efficiently produced by replacing the native plant community with non-native species, or by otherwise concentrating the lion's share of nutrients and energy into the desired plant and animal products.

Which view or model is "right," an agricultural production approach or an ecosystem approach? That depends on who owns rangeland and what their objectives may be. For many private landowners, the objective is profitable livestock production to support livelihoods and chosen lifestyles. The agricultural production model may be the most efficient way to meet these objectives.

Two things are clear. First, you can't have it both ways. These are two distinctly different paradigms, or views of what rangeland ecology and management are all about. Second, for the USDA Forest Service, the ecosystem management approach is the course of the future.

Gaining Perspective

The move to ecosystem management is not confined to the rangeland management program of the Forest Service. On June 4, 1992, Chief Dale Robertson announced the agency's adoption of this approach Service-wide (Robertson 1992). The decision to embrace ecosystem management did not happen overnight; rather, it was the culmination of a transition process called "New Perspectives." During this 3-year period the Forest Service took a hard, analytical look at the turmoil surrounding land and resources management (Kessler et al. 1992). The purpose was to understand important changes underway in science and society, and to plot an appropriate new course for managing the national forests and grasslands. It was my fortune to serve as Assistant Director for the New Perspectives effort, and that experience has greatly influenced my thinking about land and natural resources management.

A key part of New Perspectives was a challenge to our field managers and scientists to develop new and creative approaches for solving complex land management problems. This challenge was answered with nearly 300 projects featuring innovative management concepts, practices, and ways of involving people. These experiences confirmed that most land management problems today are far too complex to "fix" with improved techniques and technology alone.

We found that our fundamental approach to sustained-yield, multiple-use management lay at the heart of many of our difficulties. Linear thinking, focused on production goals, has prevailed in public land management for several decades (Congressional Research Service 1993). Although such thinking has important applications in the natural resource disciplines, it is in itself an inappropriate approach for solving today's complex problems involving land, natural resources, and people.

Competing Uses, Conflicting Interests

What view of land and natural resources shaped analysis and management approaches in the 20th century? It was a very practical view, focusing on the important uses that are provided to humans by lands, water, and the living things that grow there. This focus on uses is why the natural resources fields developed as they did: as a set of distinct disciplines, each oriented toward a particular resource of use to humans. Hence there are separate professions dealing with science and management of rangeland resources, of wildlife, of fisheries, of timber, of outdoor recreation, and so on. Within a given discipline, a key role has been to discover factors that limit production of that resource, and to remove those limitations through scientific management.

This approach had a long history of successful application in agriculture and industrial production. The approach shaped how the natural resource disciplines characterize

A paper presented at the Range Ecology Working Group session at the Society of American Foresters National Convention held at Richmond, Va., October 25–28, 1992.

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lands and waters: in terms of their potential to produce useful crops. For example we talk about a range allotment's capability to provide animal-unit-months of grazing, the site index of a forest stand to produce timber, or the habitat capability of a lake to produce fish and recreation user-days.

On lands having many stakeholders, such as the national forests and grasslands, management must produce not one but several uses. The Forest Service features each of several key uses in separate programs for range management, timber management, wildlife and fisheries, recreation, and others. Because each resource discipline has been concerned with improving production of its particular resource, what results is a model not just of multiple uses but of competing multiple uses. The choices are presented to stakeholder groups as tradeoffs among the different uses. (You want more wildlife? Okay, but how much decrease in timber are you willing to accept? You want more fish production? Fine, but it will cost you in livestock grazing use).

Increasingly today, the phrase "conflicting resource uses" dominates discussion about lands and natural resources. Should we be surprised? A system that views natural resources in terms of competing use interests is destined to breed conflict. And as lands and resources get scarcer, the conflicts intensify.

Dealing with the Issues

How do the conflicts about natural resources get expressed? Most often, they emerge as specific issues reflecting highly polarized viewpoints. For example, one of the hottest issues today is whether or not livestock should be permitted to graze on public rangelands.

An important thing to consider here is how, under the prevailing paradigm, we have defined and attempted to deal with resource issues. As issues arise, the procedure is to fit them into appropriate disciplinary or resource-use pigeonholes. For example, animals whose populations are declining become a wildlife problem—unless they live in the water portions of the landscape, in which case they are a fisheries problem.

What about endangered plants? Should this be considered a range problem? But what if the species occurs in timbered habitats, is it then a timber management problem? The Forest Service avoided that dilemma by making endangered plants a part of its wildlife and fisheries program.

Diseased trees are called a forest health problem—something that timber managers need to deal with. But once the trees die, they are of less interest to timber managers and instead become a fuels management problem. Fuels managers are quite capable of dealing with the problem through salvage or other means; however, the results of these solutions may give birth to a new set of visual resources problems, wildlife problems, and fisheries problems.

And so the vicious cycle goes on, with each group of specialists trying to "mitigate" the problem from their particular disciplinary perspective. Is this any way to run a rangeland, or a forest, or a wetland? The disciplinary filters we wear tend to blind us to what these lands and resources really represent. They are living, dynamic, complex systems of plants, animals, water, soil, air, climate, topography, and people. In systems terminology, we have concerned ourselves with manipulating stocks and flows of resources, with far less attention to the state or condition of the systems from which those resources derive (Brooks and Grant 1992). While focusing on production performance, we have ignored the vast complexity of rangeland and forest ecosystems. Resource relationships, inherently complex, have been stripped down to a set of production functions.

Thus what we call issues today are often just symptoms of the real problems, which are ecosystem problems. Complex ecological, social, and economic questions involving rangelands are buried in the debates about livestock grazing. Endangered species provide a vivid example of the problem. Is it really the *fact* of a species becoming rare that is troublesome? Or should we become more concerned with what the species' predicament tells us about the condition of the ecosystem of which the species (and human communities) are a part? A couple of cases will help illustrate these points.

Solving Ecosystem Problems

The forests of the Blue Mountains of northeastern Oregon and southeastern Washington are in trouble, with forest mortality occurring on a massive scale (Wickman 1992). What is the essence of this "forest health problem" in the Blue Mountains? Is it a problem of drying trees and lost timber volume? Or hazardous fuel accumulation? Or deteriorating wildlife habitat? The real problem spans all of these concerns—it is a story of a stagnant, ailing ecosystem. Many decades of fire exclusion have interrupted dynamic processes vital to the system's health, and the consequences reach widely in the ecology, economy, and social fabric of the region.

What is the real story of the declining fish stocks in the Columbia River system? Is it overgrazing around headwaters, and hence a range management problem? Or sediment from logging, and hence a timber management problem? Maybe it's overfishing by local people, and thus a socio-economic problem. Or maybe the dams are the real culprits, making this an engineering problem. In reality, it is all of the above and much more: it is an ecosystem problem. And it can only be solved as such, from an ecosystem perspective (Lee 1989).

For problems involving ecosystems (which I suspect is the case for most natural resources problems), all the partial remedies developed from a functional, competing-use perspective will not add up to a solution for the whole. That is why the Forest Service, this past June, adopted the new policy on ecosystem management. Its fundamental approach is to bring together a wealth of disciplines to solve complex problems involving lands, natural resources, and people.

Land use planning under the new model must go beyond establishing goals for selected uses that people

may wish to make of lands and resources. It must include goals that relate to the health and sustainability of the system. After all, it is healthy ecosystems that will continue to provide the traditional multiple-use benefits, plus those benefits we do not often think about such as oxygen production, nutrient cycling, water conservation, and other life-support functions.

Rangeland forage, livestock, and the people who profit from them are important parts of rangeland ecosystems. But rangeland management must treat that particular use in the larger context of sustaining healthy, productive rangeland ecosystems in the long term.

Toward Healthy Rangeland Ecosystems

You may be wondering whether the sudden policy change to ecosystem management has been a shock for our rangeland professionals. Quite the contrary; most of our range people view it as a positive sign that the rest of the Forest Service is catching up to them!

The current emphasis on sustaining ecosystem health and productivity—for the many uses, products, and values that healthy ecosystems offer to people—was adopted 6 years ago. You may recall this as the "Change on the Range" initiative, which shifted the focus from forage production and use to restoring and maintaining healthy rangeland ecosystems to meet the diverse needs of society. Thus our rangeland professionals committed to an ecosystem approach well before the rest of the Forest Service tested the waters with its New Perspectives, and certainly before ecosystem management was adopted as a Service-wide policy.

I will close by repeating my opening statement, that we have come full circle. The ecosystem view of rangeland management more strongly reflects that conveyed by my range professors many years ago, before linear thinking (and its analog, linear programming) changed the orientation of natural resources curricula. And I believe it reflects the outlook of the Wyoming ranchers whose lands I hunt on each fall. Although disinclined to use jargon, these men and women have a decidedly "holistic" outlook on their operations. After all, these lands are their home, livelihood, way of life, and heritage for their descendants in the long run.

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The PROCEEDINGS OF THE IVth INTERNATIONAL RANGELAND CONGRESS WHICH CONVENED IN MONTPELLIER, FRANCE, 22-26 April 1991, are now available. They consist of three volumes with a total of 1,280 pages. Vol. 1 and 2 are 592 and 401 pages long, respectively. They contain the 255 original articles accepted by the Scientific Committee and presented at the Congress by regularly registered participants. These articles are gathered into 16 different subject matter symposia. Vol. 1 includes symposia 1 to 8 dealing with: Ecological Bases of Range Science (11 articles), Dynamics of Rangeland Ecosystems (32 art.), Functioning and Productivity of Rangeland Ecosystems (16 art.), Ecophysiology of Range Plants (17 art.), Range Resources (11 art.), Ecological Adaptation and Phytogenetic Resources (24 art.), Plant/Animal Interactions (19 art.), Descriptive and Geographic Aspects of Woody and Herbaceous Range (20 art.).

Vol. 1 also contains a detailed statistical analysis report on the geographic origin of participants, their disciplines, the geographic origin of the papers presented, the number of participants and papers by country and geographic area, subject matter, etc.

Vol. 2. includes symposia 9 to 16 addressing the following subjects: Selection and Intake of Plants by Herbivores (21 papers), Performance and Productivity of Domestic and Wild grazing Animals (11 papers), Range Production Systems (13 papers), Diagnosis and Improvement Method in Range Utilization (12 papers), Rational Management of Rangeland Systems (8 papers), Utilization and Control of Woody Ranges (10 papers), Socio-Economic and Legal Aspects (15 papers), Education and Training, North-South Relationship (16 papers).

Vol. 3 contains the Syntheses of each of the 16 Symposia, their Conclusions and Recommendations, the 4 Plenary Lectures, various speeches delivered at the 'Forum of Development Actors', Historical Notes on IRCs, list of Continuing Committee, Organizing Committee, Scientific Committee, List and mailing Addresses of the 620 participants and various business items, vol 3 is 287 p. long.

The selling price is 1350 FF, surface mailing and taxes inclusive, that is approx. 245 US $. Orders should be sent to CIRAD/CIDARC, S.C.I.S.T. (Attn Dr J.F. Giovanetti), 2477, Avenue du Val de Montferrand, B.P. 5035, F-34032, Montpellier Cedex 01, France, Tel. (33) 67 61 58 48, Fax: (33) 67 61 58 20.

Desert and Prairie Ranching Profitability

Jerry L. Holechek and Jerry Hawkes

During the 1980's and early 1990's the ranching industry in the United States has been in a deflationary mode compared to a highly inflated economy in the 1970's. How are these changing economic conditions affecting ranch values and profitability? Knowledge of the general economic conditions can be useful in decisions regarding implementation of range improvements such as grazing systems or brush control.

To make valid comparisons of ranching profitability under changing economic conditions, information is required from both public and private land ranches. To examine the financial aspects of ranching under the inflationary conditions of the 1970's and the deflationary conditions of the 1980's and 1990's we used the average New Mexico cold desert ranch (250 AU) where the land is primarily publicly owned and the average shortgrass prairie ranch (250 AU) where the land is primarily privately owned. These comparisons are possible because large amounts of both range types occur in the state, with long-term (65 years) detailed financial characterizations of ranches in each range type. The cold desert ranches are in the northwestern corner of New Mexico and shortgrass prairie ranches are in the northeastern corner. The Rocky Mountains in the center of the state separate the two range types. It is important to recognize these comparisons are for the average ranch, and there are individual ranchers who do substantially better or worse.

Methods

Our analysis comes from a series of reports by agricultural economists at New Mexico State University dating back to 1925 plus analyses we've performed using a computer model developed by Allen Torell, agricultural economist, NMSU. The financial structure of the two ranch types, cold desert and shortgrass prairie ranches, for the periods of 1978–1980 and 1990–1992 is based on rancher interviews and range surveys directed by James Gray, John Fowler, Allen Torell, and the authors. Average prices and costs were used for the 1978–1980 and 1990–1992 periods to avoid aberrations associated with particular years not representative of the period.

Production characteristics such as calf crop, calf weights, death loss, etc., at 1990–1992 levels were used for both 1978–1980 and 1990–1992 periods so the influence of cost/price structure changes could be separated from managerial improvements. Generally modest increases were made in production characteristics between the 1978–1980 and 1990–1992 periods (Table 1).

This paper was supported by the New Mexico Agr. Exp. Sta., Las Cruces, and was part of project 1-5-27417.

Authors are with the Department of Animal and Range Sciences, Box 30003, New Mexico State University, Las Cruces, NM 88003.

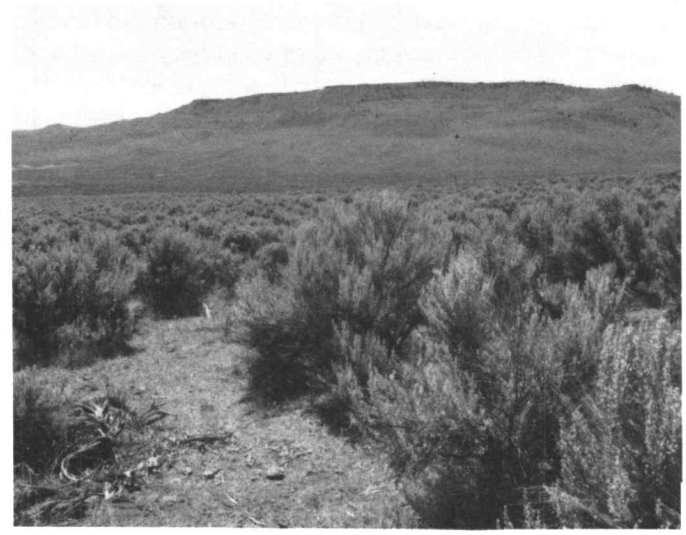
Table 1. Production and efficiency characteristics for average medium sized cold desert and shortgrass prairie ranches in New Mexico in the 1978–1980 (inflationary) and the 1990–1992 (deflationary) periods.

	Average Cold Desert Ranch		Average Shortgrass Prairie Ranch	
Characteristic	1978–1980	1990–1992	1978–1980	1990–1992
Ranch size (acre)	28,614	28,614	7,750	7,750
Number of AUY	250	250	250	250
Number of mature cows	186	193	192	187
Replacement rate (%)	12	14	13	15
Bull to cow ratio	1:18	1:15	1:20	1:20
Calf crop %	75	80	77	87
Calf death loss (%)	2.7	2.5	3.5	2.5
Steer calf weight (lb)	410	450	390	460

Ranch Values

Between 1978–1980 and 1990–1992, the average cold desert ranch with cattle excluded lost approximately 38 percent of its value (Table 2). In contrast, shortgrass prairie ranches dropped 9 percent in value in the same period. Generally, values of most types of real estate suffer under deflationary conditions (Batra 1989, Schiller 1991). During the depression of the 1930's, agricultural land and commodity values were much more severely depressed than assets associated with manufacturing and service (USDC 1975, Batra 1989).

The differential reduction in ranch value in the cold



Cold desert zone in northwestern New Mexico.

Table 2. Financial structure of the average medium sized (250 AU) cow-calf ranch in the cold desert and shortgrass prairie regions of New Mexico in (1978-1980) and (1990-1992).

Item identification	Unit	Quantity	1978-1980	1990-1992	1978-1980	1990-1992
Cold Desert:			$ value/unit		Total value $	
Land:						
Owned rangeland	Acres	7,164	54.57	20.00	390,939	143,280
State lease rangeland	Acres	4,070	38.98	4.91	158,648	19,983
Federal lease rangeland	Acres	17,380	—	—	—	—
Federal lease rangeland	AUM's	1,896	60.03	32.74	113,816	62,075
Subtotal	Acres	28,614			663,403	225,338
Dwellings					45,833	55,000
Other buildings					35,752	36,000
Watering facilities:						
Wells	Number	6	8,920	10,000	53,520	60,000
Pipelines	Miles	8	1,697	2,100	13,576	16,800
Tanks & Resources	Number	22	2,362	2,500	51,964	55,000
Subtotal					119,060	131,800
Barbed wire fence	Miles	40	1,712	2,000	68,480	80,000
Machinery					25,500	66,500
Subtotal					958,028	594,638
Cattle:						
Cows	Number	193	438	600	84,534	115,800
Heifers 1-2	Number	27	336	600	9,072	16,200
Heifer calves	Number	50	236	374	11,800	18,700
Bulls	Number	13	844	959	10,972	12,467
Horses	Number	8	670	1,000	5,360	8,000
Subtotal					121,738	171,167
Total Value					**1,079,766**	**765,805**
Shortgrass Prairie:			$ value/unit		Total value $	
Land:						
Owned rangeland	Acres	6,209	92.00	78.81	571,228	489,352
Private lease rangeland	Acres	540	—	—	—	—
State lease rangeland	Acres	1,001	76.00	19.70	76,076	19,723
Subtotal	Acres	7,750			647,304	509,075
Dwellings					45,833	55,000
Other buildings					35,752	36,000
Watering facilities:						
Wells	Number	5	8,920	10,000	44,600	50,000
Pipelines	Miles	2	1,697	2,100	3,394	4,200
Tanks & Resources	Number	8	2,362	2,500	18,896	20,000
Subtotal					66,890	74,200
Barbed wire fence	Miles	18	1,712	2,000	30,816	36,000
Other range facilities					1,943	4,000
Machinery					26,380	46,500
Subtotal					854,918	760,775
Cattle:						
Cows	Number	188	438	600	82,344	112,800
Heifers 1-2	Number	27	336	600	9,072	16,200
Heifer calves	Number	59	236	374	13,924	22,066
Bulls	Number	11	844	688	9,284	7,568
Horses	Number	5	670	1,000	3,350	5,000
Subtotal					117,974	163,634
Total Value					**972,892**	**924,409**

desert compared to the shortgrass prairie is primarily because most of the land is publicly owned. Policy changes by the federal government account for this differential reduction. The uncertainty associated with grazing fees and tenure of grazing privileges and the lower financial returns in the 1980's on public land ranches has caused buyers to reduce prices they are willing to pay per animal unit (AU) compared to that on private land ranches (Torell and Doll 1990).

Land values of the privately owned land portion on the cold desert ranches have also dropped sharply since the 1982 highs. Declining real personal income, saturation of the market with ranchettes, reduced oil revenues, high real interest rates, lower ranch returns, and a change in the tax code in 1986 caused a collapse in the market for southwestern rangeland in the mid-1980's. Present land prices reflect mainly grazing value rather than future development potential. In the shortgrass prairie, ranches have dropped much less in value because they occur in the area which is not attractive for retirement. Historically, land in the Great Plains has been appraised mainly on the basis of income from livestock and farming, rather than development potential.

Nearly four times the amount of land is required per AU in the cold desert compared to the shortgrass prairie due

Shortgrass prairie range in good condition in norteastern New Mexico.

to lower precipitation and more rugged terrain. In the cold desert ranges, forage production is between 100–400 lbs per acre compared to 600–1,400 lbs per acre in the shortgrass prairie (Holechek et al. 1989). The larger area means that total fencing and watering point values are much higher on the cold desert compared to the shortgrass prairie ranches.

The value of ranch fences and watering points have appreciated at about one percent per year (1978–1992) compared to an average annual inflation rate for the U.S. economy of 5 percent. Annual maintenance costs range from 5 to 10 dollars for a mile of fence and 200 to 350 dollars for a well. The failure of these assets to keep up with inflation and high annual maintenance costs makes it financially essential to keep fence and water developments at minimum levels necessary to effectively utilize the forage resources of the ranch. This is particularly true in the cold desert where these assets occur primarily on federal lands, and future grazing privileges are uncertain.

Table 3. Budgeted costs for the average medium sized (250 AU) cow-calf ranch in the cold desert and shortgrass prairie in New Mexico in 1978–1980 and 1990–1992.

	Cold Desert		Shortgrass Prairie	
Cost type	1978–1980	1990–1992	1978–1980	1990–1992
	----------$----------		----------$----------	
A. Variable costs				
1. Grazing fees				
Private lease	367	0	800	1350
State lease	395	2,431	250	777
BLM/Forest Service fees	2,277	2,883	—	—
2. Supplement feed	4,000	10,672	9,000	12,982
3. Livestock expenses				
2 purchased bulls	1,026	2,700	1,296	2,600
Fuel & repairs	5,706	5,410	4,020	4,500
Veterinary & medicine	462	1,546	650	1,425
Property taxes (livestock)	126	1,212	178	1,130
Maintenance	2,156	3,276	1,627	3,000
Other	360	500	540	1,600
4. Hired labor	2,692	5,400	2,500	4,000
Total variable costs	**19,567**	**36,030**	**20,861**	**33,364**
B. Fixed costs				
Electricity	1,111	1,440	993	1,800
Telephone	142	800	240	840
Butane & heating	60	1,200	280	1,000
Insurance	690	5,200	640	3,600
Depreciation	6,567	14,535	5,570	8,146
Property taxes (land)	1,026	1,182	1,439	1,179
Total fixed costs	**9,596**	**24,357**	**9,162**	**16,566**
TOTAL COSTS	**29,163**	**60,387**	**30,023**	**49,930**

Ranching Costs

Between 1978–1980 and 1990–1992, total ranching costs in the cold desert have increased about 100 percent (7 percent per year) (Table 3). In the shortgrass prairie total costs have increased about 60 percent (5%/year). Insurance, electricity, taxes, livestock health care, supplemental feeding costs, and state lease grazing fees all showed major increases on both types of ranches. Supplemental feed costs increased more sharply on the cold desert than on the shortgrass prairie. Research indicates under proper stocking rates supplemental feed costs of $15–20 per AU will maximize cow-calf performance on most New Mexico ranges (Wallace 1988, Holechek 1992). However, the average rancher is spending $40–45/AU on supplemental feed (Torell and Word 1991a, 1991b). It has been our experience based on visits to both cold desert and shortgrass prairie ranches that supplemental feed programs are often poorly thought out. Ranchers err in using inappropriate supplements and applying them at the wrong times and to the wrong classes of livestock. We believe supplemental costs could be reduced by 50 percent or more on most ranches with no reduction in cattle productivity.

Grazing fees on federal lands have been a subject of much controversy. However, they represent a small part of total costs (4 to 5%) in the cold desert. It is our impression that many ranchers are disproportionately concerned about increases in grazing fees relative to other production costs. Generally, ranchers believe major reductions in ranch valuations will occur if grazing fees are increased. This concern has validity on the basis of Torell and Doll's (1990) report.

Return on Investment

Both net income and return on investment were substantially higher on the shortgrass prairie compared to cold desert ranches (Table 4). This is due to higher cattle productivity and lower production costs in the shortgrass prairie. Longer periods of green feed, flatter terrain, lower frequency and severity of drought and easier application of intensive herd management practices when livestock are concentrated in smaller areas all explain the superior economic returns from the shortgrass prairie. Based on our analysis, the shortgrass prairie is a more efficient area for beef production than the cold desert.

Nominal cattle prices were at historic highs in the 1990–1992 period. However, when adjustment is made for

Table 4. Returns for average medium (250 AU) cow-calf ranch in the cold desert and shortgrass prairie in New Mexico in 1978–1980 and 1990–1992.

Receipts (Sale of livestock)	1978–80	1990–92	1978–80	1990–92	1978–80	1990–92	1978–80	1990–92
Cold Desert:	Number		$/Cwt		Lbs. Sale wt. (avg)		Total $	
Yearlings	23	23	67.00	82.00	550	550	8,476	10,373
Calves	121	121	76.00	96.00	425	425	39,083	49,368
Cull bulls	3	3	56.90	60.00	1,475	1,475	2,517	2,655
Cull cows	24	24	44.00	46.00	900	900	9,504	9,936
Total ($)							**59,580**	**72,332**
Expenses								
Variable costs							19,567	36,030
Fixed costs							9,546	24,357
Total costs							29,163	60,387
Returns								
Total net return ($)[1]							30,417	11,945
Net return AU ($)[1]							121.67	47.78
Net return acre ($)[1]							1.06	0.42
Return on investment (%)[1]							2.82	1.56
Total net return adjusted for inflation (1980–1992) ($)[1]							**45,546**	**11,945**
Shortgrass:	Number		$/Cwt		Lbs. Sale wt. (avg)		Total $	
Yearling heifers	2	30	67.00	82.00	685	6.85	918	16,851
Calves	150	122	76.00	96.00	450	4.50	51,300	52,704
Cull bulls	2	2	56.90	60.00	1,500	15.00	1,707	1,800
Cull cows	27	27	44.00	46.00	950	9.50	11,286	11,799
Total ($)							**65,211**	**83,154**
Expenses								
Variable costs							20,861	33,364
Fixed costs							9,162	16,566
Total costs							30,023	49,930
Returns								
Net income[1]							35,188	33,224
Net return AU ($)[1]							140.75	132.90
Net return acre ($)[1]							4.54	4.29
% return on investment (%)							3.62	3.59
Total net return adjusted for inflation (1980–1992) ($)[1]							**57,317**	**33,224**

[1]No value is subtracted for operator labor and management or opportunity cost.

inflation (5% per year average 1980–1991) real cattle prices since WWII peaked 1951. Real income adjusted for inflation has decreased about 74% on cold desert and 42% on shortgrass prairie ranches between 1978–1980 and 1990–1992 periods.

The problems confronting western range cattle ranchers in recent years are an oversupply of beef due to a low population growth rate, changes in consumer eating habits, expanded world beef supplies, and beef production increases from new technologies. The new beef production technologies involve better cattle health care, embryo transplants, improved breeding programs and intensive nutritional management. Many of these operations are best suited to humid areas where low amounts of land are required per animal unit.

Compared to other investments, western cattle ranching is definitely a high risk-low reward proposition. Presently, yields on 1- to 30-year treasury bonds are around 3.5 to 7.5 percent, respectively. Yields on triple A rated corporate bonds go 1 to 3 percent higher than treasury bonds. Annual returns in the stock market have averaged around 10 percent over the last 40 years. Profits of large corporations in America have averaged about 12% on investment. These returns are all well above the 3.6% and 1.6% that characterized shortgrass prairie and cold desert ranches, respectively.

Historically, ranching returns in New Mexico have ranged between –3 to 5% on investment. Generally, profitability has been higher on large ranches than small ones due to economies of scale. Since World War II profitability of New Mexico ranches has gradually trended downward with the low point occurring in 1986 when return on investment averaged –1 percent.

Sustaining Cattle Ranching in the West

Our analysis indicates the profitability (net real income adjusted for inflation) of cattle ranching on both public and private lands in New Mexico has declined over the last 15 years. This decline has been most drastic on arid public land ranches. Failure of cattle prices to keep up with production cost increases is the reason for the decline. The decline in profitability has been accompanied by falling ranch values.

Under present conditions economic survival appears to depend more on cutting costs than increasing production. Generally, management has been oriented to the approach of grazing systems, brush control and expanding ranch size. All three of these approaches generally involve heavy capital outlays and work best in an inflationary economy.

Many economists project deflationary conditions to last well into the 1990's due to excessively high levels of government and consumer debt. This problem is further exacerbated by a depressed world economy. Present overall economic conditions have many similarities to the late 1920's prior to the 1930's depression (Batra 1989).

The present economic downturn could cause major changes in ranching and range management in the western USA. If the present downturn continues, many highly leveraged ranchers could be forced out of business by the mid-1990's, unless they are able to sustain the ranch with outside income. There has already been considerable shake-out in the ranching industry in New Mexico (Fowler and Torell 1987, Torell and Doll 1990). Conservative ranchers that avoided capital intensive range management practices such as intensive grazing systems and/or brush control are generally in the best financial condition in terms of debt to equity. As long as deflationary conditions persist, it is our view professional range managers need to shift their emphasis from capital intensive practices that increase production to low input practices that maximize profit with low risk, such as more careful stocking rate selection, better breeding programs, livestock behavioral modifications to improve distribution and reduce poison plant death losses, better placement of watering points, and improved supplemental feeding progams.

Common-use grazing and diversification into recreation are two other approaches that show considerable potential to improve profitability for some ranches. Integrated cattle and sheep ranches in New Mexico have been more profitable than straight cow-calf operations over the last 10 years (Torell and Word 1991a, 1991b). Increasingly New Mexico ranchers are finding fee hunting for both big game animals and gamebirds to be lucrative side endeavors that involve low risk and small capital outlay. Fee hunting works best on ranches that are largely in private ownership and naturally have high game populations. Several ranches in New Mexico now generate $2,000 to $30,000 in additional income from fee hunting.

Cowboying as a recreational experience is in its infancy as a western ranch enterprise. Some ranches are now providing a week of cowboying or dude ranching as in the recent movie *"City Slickers"* for around $2,000–$3,000 per person. Other aspects of this type of enterprise such as wilderness pack trips and nature tours are also being offered. The fact these enterprises (fee hunting, dude ranching, nature tours) are doing fairly well even under recessionary conditions reflects their potential to boost ranch income in the future.

Western ranches are not as efficient as ranches in the Great Plains and southeastern USA for cattle production but they have tremendous potential to provide high quality recreational experiences for an increasingly crowded, stressed out, unbanized society hungry to experience its colorful past. It is our opinion that cattle ranching will continue to be an important part of western economies but the future will belong to those ranchers who successfully diversify into recreation.

In closing we think the range profession needs to consider these trends and make appropriate adjustments. A strong understanding of the financial consequences of management interventions and knowledge of how to help ranchers develop and manage recreational enterprises will probably be important skills for tomorrow's range managers.

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Succession in Sagebrush

T. Lommasson

Editor's Note:
To truly make progress in research it is necessary to be aware of information found in the past. All too frequently we keep rediscovering the wheel. The following article is a case in point. During the past few years there have been several articles on plant succession published in the *Journal of Range Management*. I selected one article for reprinting. There is much good information in this article on factors which affect plant succession. I wonder what would have been concluded if the study had been for only 5 years at some period during the 31 years that this study represents.

Common sagebrush *(Artemisia tridenta)* on the grasslands of the Beaverhead National Forest in southwestern Montana apparently will maintain itself indefinitely under natural conditions. This conclusion is the result of a 31-year-old study conducted by the Forest Service to determine the possibility of sagebrush giving way to grass under good management of rangeland.

The study area occupies a basin of deep loam soil at the head of Cherry Creek on the east side of the Gravelly Range. Before and during the period of early settlement of this section of the State, this entire range was grazed by herds of buffalo during the summer months. The last buffalo in the adjoining valley was killed in 1882. At this time the heads of the streams and the gently sloping grasslands had been reduced to areas of bare soil pocked with the wallows of the buffalo. On these areas they rolled, pawed, and threw dust for protection against insects. The wallows are still a feature of the landscape.

From 1882 until about 1914, little grazing use was made of the range and the bare soil was allowed to revegetate almost unhindered. During this period sagebrush gained a foothold and became established in favorable locations. Since 1914 the area has been grazed by sheep. In 1926 it was placed under systematic management, following a range survey.

Sagebrush plants in the stand had an average age of 61 years in 1945, by growth ring count. They became established, therefore, in 1885, and in 1915 when the study began, they were 31 years old. At that time they were 24 to 30 inches tall, and were thick and thrifty. A 30-foot square area supported 167 mature plants, having 659 basal branches extending from the plant bases. No other shrubs were present.

In 1932, 18 years after the study started, the plants had decreased in number to 114, with 224 basal branches, a loss of 32% and 66%, respectively. No new plants were present. In 1936 only 93 old plants with 200 basal branches remained. However, the stand was beginning to show openings, and 5 seedlings were present in the open spots. The appearance of seedlings marked the turning point between sustained loss over a long period of years and the beginning of replacement of the stand. At this time the reduction of old plants had reached 44% and the loss of basal branches 70%.

In 1945, 88 old plants with 151 basal branches remained. In addition, the seedlings of 1936 had become well-established plants. The old plant loss since 1915 amounted to 47%, and the basal branch loss 77%

Total vegetation density and percentages composition of sagebrush, grasses and grasslike plants, and weeds present on the plots for each of the periods were as follows:

	1915	1932	1936	1945
Total vegetation density	.8	.7	.65	.5
Sagebrush (% composition)	40	57	44	27
Grasses and grasslike plants (% composition)	40	32	40	58
Weeds (% composition)	20	11	12	15

Studies were made also of sagebrush invasion on a companion plot. In 1932 all the sagebrush on this plot was

pulled, leaving it fully open to the sun. After 5 growing seasons, 2 new sagebrush plants were present on the plot, one 10 inches tall, the other 20 inches. In 1945, 14 years later, there were 33 plants present averaging 24 inches tall, and 243 other plants varying from established seedlings to 4 inches tall. The latter averaged 4 years old. Location of the seedlings, most of which were close to older plants, indicated they came from seed of the older plants rather than from seed stored in the soil. The principal new stand was established in about 1941 and should reach the decadent condition of the older stand in about 50 years.

More general studies elsewhere on this range in 1945 showed a distinct trend toward increase of sagebrush in the grassland association. Many new seedlings and small plants now occupy areas formerly free of sagebrush except for a few scattered old plants. Once established, such new plants increase the density of sagebrush cover and reduce the production of forage.

Discussion

It was apparent that the thick, thrifty stand of 1915 had to age sufficiently to break down into a more open stand before conditions were right for new plants to come in. As the age of the plants increased, they became brittle and decay developed at the ground level. Basal branches succumbed first and later the plants would die. Because the plants were very thick in 1915, many plants died before the stand was open enough for sunlight to reach the ground and permit seedlings to come in. This point was reached in 1936 when the number of plants had been reduced by 44% and the number of basal branches by 70%. Seedlings began to appear then, and by 1945 these were firmly established. Fifty-two years elapsed, therefore, before new seedlings gained a foothold.

If the old plants had continued to die without replacement, the stand would eventually have passed out of existence, of course. However, with the stand opening up to the sun, new plants established themselves and maintenance began. At the present stage of this study the facts point toward continued replacement by new plants as the old ones die.

It may be concluded that the development of sagebrush in an established stand under the conditions described is inversely proportional to the thickness of cover present; therefore, the less cover of sagebrush, the greater the amount of new growth which occurs. Also, unless the habitat is disturbed unduly, sagebrush on sites favorable for growth probably will continue to reproduce itself indefinitely.

Correlation of the 61-year-old stand with periodic weather conditions indicates that its establishment in 1885 coincides with a period of growing conditions favorable for seedling establishment and that the new stand in the companion plot established itself during a period of favorable moisture conditions. It may be concluded, therefore, that moisture conditions favorable for seedling establishment are necessary for the beginning of development of a thick stand of sagebrush, and also for its maintenance once the turning point of an established stand is reached.

At the elevation of this area, 8,300 feet, droughts are of little consequence and are not as destructive to sagebrush as they have been demonstrated to be at lower elevations in this latitude.

Application of Results

In many of the high producing grassland areas where often only a few old sagebrush plants are found, numerous seedlings and small plants have become established, and more are coming in. If these are allowed to continue growth, it may be expected that the area of sagebrush will increase materially in the future. This will result in a decrease of forage, and also grazing capacity.

Eradication of the parent plants and the new seedlings by grubbing, pulling, or by toxic sprays, represents a comparatively small task in many areas; whereas, if they are left until the problem becomes one of large areas occupied by dense sagebrush, the job becomes a major one which will involve appreciable amounts of time, labor, and money. Also the reduction of grazing capacity, and the management problems which are involved, will increase costs and reduce financial return to the dependent communities. Clearly, action is needed immediately in order to forestall a large scale job in the future and the inevitable reduction of numbers of livestock on those ranges where sagebrush dominance is now in its incipient stages. (Reprinted from *Journal Range Management* 1(1):19–21 1948).

Exploring Southern Utah, 1872
The Diary of William Derby Johnson, Jr.

compiled and edited by
Great-granddaughter Sherri Haver

Preface

William Derby Johnson, Jr., was born May 2, 1850, in Council Bluffs,, Iowa to William Derby Johnson and Jane Cadwallader Brown. When William was 13 they crossed the plains to settle in Utah. During the trip, William was run over by a wagon but escaped permanent injury.

William received a 'diploma' from Deseret University (later University of Utah) in 1868 in Bookkeeping. He was asked to remain at the University and become a part of the faculty. In 1869 he married Lucy A. Salisbury in Salt Lake City. He left the University in 1870 and began bookkeeping for ZCMI at $125 a month. In 1871, William moved his family to Johnson, Utah, several miles north of Kanab.

In 1872 William was introduced to Major Powell and his company. He was invited to go with them that spring on their second trip down the Colorado River. The salary would be of great help to his new family. Until they left for the river, he worked with members of the party on the Arizona Strip surveying the area and classifying plants.

The Temple of Music referred to in the latter part of the journal record is now 300+ feet under Lake Powell, behind Glen Canyon Dam. William left the river party at Lee's Ferry because of concern for his wife's health and the danger of the rapids. He returned to Kanab, Utah, to live with his family and friends. During the rest of his life he continued to study and use the geology and botany knowledge learned on the trip. William also used the surveying skills he learned to facilitate many jobs throughout his life.

From Kanab, he moved his family to colonize Colonia Diaz, Mexico, located below Demming, New Mexico. This was one of three colonies established in the area. They lived in Mexico for 27 years, where my (Sherri Haver) grandmother was born. During the time in Mexico, William lost his oldest son to rabies.

While he Mexico, he became involved in an attempt to build a cross-country railroad through Mexico. This was the second attempt to survey and build the Trans-Mexico Railway across northern Mexico. Due to various problems, the railroad was not completed until late 1960's-70's. My grandmother remembered the excitement of going with her father on one of the many trips he took to Mexico City to talk to the authorities.

In July 1912, the colonists were forced to leave their homes and flee ahead of Pancho Villa. Other than what little they could put on 1 wagon, enough for 8 children and mother, everything else was left. Pancho Villa's men destroyed everything they did not take. Nothing was salvageable by the colonists who returned later to survey the town.

William Derby Johnson, Jr., died in Tucson, Arizona, on Oct. 27, 1923. During his life he kept a detailed diary of his activities and thoughts. Following are some of the diary entries from the period of Major Powell's exploration of the Colorado River.

Diary Entries

1869 Nov 29. Pres't Wells married Lucy A. Salisbury and I. Went to live with her mother.

1870. During January and February we managed to save enough to buy us three chairs and a bedstead. I made at odd times a cupboard table and other things and painted them. In March rented a room of Thomas Heath at $4 per mo.

Left Salt Lake City the 9th of November after traveling through snow, storm and many trials we arrived the 9th day of December at Washington Southern Utah.

1871 March 18 ...started for Kanab arrived there March 22nd and to the place called Johnson on the 23rd of March at noon.

Major Powells Party came to Kanab in November four of them here now. The remaining of the party are at House rock some sixty miles from here. They have just come from crossing at Lee's Ferry. Having come down the Colorado River from Green River City.

[Major Powell's Party]

John F. Stewart—Geologist
S.V. Jones—Topographer
A.H. Thompson—Brother-in-law, Ass't to Powell, Also referred to as Prof.
Capt. Bishop—Military title
Clem Powell—Brother of Major Powell
Fred Dellambough—Photographer and author of trips, published book
James Fennimore—Photographer
Capt. Dodds—Military title
Jack—John Stewart??—Gopher?
George?—Gopher?

Editor's Note: *To maintain the feeling of the time the diary is printed using the same word spelling and sentence construction that was in the original diary.*

[Locations]
Dirty Devil River—Fremont River today
Mouth of the Pahreh—Location of Lee's Ferry

1872 Jan 6 Saturday The wind blew very cold this morning....went down to the majors camp. Mr. Clem Powell took our pictures outdoors. The Major asked me if I was going with them in the spring I want to go but the folks dont want me to.

Jan 21 Sunday In the evening I went to Major Powells lecture, the subject was his trip to the Colorado River.

Feb 1. Thursday Mr. Thompson offered me $35 a month to go down the river with them. Have not made up my mind what to do yet.

Feb 12 Monday I have concluded to go the river if they will give me $45.

Feb 16 Friday Got a cow today she is rather old but I hope a good one. Paid $35 for my cow.

Feb 20 Tuesday Feel rather discouraged as my cow is not as good as I hoped she would be.

Feb 24 Saturday Have been up to work on my lot today fixing fence. My cow don't seem to be much account.

Feb 26 Monday Hired to A.H. Thompson at $45 per month.

(From the period of March 10 to April 18 William was part of the Powell party surveying and exploring much of the country north of the Grand Canyon (now called the Arizona Strip). He returned home on April 20 to spend some time with his wife and family for several days before leaving with the Powell party to explore the Colorado River above Lee's Ferry (much of the area described is now under Lake Powell)

April 23 Tuesday I was going to leave this morning but Lucy wants me to stay another day so I think I will. I would not leave home if it were not to get a sewing machine and some other things to make us comfortable. Although Lucy says she would rather go without them and have me stay at home. We went horseback riding this evening.

(Returned to Kanab to meet rest of party. Next several days spent mapping)

May 2 Thursday This is my birthday I am twenty-two years old, how I would like to be at home to spend the day....

(The next few weeks were spend mapping the area around Pipe Springs and getting ready for the Colorado River trip)

Exploring the Colorado River

May 31 Friday Started in NE directions from Lees on a train, had a Piute guide with us, started for Potato Valley. Traveled over gulches and ridges for 12 miles then came to a nice little valley, filled with green grass, and a large clump of willows, in which we found water. Out of this valley we went over a large flat ridge 5 miles, came to what we called Swallow Park a valley about 10 miles long by 3/4 of a mile wide, filled with as fine grass as I ever saw in this country. In this valley we found a lake 250 yds in diameter being nearly round. In this valley we found a number of swallows. The hills here are low only 75 ft high sloping nicely down into the Park, these hills are covered with pine and cedar. Little valleys branch off to the East which are full of grass 1 1/2 ft. high looking like fields of grain, it is the most pleasing looking place I have seen since this side of the Missouri river. In Swallow Park we camped under a large cedar tree large enough for us all to get under cover. Near it was a nice cold spring 3 ft. in diameter 5 ft. deep we had a nice time hunting duck in the lake and killed enough for breakfast. The water in the lake is about 30 ft. deep and full of fish of the kind chubs below the lake about 4 or 5 miles is another valley nearly as beautiful where the walls are high and it is well watered and full of grass. Swallow Park heads in what is called the pink cliffs, these cliffs are very high and thickly covered with Norway Pine these cliffs are of a bright pink color they contrast greatly with the green valley beneath.

June 1 Saturday Started early traveled in NE direction for 7 miles from Swallow Park over low hills and valleys, filled with wild hay and bunch grass then we went down and up over a very rough country composed of sand and limestone, also a great deal of gypsum. Our Indian guide seemed to be lost about noon until Capt. Dodds happened to run on his old trail, then we soon found the way. Crossed over Buffalo Berry Creek about 8 miles from the divide. Two miles from this we came down a steep ledge of rocks, where young Elijah Everett was killed by two Piute Indians (out of revenge) there was 6 other boys with him when he was shot but they ran, as they did not know how many Indians there were ambushed, they belonged to an exploring party from St. George, they came out to explore Potato Valley and the head water of the Sevier River, 2 miles from this place came to clear creek in a little valley the country is filled with gypsum. Three miles farther we came to the Pahreah River and camped for the night grass very thick, had to burn off a place to cook our supper had quite a time putting it out. Clouds Cumuli, no wind, Fred, Jack and myself washed in the creek.

June 2 Sunday We started this morning in a Northerly direction, it does not seem much like Sunday to me. Went up the East forks of the Pahreah 18 miles, some very curious and picturous scenery up the river, where we found a little valley filled with grass and water, also pine and hemlocke trees in abundance, cloudy looks like a storm Cumuli Nimbus we found about three miles from our camp a bottle, and pieces of a California shirt and blanket partly buried in the creek the bottle was one of Jarynes Preparation from Paiche. It looks rather suspicious, Jack forgot his shot and powder until we got 9 miles from camp and had to go back after it. The divide between Pahreah and Potato Valley is composed of huge hills of clay stone and slate very steep and sharp, it looks like so many hogs backs only more sharp, just as we started up the divide it commenced raining, the packs nearly all came loose and we had quite a time fixing them in the rain. The divide was 1,500 ft high, and the trail very narrow if we should slip we would go down 1,000 ft. the day became sticky and we got wet though. When we got to the top of the divide there was the prettiest sights I ever saw (it was the head of Potato Valley) it was a little valley surrounded by low hills and these covered with large pine

trees. The valley was full of meadow grass. On the North side loomed up a table Mt. one of the finest mountains I ever saw. It is composed of arrenaconus rock of a bright pink color and capped on the top with a stratus of pure white sandstone, and this is covered with fine timber, 1 1/2 miles down the valley we made our camp under a grove of large pine trees, near a nice cool spring. Looks like rain cloudy and dark. Jack came a little before dark.

June 3, Monday This morning drizzling and misty. Our Indian sick and wants to go home. Prof. gave him a blanket and some flour away he went. About 10 oclock stopped raining and we got our horses and started. Went down the valley 6 miles when it commenced to canon in. We traveled 6 miles further and camped because we could not cross a fork of the creek it was so deep it commenced raining again about dark.

June 4 Tuesday Raining hard, Prof. sick. I found some fossils here, in the sandstone proved to be ostrea belonging to the cretacous period. I shot a muskrat in the afternoon. I cleaned my pistol. We did not move camp on account of the rain.

June 5 Wednesday Started early crossed the creek and went down the canon or valley 10 miles and camped for noon. Here is the foot of Potato Valley where the creek canons in. Grass good, nice spring plenty of good land and water. Mr. Fennimore got hurt today but not serious. Climbed the canon walls to ascertain what period the rocks belong to also looking for fossils. The creek cuts through an immense fold here. Fred, George, Capt. and Prof. gone to look for trail. Jack and Fennimore taking pictures I found two new flowers.

June 6 Thursday Prof. and Capt. found water about 8 or 10 miles from here for a camp. Started for there about 8 oclock. Found three new flowers going over there. The country is composed of a grand fold. South of Potato valley a distance of 1 mile is a large valley 15 miles long by 3 to 5 wide and good land. Could take the water from Potato Valley to water it. Arrived at Pool Canon about one oclock. This canon is full of pools of water in the solid rock. After dinner Fred and I went down to the canon walls of the river of P. Valley the ramble was full of interest could see nothing for miles on top of the cliffs but bare rounded monuments of white sandstone. Found pools of water on top of the mountain. Found Jack and Fennimore taking pictures. In the gulch looking down was one of the grandest sights I ever saw it was wide at the top and sloped down to the bottom about 3 feet wide and 2,000 ft. deep running down to the river. We saw some lakes small ones Clem took our pictures while standing on the cliff above. Jack and Fennimore also took them standing at the gulch looking down. Had a wash all over in a large pool of water in the solid rock.

June 7 Friday Prof. and Capt. went yesterday to find a way out to the mouth of the Dirty Devil river. By looking and calculating they found out that we are not on the Dirty Devil as supposed but some other river. We went back to camp in Potato Valley. Prof., Capt., George and Clem went up the gulch to take more pictures. We got to camp 1/2 1 oclock, after dinner Fred and I went up the left fork of the creek. I killed a small duck. Found a new flower. Got back to camp sun one hour high. Prof. and Capt. at camp. Prof. told me Jones, and George and Clem were going to Kanab in the morning for provisions and we would go North and East and try to find the mouth of the Dirty Devil River. I wrote a long letter to my dear wife and boy how I would like to see them God bless them both.

June 8 Saturday Up early finished my letter and fixed my flowers for Jones to take home with him. Clem cashed his photographing and we cashed a large theodalite. Jones took with him 7 horses and left 16 for us. We started at 10 oclock north up the creek for 10 miles over sand and rocks through cedars. Then we went up the west fork which was dry for 5 miles up the bed of the creek. Over rough rocks. Then we stopped for Capt. and Prof. to go up the mt. and see where to go. They were gone 3/4 of an hour and came back. we went up the mt. over rough rocks of basalt and lava for 1 1/2 miles down into a little valley which had a nice clear stream of cool water in it and plenty of grass and large high pine trees here we camped for the night. Oh it is a nice place to camp, still I feel lonesome and homesick.

June 9 Sunday Started about 8 oclock it does not seem like Sunday. I got three new flowers at this place. There is plenty of wood, grass and water here. Crossed this creek went about 1/2 mile then crossed a larger one, then we followed up a little valley (north) and crossed a little branch of Birch Creek, a large stream. Went up the divide on to Lake Mountain. Then down the other side. In a canon with a large creek; then up a side canon, and up a large stream of clear cold water (Cascade Creek) after we crossed this we crossed another of smaller dimensions. We have passed through a great deal of fine timber coming down Rush Creek Canon, came to a divide between the two canons. Went down into the canon passed through a large grove of aspen and pine. Up the east slope was a nice creek and a good deal of bare ground fit for cultivation. Good black soil and any amount of water to irrigate with, also timber. On top of the divide we found a large lake nearly round about 3/4 of a mile in diameter and 3 miles around. Plenty of duck. Fred and I went fishing, nice place to ranch here.

June 10 Monday Fennimore sick this morning and found his revolver he had lost. Started at 8 oclock in the south direction for 3/4 of a mile. Then crossed the Aspen Creek and up a fine little valley full of grass and scattered aspen trees. We crossed three little grass valley in succession full of grass then we came to a lake with a little water in it with about 50 acres of land and hemmed in by a thick grove of aspen trees. 1/2 mile further we crossed another little valley surrounded by aspen and pine. We then came to a divide which we descended into, then up a small hill and crossed another creek went about 3/5 of a mile and camped in a grove of pine and aspen near a nice little riverlette of cold water. This country is all full of grass and timber. Fred, Jack and I want to find and photograph some lakes Capt. saw from the divide. Took a mule. We

found them and took 2 good views. I found a lily today. Found four lakes the large one we called Hidden Lake. From this place we are 10,500 ft. above the sea and a fine view we have of the country.

June 11 Tuesday Could not find the horses until late. Cross the little creek at our camp. Then went east 1 1/2 miles and came to what I called Cataract Creek a large one and clear cold and beautiful. Then went another half mile and crossed a large creek, this we called Cascade Creek. Followed NE up this creek for 1 1/2 miles and 2 miles distant saw a large waterfall, being the head of Cascade Creek. Which came off the top of the mt. and fell 1,000 ft. first fall 200 ft. without touching rock. Then it bounded down over steep rocks for 800 ft. more, it was a fine site. Think the creek heads in a large lake in the top of the mountain. There is a large cave under the fall. These two last mentioned creeks form what we called the Big Boulder. The stream is nearly as large as the Jordan River. It runs through a large valley of 8 or 10 miles long by 2 or 3 wide full of grass and good soil it was nice traveling on sloping hills. We camped in a large grove of pine and aspen. Near a cold creek got dinner then went 7 miles and camped at the Mosquito Spring. Having crossed nine creeks and traveled 18 miles. From here we can see the Dirty Devil Mts. we are now 10,000 ft. above the sea. We are going today and tomorrow and look around for a trail.

June 12 Wednesday Our camp proved to be a fair one with the exception of the mosquitos. Which bothered us a good deal. Capt. and Prof. went NE to find a trail. Fred and I took the SE direction from a canon and over hills (sandrock). We came again into that fold we left in Potato Valley. We found an old trail with fresh Indian signs on it seemed to be three or four horses and colt and three or four lodges of Indians following the trail. We followed about 6 miles and turned back. Prof. and Capt found the same trail. Commenced raining about 2 oclock we fixed up a shelter and got out of the rain. Fixed our camp comfortable for the night. The country here is covered with Trachyte. Found 3 new flowers today. I would like to be at home with Lucy and our boy tonight.

June 13 Thursday It rained a little last night started early on the trail in the east direction toward the Dirty Devil Mts. After going 8 miles past 2 pools of water in the solid rock. 2 miles farther found a fine little valley about 1/4 of a mile wide by 2 miles long and it was full of Indian signs. We lost the trail for awhile. Then Capt. found it traveling over sandstone gulches and hills through thick cedars not very pleasant for the pack train. After going 6 miles farther came to the descent of 1,000 ft. over and down the bare sand rock. Half way down came to a pool of water. The horses got all they wanted. Here we came into what I called Pleasant Valley composed of red sandy soil very rich there being plenty of gypsum in it. It was 2 miles wide by 6 or 8 long and all of it covered with wild oat and grass it looks like a field of grain. We camped at a large creek for the night and took a bath. Saw smoke down the creek about 3 miles think it must be the Indians we are following.

June 14 Friday At 8 oclock went down the creek 3 miles came to the Indian camp. They all run but one. They were so frightened. He came to meet us trembling. We went up to his wickiup and smoked with him. Gave him some bread and talked with him until 2 squaws came back and 2 more Indians. We concluded to stay here all day and get all the information we could concerning the trail. Traded with them for two buckskins.

June 15 Saturday Started from camp early. We camped near the Indians last night. Traveled over the trail 7 miles over gulches sandstone and through a cut in the fold found some fossils near the creek they were Ostra and Graphic belonging to the Cratice. When we got through the cut lost the trail hunted for it went up the main canon but could not find it. Went back and camped for noon at the creek. We then went up the left hand gulch. Until we got to the end of it. Came back and hunted for the trail again. We went up the main canon for 5 or 6 miles came to an alkali spring and went 1 1/2 miles farther and camped for the night, in one of the forks of the canon. We found a canteen we think we are on the trail. Made a dry camp.

June 16 Sunday Went up the canon and found we could not get out. Got some water for the horses filled the canteens then went back 5 miles hunted up all the gulches and was disappointed. Feel dubious about the Dirty Devil trip. Came back to our camp and camped again. We all hunted for a place to get out Prof. found one. Fred found a pool of water. We got up the cliff by making a little dugway I strained my back. Got to the top of the cliff then went North 3 miles to pools camped there at dark.

June 17 Monday I feel rather sick this morning my back pained me considerable last night. Had quite a time watering the horses started again traveled over timber and rough country then down into a canon crossed two gulches then we came to the D.D. Mts. The wind blew very hard found an old trail followed it a ways came to a small creek coming down from the mountain went one mile then up the hill 2,000 ft. to a fine grove and a nice creek. Here we camped for the night the wind blew and it was very cold my back sore and lame.

June 18 Tuesday Prof., Capt. and Jack climbed the second mountain. Fred and I the first to take the angles and sketch. After going 7 miles we got to the first peak at one oclock 13,000 ft. above the sea it snowed quite hard for an hour. Very cold thermometer 30 degrees did not go to the top to far and were to hungry and cold. Took a sketch and took angles. Going back to camp I fell and hurt my back again. It hurt me very much going back. Had a hard time getting home, Fred helped me. Got to camp tired out and hungry. Thinking of home and the dear ones there.

June 19 Wednesday Fred sick from eating cold beans. My back feels better. We took a northerly course for 2 mile then east 2 mile over cedar, ridges and gulches for 10 miles. Into a creek called Trachyte creek and camped at one oclock. We came to an Aspen grove on the mountain containing the finest poles I ever saw; they were 70 feet long and as large as my leg. A nice creek flowed through it

called Bare Park. Fennimore and I went down the creek found some sulphur springs, fossils, flowers, soda and Nitre in salt. Got back at 6 oclock. Prof. and Capt. climbed out and found an old trail fossils prove to be coral.

June 20 Thursday Started this morning up the hill then took an east direction for 2 miles found an old trail followed for 1 mile lost it then found if again after a time, then it took a SE direction down the creek for 4 miles. Lost it then found it. Went 6 miles in SE down to a gulch on to Trachyte Creek and camped for the night. Prof. and Capt. climbed out and found that this was not the creek it must be farther to the east. All had a bath in the creek sandrock and warm.

June 21 Friday Prof. and Capt. started early to find the creek and a way to get to it. We packed and got ready by 9 oclock and waited til noon for them. At last Capt. came and we went down the creek 1/2 mile then east over sandstone 3 miles. Came to the gulch and took a circle of 5 miles to get one. Found a way down the bare rock by winding around got 1/2 way down and stopped 2 hours. Prof. and Capt. trying to find a place found one at 5 oclock and such a place it was got down into a side gulch and camped 1 mile below in a grove of cottonwood trees. A fine camp got our water from the pockets.

June 22 Saturday We traveled through cane and willows for 3 miles into the main canon then down it for 8 miles then came to the river Colorado. Prof. horse got into the river had a hard time getting out. Ate dinner then went up the river to the foot of the cliffs and found the boat. Corked her and came back to the camp by water. Drew the boat out onto the land. Prof. is going back tomorrow. I wrote to Lucy tonight.

June 23 Sunday Finished writing this morning to Lucy and father. Fred is plotting the trail. I helped Jack cork the boat a good part of the day. It is very warm and sultry Prof. wants me to keep geological notes going down the river. I am afraid I cannot do so to satisfy myself and him. I trust the Lord will give me intelligence to enable me to do so correctly. I feel very homesick today. We finished the boat in the afternoon I went fishing caught me one and lost it again. Fred got his plot done Prof. started about 6 oclock I did not have time to finish fathers letter. Feel more homesick than ever.

June 24 Monday Jack and Fred got breakfast I went fishing and caught three. Fennimore worked around this morning put the first coat of paint on the boat, in the afternoon, the second; then came up a terrible wind and rainstorm. Came near blowing some of our things into the river it lasted about 10 minutes. I washed my shirt and garment and got them clean I guess. I found a singular looking insect which I caught and put into a bark box. Fred gave us a big scare last night got up in sleep and yelled woke us all up. Looks cloudy tonight.

June 25 Tuesday This morning feel rather wet and miserable. It rained very hard last night wet us completely through I went and helped Fennimore and Jack make 4 negatives before dinner. Then we went again and made 3 more, cloudy again. We've got fixed just in time for a storm rained very hard for a short time also blew. Across the river during the storm we saw little cateracts formed from the rain which looked very beautiful coming down from the cliffs above cleared off in a short time was finished. We then finished the boat. Fred painted two stars on the bow and a red strip around the boat. We are all ready to start in the morning. Pray the Lord to bless the dear ones.

June 26 Wednesday We got the boat in the water, she does not leak much we packed her. And about ten oclock we pushed off for the Pahreah. I asked the Lord to bless us and take us safely through. Floated down 4 1/2 miles and came to a creek about 2 rods wide at the mouth on the left hand side. 1/4 mile below we camped to photograph old ruins (Shinomo) on the cliffs near the creek. Camped here for the day. Found a few arrow points. River 1/2 mile wide here caught one fish. Weather warm some clouds no rain. Passed through high cliffs. Behind us are a low line of cliffs along the river. The canon 2 mile wide. Made 4 views 2 of the ruins of the cliff one looking up another looking down the river and followed the cliffs past camp and I think crossed below Trachyte Creek.

June 27 Thursday Fred gave us another scare last night got up in his sleep and hollered 2 or 3 times. We got started at 9 oclock about 1/2 mile and stopped at Trachyte Creek found the mouth 3 rods wide also canon wide. Found horse and ox signs abundant all over the bottom land. Also found some more ruins, on a low point at the mouth of the Trachyete Creek. Went about 1/2 mile came to a little rapid and an island. We came near getting aground went on past a gulch from the right bank Then farther 5 miles to the Shinimo Butte. Then around a small island and came into sight of some old ruins on the Shinimo Creek and camped for the day having come nine miles took some pictures of ruins and diagramed it was 51 ft. long by 21 wide divided into 2 rooms one 33 by 21 the other 21 by 18 then joining on the east and running south is another 2 room building 32 ft. long by 15 ft. wide on 15 by 15 the other 17 by 15. Then between the angles are buildings is an old (supposed) kiva or temple an underground building which has fallen in through decay. Found a trail coming down Trachyte Creek and crossed the river. To connect with the one we saw across the river. Saw plenty of horse and cattle tracks. We supposed the Indians Navahos come this way with their cattle and horses they steal from the settlements.

June 28 Friday Very cloudy last night we put up the tent but it did not rain had a good nights rest. Started out at 9 this morning. Went 2 1/2 miles then came to a small rapid large waves at the foot quite pleasant. Got through all right landed just below at a little creek coming from the 4th mountain stopped to take pictures. Found we had left them at the last camp had to make new ones. Fred and I went up the creek 3 miles. And climbed out within 50 feet of the top and could no farther came back and found two new flowers. Saw what we supposed is 4th mts. Found traces of an old trail saw plenty of horse signs we supposed they are 10 to 18 years old. Crossed the river and

Fennimore went back over the cliffs for his dark tent, legs and Clamersdett. We camped near a gulch coming in from the NE. river here 1/2 mile wide came only 3 miles today. Fennimore got back with his things allright. Oh Lord I am thankful for the blessing of today. Weather warm and sultry. Canon wide, walls about 600 feet to the first bench, then 400 feet to the top of the bright red sandstone.

June 29 Saturday Feel sick and miserable this morning eat breakfast and climbed out to see the 4th mountain found an old ruin a short distance from camp the room was small 10 by 10 ft. had a large rock for a roof. It had fallen on the walls and leveled them. I climbed nearly out and saw the 5th mountain plain, with Freds glasses. It was different from the others. The Strata laid up on the mountain on all sides, as if a circular opening had been made and the Trachyte had blown out. Sandstone 2/3 of the way up the mountain. The 4th mountain was split in a large gap made for the evacuation of the Trachyte. Made angles to ascertain the height went back started at 10 oclock went 4 miles, and stopped in Redbug Cave and got two views. Round Redbug here in pods got specimens. Jack saw some deer shot at them. Went 2 1/2 miles farther down then camped near a gulch coming in from the right hand side, walls 1500 ft. Fine place nice creek here I would like to be home.

June 30 Sunday Fair with exception of a gale blowing in from the south Sunday in the wilderness has no charms for me. I would like to be home with the loved ones this morning. Camped in a nice grassy grove just below is a nice creek coming in through the cliff from the mountains. About 10 we went 2 1/2 miles to a pool and stopped for pictures. The wind blew so we could hardly run. At camp no. 6 we did not find much wood. Some mosquitos wind blew so we laid by the rest of the day. All left camp and wandered around but me. I staid and read and got dinner for the boys. They found pockets of water also took some pictures. Walls 100 feet high. Cloudy looks somewhat like rain. There is a gulch with a stream running out of it here a fine place to fish we caught some 1 1/2 feet long. I am so lonely I do wish I were home with my dear wife and boy.

July 1 Monday Up this morning rather late took a glass with me and climbed out 1,000 ft. above the river took a view of the fifth mountain and a sketch of the country. Found some moss and lots of pockets of clear fine water. For miles you can see nothing but bare sandrock in large and small mounds. A fine view from here of the river beneath and a small island below some two miles. Oh it is fine indeed. I went from 4 to 6 miles prospecting. Found two flowers found a very curious insect it was shaped some like a pollywog. It had a shield on its back of hard texture and a tail pointed at the end two long hairs as bristles and with two feet with pincers in front and 39 ft. and legs on each side of the body which they kept in motion all the time. They go to the water very swiftly and easily also very voracious. The young seem to be encased in this hard covering not unlike a clam shell. Another insect 1 1/2 inc. long with large black eyes. Found a large water pocket 60 ft. in diameter almost round about 20 ft. deep clear and cold. On my way back to camp came to a wall more than vertical having a stand 5 to 6 degrees under and 1,000 ft. to the bottom of the gulch in this gulch saw a large and clear pocket of water. Saw the boys coming up the gulch and called to them voices echo so that it is hard to distinguish sounds. Returned to camp ate my dinner and joined the boys in the gulch they were busy taking views the head of this gulch was beautiful indeed. Fern and moss of any amount and cold clear water and sandy nooks. We named this clear pocket gulch returned to camp went 1/2 mile came to a large gulch on the left was a creek 1 mile farther passed Heart Island 1/2 mile farther and camped near a spring in the willows. Ran two miles today camp #7.

July 2 Tuesday Up late this morning we were kept awake nearly all night with mosquitos. I found Hyroglifphics this morning on the vertical walls of the creek just below camp quite a creek. Fred staid at camp the rest of us went out photographing got five views during the fore noon. I am reading D. Fowler Photogalleries Guide find it interesting. Went up the gulch and found some Moquis ruins climbed up the tree and went up a ledge 75 ft. high a smooth surface nearly vertical. Then went 200 yds. over a smooth sandstone to a pocket of clear water about 40 by 60 ft, oblong plenty of water in it. 75 yds. above the pool to the left in a large cave stood the walls of a house. We found ourselves in a large room 20 by 80 ft. and high walls from 4 to 6 ft. high now after all that had fallen down. Also found an armful of wood looked like the last they had carried up to use some 300 years ago. Got a fine view of Heart Island at this place. Pulled out in the afternoon and ran two miles in right with a creek. And two large islands in the center of the river, one 1 mile long the other 1/2 the size also a gulch and creek on the left. 2 miles farther we passed 2 other islands, river with a creek on the left between the large and small islands ran 4 1/2 miles and camped below a gulch with creek on the right hand side of the river in a fine place plenty of grass and willow. Caught 1 fish Jack and I went and had a bath water cold weather fine.

July 3 Wednesday Had a good nights rest. Fennimore sick eat to much. Vomiting in the night. Started early to photograph the cave they found last night also the river. Fred and I went up the gulch 3/4 of a mile from the camp came to a pool of water and in looking to the left I saw a cave a wall built across the mouth of it with a square window or small door to enter. Went up over the smooth tan sandstone and came to a level ledge and found the aperture to be 2 by 3 ft. and easy to enter on hands and knees. Wall 8 ft. high put up with mortar and rock, fingerprints still in the mortar. It was in good state of preservation entered and found inside 8 by 10 high enough to stand if it was not for the rubbish the rats had carried in during the past centurys and years. Found corncoba in this place in good preservation. Some wood and flint for arrows. They had this for a store room no doubt. Where

the other house had stood all had gone to decay. So we could not tell nothing of the size or shape of the building. Returned to camp pulled out after dinner and run one mile and come to a rapid all at once. We commenced to go very fast then into the large waves away we go lighting speed. Past two gulches one on the left one the right. Ran 6 1/2 miles and camped for the night. Camp #9.

July 4 Thursday Just after sunrise Fred fired a salute of 8 shots and I 6 before getting up. Had breakfast of beans and coffee, no sugar. Lovely morning but we feel like we would rather be home. Fennimore and Jack went photographing, and I helped carry their things a little way. I returned to camp and read a few hours. Fred made a cake of sugar, flour and water, then a peach pie out of dried peaches without sugar there was none left. The boys came home to dinner and we ate it. Our camp was a fine one opposite a large bold cliff about 1,000 ft. vertical. After dinner we all went onto the hill and helped carry phototraps. The weather was very hot and sultry. After we got on the top of the mountain nearly 1,000 ft. above the camp. We came out onto a vertical cliff 800 ft. above the river. Saw from here the Dirty Devil Mts. quite plain also the large fold and a small portion of Lake Mt. NW from us. Across the river 7 or 8 miles lay one of the prettiest valley we have seen for some time. It being about 12 miles long by 5 or 6 miles wide and full of cottonwood timber as far as the eye could reach. East of us mile after mile there was sandrock out and worn into all kinds of shapes. Mostly mounds and small gulches. To the mouth from us lay Sceneca Howland looking but a few miles distance but numerous sandrock between us also gulches. To the south lay a large fold it being so high that we could not see the painted cliffs. I caught some of the tortoise insects and put them in alcohol and ether. Found one new yellow flower. The day passed off quite pleasantly considering us so far from the dear ones at home. In the evening after supper we sat on the side of the boat and sang. God bless my wife and child. Camp # 10.

July 5 Friday Had a good nights rest up early and started at 8 oclock. Ran 5 miles and stopped and took two pictures on the right side of the river. Then away for two miles and stopped for dinner. One mile and a half from camp passed an island quite large. Four miles from camp came to the first ledge of the under stratum of dark sandstone it caused quite a rapid and fall in the river; a fall of five feet. Just below the ledge on the left came to a gulch, also quite a canon with cottonwood trees. On below this came to another ledge, a rapid and fall also, 7 miles from camp a creek came in on the left quite large and wide from a side canon. The scenery today has been quite pleasant. We passed caves with springs and lots of ferns, mosses and other water plants. Also passed a large water pocket with cottonwood trees around it halfway up the cliff. 7 miles from camp I tried to take a picture of a small showerbath of the fall about 10 ft. and covered with ferns, moss and shrubbery. It would have been a very pleasant picture but on account of the wind blowing and disturbing the foliage I could not get it. After trying a number of times in vain we returned to camp and as Fred had everything ready we pulled out about 4 oclock and went 2 1/2 miles and camped under a 30 ft. bank of sand, just above a large gulch coming in on the left hand side of the river. Cliffs here very high over a thousand feet perpendicular. In this gulch found a fine stream of water running and a little fall of water where it fell some 75 ft. and trickled down onto the moss and fern, nice clean water. Cleaning glass tonight my first lesson on the subject. Weather warm and sultry. I count the days when I can go home to see my loved ones there.

July 6 Saturday Nice and cool looks like a storm. Fennimore and Jack making pictures till 10 oclock. Then went down the river 2 miles and stopped at a gulch on the left hand side for more pictures. 1 1/2 miles from camp first struck the fold enter dark sandstone. At this gulch the river is narrow and deep, runs swift. After taking 3 or 4 views went on down on the river. Passed two little riffles. Then came to a 5 mile stretch of river due west walls high and river narrow and deep. 7 miles from camp passed a good sized gulch on the right. 1 mile farther camped for the night at the mouth of a gulch on the right hand side of the river. Under a high 30 ft. bank. Looks cloudy. On looking over our provisions find that we are running short of everything but flour and coffee. The wall here are high and perpindicular came 8 miles today. Oh I am hoping and praying for the days to pass quickly so I can get home. Camp #11.

July 7 Sunday Sunday again in the wilderness. Oh how I wish to be at home this morning, to have a good cleaning up and feel at rest. It is gloomy and dull here. Walls 1,500 ft. high. River runs narrow there was just enough room on the bank for our beds and cooking utinsels. It did not rain as we thought it would. After Fennimore and Jack got through photographing about 10 oclock we pulled out About 3 miles down passed a large rock in the middle of the river which caused quite a riffle. 4 miles down we stopped for some views; eat dinner then started again and went 1 mile and struck a large creek coming infrom the right hand side stopped Fred and I went and examined it. It flowed about as much water as the Pahreah River still narrow. Started again and ran 3 miles. The walls on the right hand side after going one mile were low and composed entirely of dark sandrock. On the left hand side walls high and are light sandstone. Wall continued low on the right for 2 miles then became high. We camped for the night 1 mile above. A large gulch on the right side of the river. We camped on the left. Ran 8 miles today. All washed in the river. Camp #12.

July 8 Monday It did not rain started early this morning ran down 1/2 mile and stopped to take a picture of a gulch on the right and took several views. Found pieces of pottery and arrowheads but no ruins. Very warm, started again and ran 4 miles and came to the mouth of the San Juan River, a stream flowing 1/3 more water than the Virgin. Shallow stopped and took several views at the Junction. Wall on the left hand side low only 100 ft. high. On right hand side 800 ft. high. Went in bathing here. After

dinner ran 1 mile, passed a large gulch on the right. We could see a portion of the painted cliffs. We climbed out 1,000 ft. above the river and all the way over bare sandrock. Hot and sultry and very hard climbing. Found we could not climb the painted cliffs and could not see the fold. Returned to camp tired and pulled out for the Temple of Music. Ran 1/2 mile and camped on the left bank of the river. Under a sand bank. Then went to see the music temple. Followed up a gulch for a 1/2 mile and camped in a large cave like place 250 to 300 ft. high and wide with a small opening at the top, at the farther end we found a large pool of clear cool water. Which had come down through the roof during a storm. At the entrance of the Temple there was three or four large cottonwood trees. On the inside we found on the walls ferns, mosses of all shapes and kinds. The echo in this place is fine. The slightest noise echoed back with a clear full echo. On the rocks we found the names of the Majors party that were here before. It was a beautiful place. Returned to camp and put up our tent as it looked cloudy. Camp #13.

July 9 Tuesday Rained some last night and has rained off and on all day. We layed around camp read and talked away as pleasant as possible, so homesick. During the storm it was nice to look at the large and small cateracts falling from the tops of the cliffs into the river. Some were 500 ft. some few 1,000 ft. and lost themselves in spray before reaching the ground or river. Did not go away from camp today. I caught a fish tonight 1 1/2 ft. long. Almost out of provisions except flour. Camp #14.

July 10 Wednesday Still raining. I commenced to write to the Deseret News. It stopped raining about 3 oclock and became clear. During the later part of the storm it rained very hard and we saw many fine falls. Fennimore, Jack and I went into the Temple and took 2 views this afternoon. Only 1 mess of meat and beans left. The sunset is clear tonight. I do hope this weather will be fine so we can hurry as we are so short of provisions. Any amount of beaver signs here. The point of the painted cliffs come nearly down to the river opposite our camp. Oh I wish I was home tonight I feel so lonesome sitting here in the boat viewing the cliffs. On the right hand side they are 2,000 ft. on left 800 ft. Camp #15.

July 11 Thursday Jack and Fennimore in the Temple this morning, Fred and I talked about magic points worked around the camp. About noon we went up to the Temple and carved our names in large letters in the rocks. Got a piece of red brit and some ferns and flowers. We helped the boys carry their traps to the boat. Ate dinner and started. Went 2 1/2 miles and stopped for Fennimore to take a view of mt. Seneca Howland and one of the monuments on right hand side. From this place we can hear the roar of a real Rapid. Jack and I went on to reconoitre came back. Jack said if she tips over grab for the boat and cling on for dear life. The noise was great and as the water went howling past made it seem terrible enough. Well we started slow at first. Then came the current. The water at the head of the rapid was smooth and shining like glass but so swift. We shot through this with a dreadful feeling around the heart. But still wild and exciting in the rapid. The boat was tossed to and fro like a feather, huge waves from large rock in channel came dashing over our heads and into the boat. At last we got through it safe and how glad we felt that it was no worse. We were all wet through. 2 miles passed a large riffle but not bad. The waves were large but did not wet us. Wall 1,000 ft. high and behind them towering up we saw monuments and grand representation of castles. Ran 10 miles farther and camped on the right near Rock Island. Passed three islands today two large ones composed of solid rock. Passed a creek at the head of the rapid. Came 15 miles today. Camp #16.

July 12 Friday Pleasant morning, cool. Started 7 oclock ran 1/2 mile then ran a small riffle. Passed along gulches some large and some small, also caves, some very curious. Above the red sandstone walls stood monuments Castle Forts and Ruin Cities. This morning about 10 oclock on looking back on the left we saw a large cliff divided into courtyards, towers &c that made up an old fashioned Castle on Rhine. It was grand and beautiful site, with a cloudy sky beyond made into all shapes. Arrived at the old crossing of the Fathers at 11 oclock. Ran in and camped for noon. Majors party camped here a week last year and cashed a box here that we were to get. After hunting some time found it. Ate dinner. We tried to shoot some geese today but failed there is enough meat to make gravy for one meal. Ran 10 miles and came to a large creek on the left side (Shinamo creek) the wall re about 400 ft. high all the way we have come this morning. Ran 10 miles farther and came to sentinel creek, on the right; a large pillar 200 ft. stands all alone as if to guard the creek. For it stands at the mouth of it. From this creek the walls commence to get higher. Ran 5 miles farther and camped on the left on a sand bank, plenty of wood. Sun warm, nearly scorching. Cliffs back of us 1,000 ft. high and vertcle looks rather gloomy at night. Came 40 mile today; and camped at three oclock in the afternoon, and all had a wash. I thought I had lost my locket I went to take off my shirt when my chain fell off but no locket. I felt very bad, but thanks to my Heavenly Father I found it an fixed it on much better. I hope the Lord will be merciful to me and cause that I may have a chance to go home to my dear wife and boy. Camp #17.

July 13 Saturday Started early this morning and ran 10 miles and came to the mouth of the Pahreah. We did not find the boys as expected. We went and saw Bro. Lee I have got a chance to go home with him. Oh I feel so thankful. We expect to start tomorrow.

July 14 Sunday Up early and ready to go I shall soon see Lucy and Willie. I helped to get the wagons over a horrible road for a mile then we traveled 10 miles and camped for noon. In the afternoon we met the boys Clem and Andy I asked them if they had any letters they gave me two. Clem said Lucy had gone to the city but I could not believe it till I read the letter I was so disappointed and surprised it fairly stunned me. The letter stated that my little brother Carlos was dead.

July 15 Monday ...Went to Kanab had a talk with Bishop Levi Steward he advised me not to go anymore with the Powell company as it was to risky. As below Lee's Ferry the rapid were much worse than what we come over. All my friends felt as the Bishop. Father and mother urged me to leave the company as they feared for my safety if I went with Powell through the Grand Canon. After thinking the matter over concluded to quit the expedition. Prof. Thompson did not wish me to leave but when he saw how I felt settle with me in good feelings. (Williams finally got to Salt Lake City the first part of August and reunited with his wife and child).

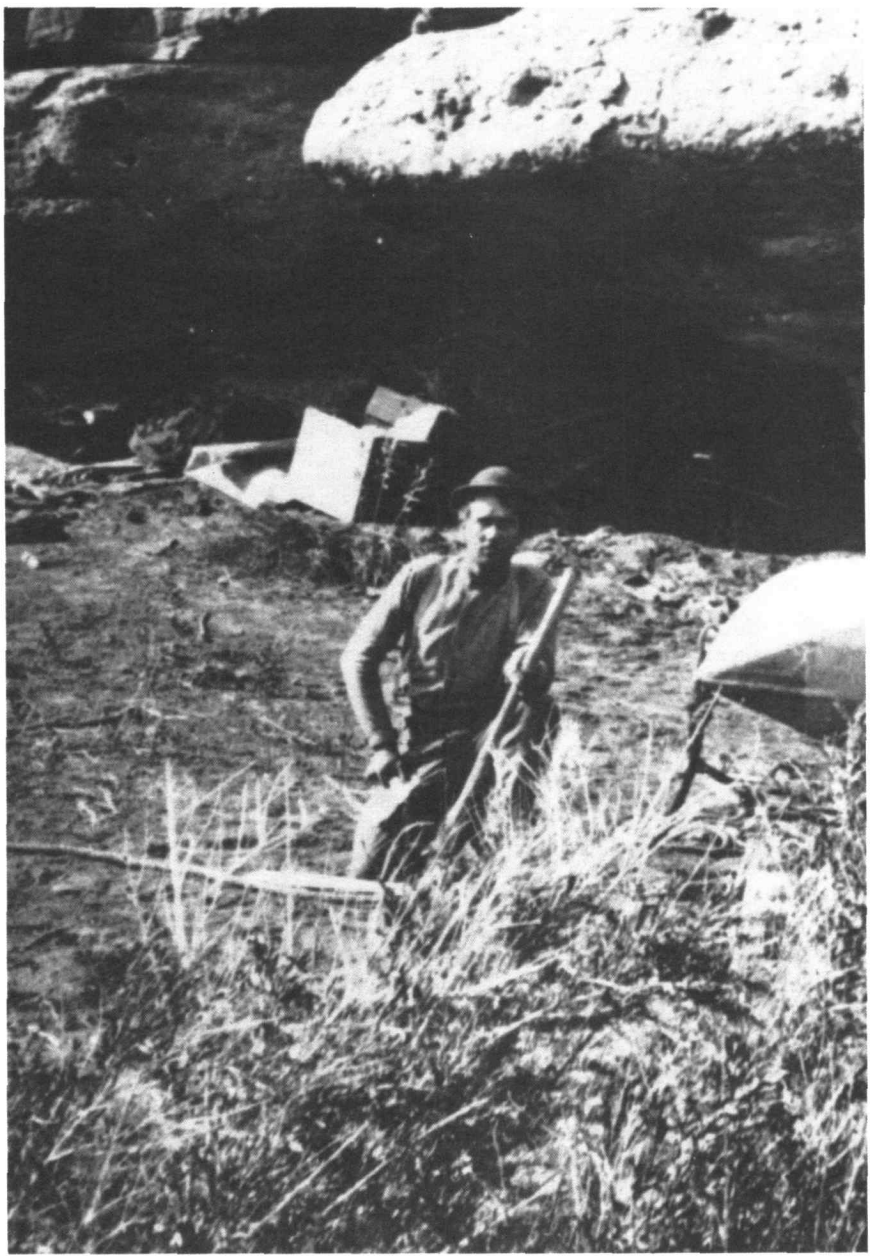

Photo taken at the mouth of the Dirty Devil River where the Powell party camped and fixed the "cashed" boat. The man kneeling is William Derby Johnson, Jr. Photo by J.K. Hiller Photographer on the Powell trips. Photo courtesy of USGS Center, Denver, Colorado.

Habitat Selection by Cattle Along an Ephemeral Channel

Michael A. Smith, J. Daniel Rodgers, Jerrold L. Dodd, and Quentin D. Skinner

Cattle behavior, including distribution patterns, selection of habitats, and differential utilization of forage species, provides a basis for grazing management and range improvement planning. Cattle usually prefer perennial stream riparian zones over upland range sites because of available water and greater quality and abundance of forages. Increasing attention is being paid to grazing in riparian zones. Concerns about grazing effects on water quality and nonpoint pollution have intensified the need to understand these relationships.

Ephemeral channels cover more area and have less vegetative cover potential than perennial channels. Overgrazing has long been assumed to cause ephemeral channel alteration (Bryan 1925). Sediment yield from rangelands may be influenced more by grazing management along ephemeral channels than along perennial channels. We could find little information concerning grazing relationships with and impacts to ephemeral channels.

We studied seasonal habitat selection by cattle along an ephemeral channel and adjacent upland. Forage quality, standing crop, and utilization of vegetation were also determined. We used small seasonal pastures where distance to water was assumed to have a minor influence on grazing distribution and 2 replicate areas of a large allotment where water sources could be up to 4 miles distance away from potential grazing sites.

We assumed that ephemeral riparian zones would be preferred over uplands because of more and higher quality forages. However, water availability could modify the degree of preference expressed.

The study area and methods used are described in Smith et al. (1992). We determined the distribution of cattle by activity in channel, flood plain, and adjacent upland habitats in spring, summer, and fall for 3 years along the ephemeral 15-Mile Creek in the Big Horn Basin of northcentral Wyoming. The study site had three 28-acre small pastures, 1 used in each season, and a large surrounding allotment. Plant species occurrence, productivity, forage quality, and utilization by cattle was determined in the small pastures.

Results and Discussion

Small Pastures

Cattle Use

Cattle use observed in channel and floodplain habitats exceeded percent of the pastures occupied by these habitats (Table 1) except floodplain in fall when use was proportional to floodplain area. Uplands were always used in lesser proportion than suggested by proportional area of the habitat (Table 1). The floodplain habitat had a greater

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This paper is a requested condensed version of the paper "Habitat Selection by Cattle Along an Ephemeral Channel" by M.A. Smith, J.D. Rodgers, J.L. Dodd and Q.D. Skinner which appeared in the *Journal of Range Management* in 1992.

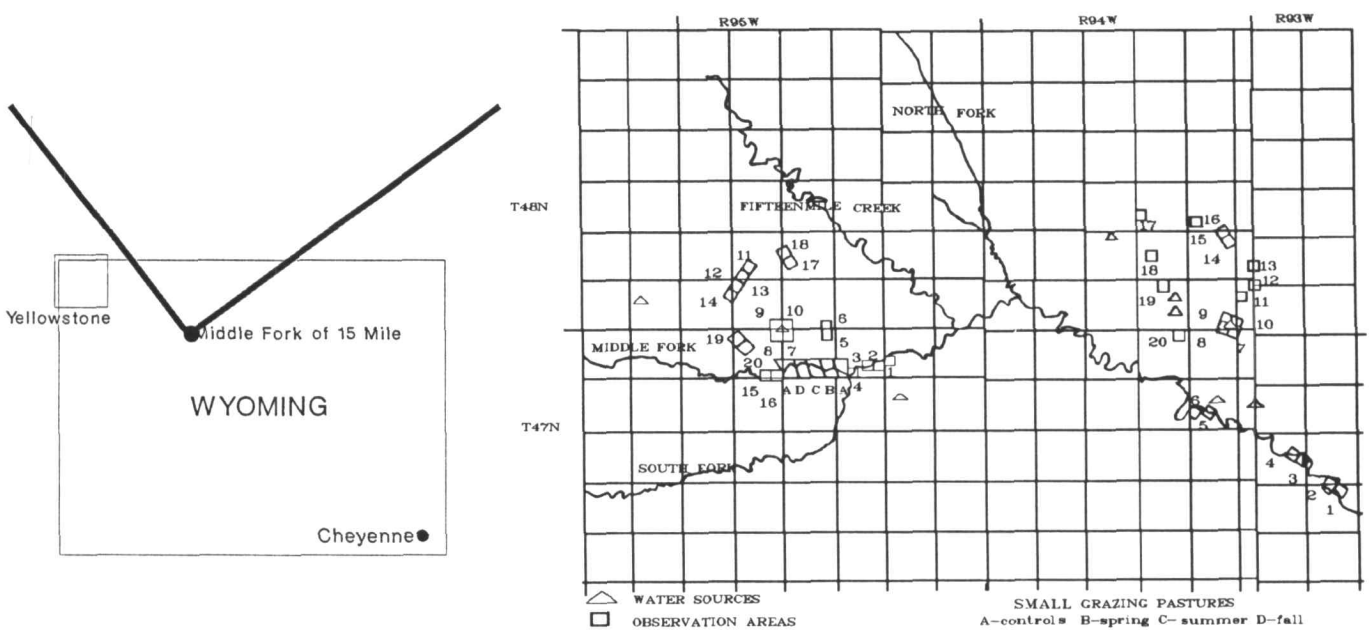

Fig. 1. *Fifteen Mile Creek study area showing small seasonally grazed pastures (A-D) and large allotment observation sites (1-20) on Middle Fork (replicate 1) and on Main Channel (replicate 2). Grid lines, surveyed section lines from USGS 1:24,000 scale maps, are nominally 1.6 km (1 mile) apart.*

15-Mile Creek near Worland, Wyo.

percent of resting cattle than other habitats. Uplands had a greater percent of grazing cattle, but not as great as the percent of the habitat in the area.

In the small pastures, maximum distance to water and shade was only 760 yards and 430 yards, respectively. Shade and water occurred only in the channel and floodplain habitats and probably led to the higher incidence of resting behavior (Table 1) in those habitats.

Table 1. Percentage of total cattle observed in, percent of area occupied by in 3 habitats of the seasonally grazed pastures on Middle Fork of 15-Mile Creek and surrounding large allotment.

	Habitats		
	Channel	Floodplain	Upland
	---------- % ----------		
Small Pastures			
Habitat Area %	2	15	83
% Cattle: total	13	34	52
grazing	11	29	60
resting	11	47	42
Large Allotment			
Habitat Area %	5	26	70
% Cattle	24	41	36

Forage Quality

Since water and shade were apparently not limiting and topographic variation was minor, forage abundance and quality should be closely related to cattle selection of habitats for grazing. The channel habitat produced the most herbaceous vegetation (Table 2). Current annual growth of greasewood, occurring only in the floodplain, likely increased forage for cattle above that available in uplands.

Forage Protein

Annual grasses, most abundant in the floodplain and scarce elsewhere, had the least protein and greasewood, particularly new growth, had the highest amounts (Table 2). Perennial grasses had intermediate protein levels.

Table 2. Forage, quantity, crude protein content, dry matter content, and utilization in 3 habitats of seasonally grazed pastures on the Middle Fork of 15 Mile Creek in years 2-3, 1984-85.

Habitat and forage class	Quantity	Protein	Dry matter	Utilization
	-lb/ac-	---------- % ----------		
Channel				
Perennial Grass	342	9	51	43
Floodplain	135			
Perennial Grass		8	65	41
Annual Grass		6	72	23
Greasewood		16	35	52
Upland				
Perennial Grass	189	10	60	40

Forage Succulence

Succulence, indicated by dry matter content of forages (Table 2), was greater in channel and upland area than in flood plains. However, greasewood in flood plains was the most succulent forage (Table 2).

Forage Characteristic Effects on Habitat Selection

Forage availability, crude protein, and succulence are generally known to favorably influence habitat selection by cattle. Forage productivity was greatest in the channel, with intermediate crude protein content, and high succulence compared to grasses in other habitats. Channels were preferentially selected in our study, suggesting the influence of such forage characteristics on selection. Greasewood quality appears to provide the only reason for grazing cattle to show preference for the floodplain areas because quantity and quality of other floodplain forages were either similar or inferior to those of uplands. Greasewood had the highest protein and succulence values of any forage and was relatively abundant.

Upland areas had relatively low amounts of forage, dominated by short statured blue grama. All upland species were of relatively low succulence but crude protein levels were comparable to or higher than herbaceous forages in other habitats.

Effects of Habitat Selection on Utilization of Forages

Even though disproportionately more grazing cattle were found in channel and floodplain habitats, forage utilization did not correspondingly increase. Utilization of channel and upland forages (perennial grasses, Table 2) was similar. The preferred floodplain habitat contained the forage class with lowest use (annual grass) as well as the class with highest use (greasewood). The higher use of greasewood appears to be the only case where preference for the habitat and increased use of a forage class occurred simultaneously.

Higher greasewood utilization levels illustrated the effect high forage quality can have on increasing selection by grazers. Less variation occurred in utilization dur-

ing spring, when forage quality was more uniform, than in other seasons when more variation in quality among species occurred.

Free Ranging Cattle in the Large Allotment

In general, habitat preferences were similar in the small pastures to those in the large allotment (Table 1). These findings verify the applicability of the small pasture studies to larger areas of similar vegetation and landforms and emphasize the importance of water developments to grazing management. Water location influenced cattle selection of habitats in the large allotment. A slightly greater proportion of cattle selected channel and flood plain habitats near water, and fewer cattle used uplands than in the small seasonal pastures (Table 1).

Use of the channel where water was present increased in summer while use declined in the floodplain. Similar changes did not occur in seaonal pastures, probably because the ephemeral channels of seasonal pastures did not contain water. When no water was available at upland reservoirs, cattle reduced selection of uplands from 46% to 14%.

We conclude that when adequate livestock water is present, grazing cattle will be more likely to select areas of higher forage quality and quantity. Where we controlled numbers and length of time in the pasture, increased selection did not result in increased utilization in the preferred areas. Limited water distribution in large allotments probably increases utilization closer to water. Since channel areas are important in maintaining habitat diversity and trapping sediment, grazing management plans should emphasize maintenance of channel vegetation. No particular season of grazing in our study resulted in more detrimental utilization of channels when water was not limited. Based on our studies, vegetation in or near channels can be best protected by developing water points in adjacent uplands while monitoring utilization of channel areas.

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Ranchers Monitor Montana Rangelands

Kim Enkerud

Imagine if you will...a scene from the future, a scene which every rancher hates to think about. A rancher in a courtroom setting. The charge: overgrazing of the public land upon which the rancher's future depends. The accuser: it does not matter who it is, no one is going to believe the rancher has taken care of the range resource.

Or has he? It just so happens a rangeland monitoring program has been in place the past 5 years. The data and photos indicate that the range condition has been improving while the livestock utilized the resource. What does the accuser have? Nothing which stands up to the rancher's information. The judge determines the accusations are not justified and because the rancher is taking care of the resource, the livestock can remain. This realistic example shows how rangeland monitoring can pay off.

Mention the words "rangeland monitoring" and most ranchers used to say, "all the monitoring I need to do is what I see and record in my memory." Well, that would be nice if we were still living in the 1960's. However, we are not. More and more, the livestock industry is defending the use of livestock as a tool to improve our rangelands and provide food. Rangeland monitoring is a proactive strategy that ranchers can use to prove their livestock grazing is sustainable use of our private and public rangelands.

Rangeland monitoring received a jump start in Montana in 1992 with the Pole Creek Grazing District monitoring project in south central Montana. District President Gary Eliasson and Musselshell-Golden Valley County Extension Agent John Pfister were instrumental in getting "the show on the road." Gary gave the following speech during the 1992 Montana Association of the State Grazing Districts annual meeting. His version of this rangeland monitoring program is a success story in itself.

> I live and work on our ranch near Roundup where I have a partnership with my brother Don raising cattle and hay. We also assist our parents on their ranch in the same area. Both outfits consist of a combination of deeded, state, and federal lands as is quite common in central and eastern Montana.
>
> Like many others here today, I am concerned about the frequency of attacks on the land stewardship of livestock producers in the western United States. I don't believe that there has ever been a time when the livestock industry has been under such close scrutiny as today. We are only recently learning that instead of always being on the defensive, we should explore opportunities to take the offensive in proving that the livestock industry is environmentally sound. When these opportunities also provide us with a chance to analyze our businesses in terms of grazing systems, water development, composition of the forage, or the utilization of the grass which provides us with our livelihood, then it looks like a win-win situation to me. As we have all heard many times, we are marketers of grass who use cattle and sheep to harvest it.

What is meant by the term *range monitoring* anyway? The idea of collecting data on rangeland and measuring the change in condition is certainly not new. During the Lewis and Clark expedition, nearly 200 years ago, Captain Lewis did a fairly extensive botanical survey of the country they crossed. Based on an analysis of these journals by Dr. John Taylor, (Professor Emeritus, Montana State University), the early explorers described conditions which were far from an abundance of excellent range condition as it is measured by today's standards. Later in the 19th century as cattle were brought into this region, early day stockmen were quick to recognize which areas and which species of grass added the most pounds. No doubt there have been times when ranges suffered from overuse due to lack of water distribution, ability to control livestock, or extended periods of drought.

There is no question in my mind, that if ranchers would have had a system of range monitoring in place over the course of the last 50 years, resembling the approach developed and recommended by Montana State University (Monitoring Montana Rangeland Cooperative Extension Bulletin #369), they would have documented a substantial improvement on the grazing lands of Montana. I have heard many older ranchers say that they feel much of the range is in better shape now than they can ever remember. Well that's enough history.

Those of us in the ranching history have a vested interest in seeing to it that we continue to maintain or improve our ranges. It was with that in mind that the Pole Creek Grazing District, at our annual meeting last January, had a short workshop on range monitoring. The Extension Service was instrumental in helping put this together. The Bureau of Land Management (BLM) Billings Resource office explained the monitoring that they currently do on BLM land in the area. Kim Enkerud indicated that the Montana Stockgrowers Association, Public Lands Council, and Montana Association of State Grazing Districts encourages ranchers to monitor their lands. We followed up with an outdoor session in May. The Montana Extension Range Specialist gave a hands-on demonstration of the monitoring system which we subsequently used in our Pole Creek project. We applied for a grant through the Department of Natural Resources and Conservation HB 223 grant program. The funds were requested to get a monitoring project going on the right track as we wanted an experienced individual to assist us during the first 2 years. Our grant application was successful (thanks to the statewide support from many individuals and organizations) and in mid-September we hired Chuck Hitch to work with the ranchers who were interested in setting up sites. Chuck is no stranger to Montana's ranges. He formerly was employed as a district conservationist by the SCS and he was a consultant for the Montana Association of State Grazing Districts.

Pole Creek is a relatively small grazing district. It is made up of 20 permit holders. They harvest a total of approximately 8,000 aums on 128,000 acres. These are individual allotments which vary from 36 to 1,820 aums in size. All of the Pole Creek members were encouraged to not limit monitoring to BLM land; instead, state or deeded land should be included. I should stress that the project we are working on at Roundup is

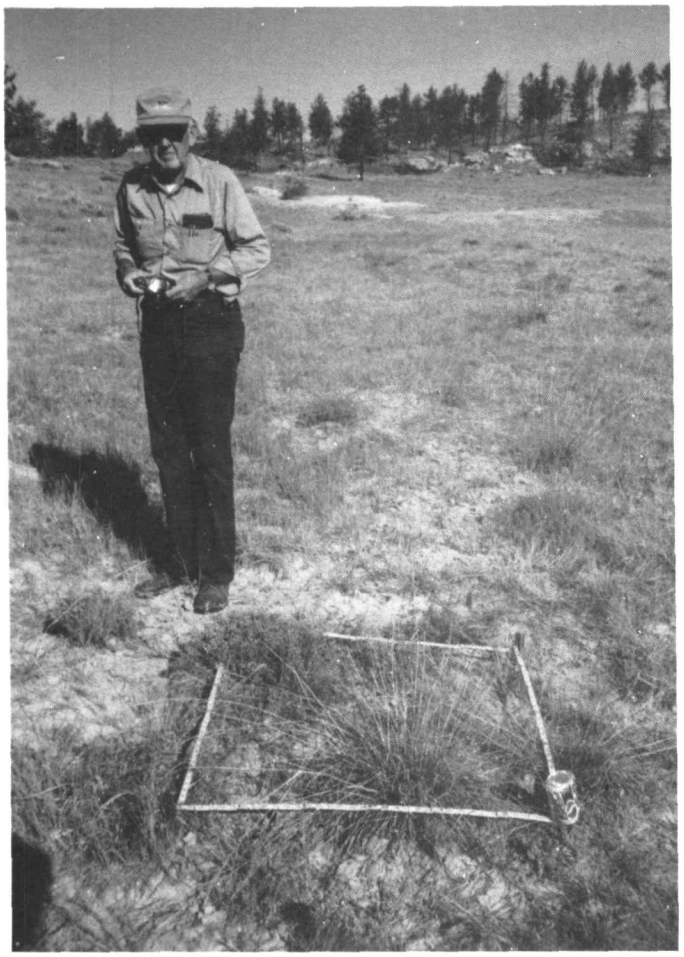

Fig. 1. *Chuck Hitch standing by the 3-foot square monitoring plots used in the Pole Creek project.*

strictly voluntary. There is probably very little to be gained if a rancher participating in range monitoring is not interested or does not feel that they are accomplishing something. If that were the case, the odds of them following up in subsequent years might be quite small.

We are very pleased with the degree of participation which we have had so far. Twelve of the 20 operators in Pole Creek Grazing District have set up monitoring sites. Eight other individuals have participated as members of the Lake Mason Grazing Association. The project was expanded to allow 4 additional ranching operations, located adjacent to the Pole Creek boundary, to participate. All together, about 130,000 acres of private, state, and federal land have been established as monitoring sites. As we were setting up the project, it was decided that the ranchers would receive the only set of monitoring data (cards and photographs). The fact that these are in sole possession of the ranchers makes it quite important that care is taken so they are not misplaced. The information recorded on the 3 cards and the photographs would be irreplaceable and defeat the entire purpose if they were lost.

One point that is important to emphasize is monitoring involves a lot more than photographing a 3-foot square plot. In talking to people, several asked, "How much can you determine from a 3 × 3 square area?" While the photo plot is a very important part of the process, much of the data collected using the MSU system involves looking at the entire pasture or

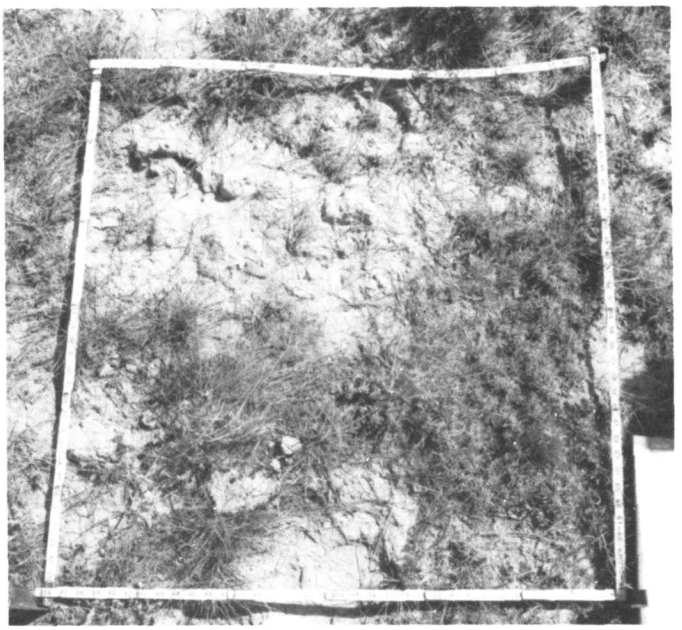

Fig. 2. *An example of a 3-foot plot.*

management system. Topography, weather data, wildlife population, insects, livestock utilization, and other items are recorded. If we stick with it over the years, we each will have some valuable information to evaluate our range management decisions, to provide a historical perspective, or to defend our position as a vital player in the multiple use of public lands.

Fig. 3. *Picture of Valley County, Montana ranchers at rangeland monitoring workshop.*

In conclusion, I would state that monitoring does not in itself insure successful range management. There are large numbers of excellent range managers who have monitored with an experienced eye for years with excellent results, just as there will be some who use a more scientific system and find their ranges might decline. If done properly, we feel it is another tool to compliment proper forage utilization and provide some useful data that will become increasingly important for sustainability and the integrity of the livestock industry. I personally feel that it is important that ranchers work to insure that it is ourselves who control our future."

Gary's story should make ranchers want to get their camera out, pack a lunch, jump in a pickup with a local extension agent, SCS, BLM, Forest Service (FS) employee

or whomever, and start a monitoring program. The process has caught fire in Montana where ranchers realize the importance of monitoring. Through the efforts of the Governors Rangeland Resource Executive Committee, Montana Riparian Association Education Committee, Montana Stockgrowers Association, Montana Public Lands Council, and Montana Association of State Grazing Districts, ranchers are becoming very active in developing monitoring projects.

One example is the Badland, Buggy Creek, North Valley County, and Willow Creek Grazing Districts in northeastern Montana. A workshop was conducted in mid-July 1992 by Montana State University, BLM, and SCS individuals. Individual ranchers then spent the remainder of the week setting up plots on their individual ranches.

In addition, the Highwood Mountain Grazing Association in central Montana, held a workshop which dealt with riparian area monitoring in August of 1992. Plans are already underway for a monitoring workshop in July of 1993 with the Williams Coulee Grazing District also in central Montana.

There are no longer glazed looks when monitoring is mentioned. Instead, the response is one of interest, curiosity, and genuine appreciation that there is something ranchers can do to insure themselves a future.

Economic Multipliers: A Comment

E. Bruce Godfrey and Martin K. Beutler

An article by Martin K. Beutler in the February 1992 issue of *Rangelands* entitled "Economic Multipliers" contained many of the basic ideas associated with the use of this concept. However, a major reference was omitted (Figure 1 was from the publication by Coppedge and Youmans 1970),[1] some important items were not covered in the article, and some relevant references were not included. This article was written to eliminate these deficiencies.

Type of Multiplier

The article by Beutler emphasized income multipliers. Other multipliers can also be developed and used. The most common include output, value-added, and employment multipliers. The different types of multipliers are not interchangeable because they measure different variables. As a result, the type of multiplier used must be appropriate to the impact of interest (e.g., income, sales, employment).

Size of Multiplier

A commonly misunderstood concept concerns the size of a multiplier. Empirical estimation is the only valid way to determine the size of a particular type of multiplier for a specific area or region because each region has different "leakages" (leakages represent the degree that local purchases—imports—are made "outside" the region), but the following generalizations will be valid for most areas.

First, income multipliers should rarely be larger than 2.0, especially for small regions where leakages are commonly large. The exception to this general rule will occur when the personal income in a sector is small and it purchases a large portion of its inputs from other local businesses. An output or employment multipliers for a particular sector or industry will usually differ from the income multiplier for that industry and may be greater than 2.0.

Secondly, because small regions generally have high leakages, their multiplier(s) will usually be smaller than those of a larger more self-sufficient region. For example, a multiplier for a state will generally be larger than the multiplier for any region within a state.

Third, "basic" sectors will generally have the largest multipliers. These "basic" industries generally purchase a high portion of the inputs (e.g., labor, natural resources) from locally *owned* businesses, and their sales are primarily to "outsiders." An industry that purchases most of its inputs from outside the region (large leakages) would have a smaller multiplier than a sector that relies more on locally owned resources. Conversely, a new firm that did not increase exports but simply took business from existing firms would have a very small multiplier effect (*net* effect in the region), even if the sales associated with this firm were relatively large.

Fourth, if the structure of a regional economy changes (e.g., a new industry or major firm is established or leaves an area), the multipliers that existed before the change will generally no longer be valid.

Measurement of Change

A commonly misunderstood concept associated with multipliers concerns whether they represent marginal or average values—most are average values. As a result, the total impact of a marginal change will commonly be overestimated when an average multiplier is used.

Multipliers include the direct as well as indirect effects

Utah State University Agricultural Experiment Station journal paper 4394.
[1]This reference was inadvertently omitted from the original article. Beutler offers his apology for this omission.

of a change. Thus, an increase in rancher income of $1,000 times a multiplier of 1.5 gives a *total* impact of $1,500 in a region.

Estimation of Multipliers

At one time, it was very expensive to estimate economic multipliers because primary data had to be collected for all types of business in an area. Improved computer technology and research have made this task much easier today. The most common method used to estimate multipliers is an input-output (I/O) model, but other methods are also available (e.g., location quotients, economic base studies). Most regional I/O models are constructed using national data that have been adjusted for local conditions. I/O models that use adjusted data have usually yielded results that are comparable to those that are based on survey data. Even though widely used and easily accessible I/O models, such as IMPLAN (IMPLAN Development and Support Group 1992) that are based on nationally adjusted coefficients, have been criticized (Keith 1982, Taylor and Fletcher 1992, and Borgen and Cooke 1992), they are generally the most cost-effective means of estimating the economic multipliers for an area.

Application

The most troublesome problems associated with economic multipliers involve their misapplication and inappropriate use (publications by Lewis et al. 1979, Shaffer 1989, Taff 1988, and Fjeldsted 1990 outline many of these problems).

In most cases, impacts may be relatively large at the regional level but relatively small in a larger context (e.g., the nation) because increases in activity in one region are commonly offset by decreases in activity in another region. Thus, the region(s) selected for analysis affects the multipliers as well as the relative impact of the action(s) being evaluated. Conversely, changes in local activity may be important even if they have little impact in a larger region (state or nation). This is especially true when one is trying to determine who is benefitted or harmed by a particular action or policy (Godfrey 1985).

Conclusion

When used properly, regional economic models and their associated multipliers provide information that is not available from other sources and are an important tool in determining the winners and losers from an action or change in policy.

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Globemallows

Bruce M. Pendery and Melvin D. Rumbaugh

We initiated research on the ecological and forage characteristics of globemallows *(Sphaeralcea)* in 1986 during a search for beneficial forbs that are well adapted to cold desert and steppe rangelands receiving less than 12 inches of precipitation annually. Globemallows are well adapted to such stressful environments. They also are native species, which may be desired or required in some situations.

Characteristics and Ecology

Globemallows (see cover photos) are in the family Malvaceae, which includes species such as cotton, okra, and hollyhock. *Sphaeralcea* occurs primarily in North and South America (Kearney 1935). There are 25 globemallow species on western U.S. rangelands (Table 1). Arizona, New Mexico, and Texas have the most species. *Sphaeralcea coccinea* is the most widely distributed species.

Generally, globemallow species in the U.S. are perennial, cool-season forbs or half-shrubs (Shaw and Monsen 1983, Pendery and Rumbaugh 1986). Most have showy orange flowers borne on multiple stems that arise from a basal crown. However, *S. coccinea* is more prostrate and spreads by rhizomes. In the western U.S. globemallows grow best in open or disturbed sites (especially roadsides) on sandy- to clay-loam soils, or on gravelly foothills receiving about 8 to 12 inches of precipitation annually (Wasser 1982). *Sphaeralcea grossulariifolia* is found on alkaline soils and tolerates moderate salinity, but it does not tolerate sodic soils.

Recent work has shed light on globemallow life-history strategies, which may improve our management abilities. Under natural conditions globemallows establish during favorable years, or on relatively favorable sites, survive for a few years, and then persist at lower densities or in seed

This article is a cooperative investigation of the USDA-ARS and the Utah Agricultural Experiment Station, Logan, Utah. Journal Paper No. 4384.
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The authors wish to thank H.F. Mayland, R. Stevens, and H. Horton for reviewing an earlier draft of this manuscript and making helpful suggestions for improvement.

Table 1. Globemallow species occurring in the western U.S.[1,2]. An "X" indicates a species has been reported from a particular state. U.S. Postal Service state abbreviations are used to indicate state names.

	States of occurrence																
Species	AZ	CA	CO	ID	KS	MT	NE	NV	NM	ND	OK	OR	SD	TX	UT	WA	WY
S. ambigua	X	X						X							X		
S. angustifolia	X	X	X		X			X	X		X			X			
S. caespitosa								X							X		
S. coccinea[3]	X		X	X	X	X	X	X	X	X	X		X	X	X		X
S. coulteri	X	X															
S. digitata	X								X					X			
S. emoryi	X	X						X	X								
S. fendleri	X		X		X				X					X			
S. grossulariifolia	X	X		X				X	X			X			X	X	
S. hastulata									X					X			
S. incana	X								X					X			
S. janeae															X		
S. laxa	X								X					X			
S. leptophylla	X		X						X					X	X		
S. lindheimeri														X			
S. munroana	X	X		X		X		X				X			X	X	X
S. orcuttii	X	X															
S. parvifolia	X	X	X					X	X						X		
S. pedatifida														X			
S. procera									X								
S. psoraloides															X		
S. rusbyi	X	X													X		
S. subhastata	X								X					X			
S. wrightii	X								X					X			
S. polychroma									X					X			

[1]Forty-three floras and plant atlases were consulted to prepare this list. They are not included in the literature cited, but are available from the authors. Synonyms have not been included.
[2]Species occurring in Canada are *S. coccinea* (British Columbia, Alberta, Saskatchewan, and Manitoba) and *S. munroana* (British Columbia). Species occurring in Mexico are: *S. angustifolia, S. coccinea, S. digitata, S. ambigua, S. axillaris, S. coulteri, S. emoryi, S. endlichii, S. fulva, S. hastulata, S. laxa, S. fendleri, S. hainesii, S. incana, S. leptophylla, S. orcuttii, S. pedatifida, S. wrightii, S. palmeri,* and *S. sulphurea* (Fryxell 1988).
[3]*S. coccinea* also occurs in Iowa and Minnesota.

banks. In the Mojave Desert, *S. ambigua* established in spaces between larger shrubs, where it led a "fugitive" life, avoiding interactions with other plants (Wright and Howe 1987). Henderson et al. (1988) found that globemallow seeds and plants had the patchy distribution common in arid land plant communities where there are few "safe sites." There were no strong associations (positive or negative) with other species, indicating reduced competition in a harsh environment. Ehleringer and Cooper (1988) characterized *S. ambigua* as a short-lived, opportunistic species that probably established during wet years but possibly had higher mortality during dry years due to relatively low water-use efficiency. The photographic record of Sharp et al. (1990) seems to confirm that globemallows establish during wet years, but die back during dry years.

The role of nonstructural carbohydrates in the grazing tolerance of globemallows has been the subject of several studies (Trlica et al. 1977, Menke and Trlica 1981, Menke and Trlica 1983). With few exceptions, root and crown nonstructural carbohydrate concentrations in defoliated *S. coccinea* did not differ from unclipped plants; however, *S. coccinea* could be sensitive to fall grazing because of its carbohydrate accumulation patterns.

Pendery et al. (submitted) found that a single springtime defoliation did not affect *S. munroana* total nonstructural carbohydrate amounts (pools). They also found that carbohydrates in roots and crowns accounted for only 7% of the total biomass in *S. munroana* regrowth following defoliation. Meristematic characteristics and flexibility in the allocation of carbohydrates are more important than the total amount of carbohydrates for the regrowth of defoliation bunchgrasses (Richards and Caldwell 1985), and the same may be true of globemallows.

Genetics and Reproduction

Sphaeralcea is a morphologically variable and complex genus. Its genetics and taxonomy have been extensively revised (Kearney 1935, Fryxell 1988). Diploid, tetraploid, hexaploid, and decaploid forms of globemallows occur (Table 2). This variability may be due to active evolution; the species are apparently poorly genetically delimited. Intergradation among species is common, probably as a result of interspecific hybridization. Globemallows are strongly outcrossing and are pollinated by insects. Several types of bees are important pollinators, especially *Diadasia* (Hymenoptera: Anthophoridae).

Nutritional Value and Utilization

Globemallows are utilized by wildlife and livestock, but *S. coccinea* is the only species that has been shown to be heavily utilized in a variety of environments (Hyder et al. 1975, Howard et al. 1990, Rumbaugh et al. 1993a). *Sphaeralcea coccinea* is a prominent component of native plant communities on the Great Plains, but it is less common in the Intermountain area.

Rumbaugh et al. (1993a) conducted a 4-year grazing trial with sheep in southern Idaho and found that the relative utilization of globemallows (*S. coccinea, S. munroana, S. grossulariifolia,* and *S. parvifolia*), alfalfa, and crested wheatgrass was as follows:

1988 (fall)	alfalfa > grass > globemallow
1989 (fall)	grass > alfalfa > globemallow
1990 (spring)	alfalfa > globemallow > grass
1991 (spring)	alfalfa > globemallow > grass.

They concluded that globemallows were acceptable, but not highly preferred, forbs which can be seeded in environments where alfalfa or other more desirable species are not adapted.

Rumbaugh et al. (1993b) concluded that forage from pastures containing 'Hycrest' crested wheatgrass and globemallows would meet dietary elemental requirements for beef cattle and sheep in the spring and fall. They also found that globemallows were similar to 'Spredor 2' alfalfa in elemental constituent values in the spring and fall.

Table 2. 2N chromosome numbers reported for several globemallow species in the western U.S. An "X" indicates that a particular 2N chromosome number has been reported for a species.

Species	2N chromosome number[1]				Source[2]
	10	20	30	50	
S. ambigua	X	X	X		1,2
S. angustifolia	X	X	X		3
S. caespitosa			X		4
S. coccinea	X	X	X		1,2
S. coulteri	X				1
S. digitata	X				1
S. emoryi		X	X	X	1
S. fendleri	X	X	X		1,3
S. grossulariifolia	X	X			2
S. incana	X	X			1,3
S. laxa	X				1
S. lindheimeri	X				1
S. munroana	X	X			2
S. orcuttii	X				1
S. parvifolia	X	X			1,2
S. pedatifida	X				1
S. rusbyi	X	X			1
S. subhastata	X	X			1
S. wrightii		X			3
S. polychroma		X			3

[1]Webber (1936) reported haploid (N) chromosome numbers.
[2]1 = Webber (1936), 2 = Rumbaugh et al. (1989), 3 = LaDuke (1986), and 4 = R. R-C. Wang (personal communication).

Cultural Considerations

Seed Production, Harvesting, and Cleaning

Sphaeralcea grossulariifolia seed is usually collected by hand or machine from wild land stands during July or August (Wasser 1982). To maximize yield, plants should be harvested when the lowest globes start to split and the majority are just ready to open. Globes at this time will be light green-brown. At the time of maximal seed yield, an estimated 15% of the globes of *S. coccinea* and about 25% of *S. munroana, S. grossulariifolia,* and *S. parvifolia* globes were ripe (Pendery and Rumbaugh 1990). This emphasizes the indeterminate seed ripening of globemallows, which is a problem for commercial seed production.

Dry seed can be cleaned with a seed cleaner in combination with a debearder to remove seed from capsules, and then recleaned on a clipper or fanning mill if necessary. The limited supply of commercially available seed ranges from about $35 to $65 per pound.

Seeding Procedures

Globemallow seed can be aerially broadcast and covered, drilled in a seed mixture, or cultipacked separately or in mixtures (Shaw and Monsen 1983). It should be seeded in fall or winter. Experience has shown that globemallows cannot successfully establish if planted at more than 1/4-inch depth, which creates difficulties in seeding mixtures where the other species should be planted deeper. Seeding rate recommendations have ranged from 1/4- to 2-pounds per acre (Plummer et al. 1968, Wasser 1982, Horton 1989). This emphasizes that there are no absolute prescriptions for globemallow seeding; experience is probably the best guide.

Seed Germination

Sabo et al. (1979) found that *S. incana* had 100% germination after 12 days when daily temperatures were alternated at 75° F for 8 hours and 65° F for 16 hours. The seed had been scarified for 3 minutes with medium grit sandpaper. Roth et al. (1987) achieved maximum germination in most of their treatments when seed was scarified with dioxane; however, due to the potential dangers of this chemical, they recommended a 10-minute soak in sulfuric acid as a preferable scarification procedure. Other studies have also clearly shown that scarification is required to improve globemallow seed germination.

Forage Yields

Sphaeralcea coccinea standing crop averaged 150 pounds per acre in blue grama grasslands in Colorado (Stanton et al. 1984). Pendery and Rumbaugh (1990) reported forage yields of *S. grossulariifolia* and *S. munroana* grown with 'Hycrest' crested wheatgrass on a favorable site in northern Utah (Table 3). The 2 globemallow species did not differ significantly in forage yield. However, the mean forage yield of globemallow was significantly less than the mean yield of alfalfa. The mean yield of crested wheatgrass did not differ whether grown with alfalfa or with globemallow.

Table 3. Forage yield of globemallows grown with crested wheatgrass, and of alfalfa grown with crested wheatgrass, at a northern Utah study site (adapted from Pendery and Rumbaugh 1990).

	Forb component		
Year	Globemallow yield	Alfalfa yield	Grass yield
	lb./ac.		
1985	1115	636	100
1986	195	3617	956
1987	314	3810	1757
1988	478	5106	795
Mean	526	3292	902

These results (Table 3) indicate that globemallows are not highly competitive but that they may prevent soil erosion while other species in a seeding establish. Globemallows do not produce as much forage as other selected forage species when seeded on sites with fertile soils and which receive more than 12 inches precipitation annually. However, they will be advantageous in seeding mixtures for sites where high heat and drought stress restrict the choice of species to be planted.

Improved Varieties

Our work with globemallows (Pendery and Rumbaugh 1990; Rumbaugh et al. 1993a, b) has resulted in the registration and release of two globemallow germplasms. ARS-2936 scarlet globemallow *(S. coccinea)* was selected for excellent spread by rhizomes, the number of shoots arising from rhizomes, and palatability for sheep (Rumbaugh et al. 1993). ARS-2892 Munroe globemallow *(S. munroana)* was selected for amount of shoot biomass, leafiness, and seed yield (Rumbaugh and Pendery 1993). Small amounts (1/3-ounce) of seed of these germplasms are available upon written request to the authors, and with the stipulation that appropriate recognition of the original source will be given when they contribute to research or development of new cultivars.

Conclusion

Globemallows are an alternative native forb component for rangeland seedings. They are best suited to areas receiving 12 inches or less of precipitation annually. While globemallows are suited to—and may be easier to establish on—wetter areas, there may be more desirable species for those sites. Globemallows are acceptable, but not highly preferred, forbs that meet the dietary elemental requirements of beef cattle and sheep when sown with grasses.

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Current Literature

This section has the objective of alerting SRM members and other readers of *Rangelands* to 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 review—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).

Blister Beetles in Alfalfa; by Charles R. Ward; 1991; N. Mex. Agric. Ext. Cir. 536; 10 p. (Agric. Mailing Room, New Mexico State Univ., Las Cruces, N. Mex. 88003) Describes the toxic effects on animals eating hay contaminated with blister beetles; provides recommendations for reducing the incidence of the problem.

Comparison of the Effects of Different Climate Change Scenarios on Rangeland Livestock Production; by J.D. Hanson, B.B. Baker, and R.M. Bourdon; 1992; Agric. Syst. 41(4):487–502. (Dept. Anim. Sci., Colo. State Univ., Fort Collins, Colo. 80523) Modified an existing ecosystem model and simulated a cow/calf production system under different climate scenarios; changes in production were found more closely related to changes in temperature and precipitation than to enhanced carbon dioxide concentration alone.

Ecology and Management of Medusahead (*Taeniatherum caput-medusae* ssp. *asperum* (Simk.) Melderis); by James A. Young; 1992; Great Basin Nat. 52(3):245-252. (USDA-ARS, 920 Valley Road, Reno, Nev. 89512) Reviews the taxonomy, history, biology, ecology, control, and management of medusahead, considered by the author to be probably the greatest threat to the biodiversity of the natural vegetation in the Great Basin.

Ecology and Management of Oak and Associated Woodlands: Perspectives in the Southwestern United States and Northern Mexico; by Peter F. Ffolliott, Gerald J. Gottfried, Duane A. Bennett, Victor Manuel Hernandez C., et al. (Tech. Coord.); 1992; USDA, For. Serv. Gen. Tech. Rep. RM-218; 224 p. (USDA, Rocky Mtn. Forest & Range Expt. Sta., 240 W. Prospect Rd., Fort Collins, Colo. 80526) A published compilation of the papers presented at a symposium held April 21–30, 1992, at Sierra Vista, Ariz.; emphasis in symposium was given to summarizing management knowledge and future research and management needs in these woodland communities.

Exotic Ungulate Production: Summary of Survey Results; by James W. Mjelde, J. Richard Conner, Jerry W. Stuth, James Jensen et al.; 1992; Texas Agric. Expt. Sta. Bul. 1703; 42 p. (Agric. Mailing Room, Texas A&M Univ., College Station, Texas 77843) A summary and interpretation of a survey returned by 99 exotic ungulate producers currently operating such earning enterprises; emphasis given to general aspects of enterprise operations, the potential for commercial exotic meat and nonmeat production, and marketing and veterinary practices.

Extreme Northern Acclimatization in Biennial Yellow Sweetclover (*Melilotus officinalis*) at the Arctic Circle; by Leslie J. Klebesadel; 1992; Alaska Agric. & For. Expt. Sta. Bul. 89; 18 p. (Agric. Mailing Room, Univ. of Alaska, Fairbanks, Alaska 99701) Determined differences in morphology, hardening behavior, winter hardiness, and other agronomic characterists of acclimated and unacclimated sweetclover cultivars.

Compiled by John F. Vallentine, Professor of Range Science, Brigham Young University, Provo, Utah 84602

Fescue Grasses Differ Greatly in Adaptation, Winter Hardiness, and Therefore Usefulness in Southcentral Alaska; by Leslie J. Klebesadel; 1993; Alaska Agric. & For. Expt. Sta. Bul. 92; 15 p. (Agric. Mailing Room, Univ. of Alaska, Fairbanks, Alaska 99701) Evaluated the cultivars and strains within five promising species of fescue for winterhardiness and productivity against two standard, non-fescue forage cultivars.

Further Enhancements of 3-nitropropanol Detoxification by Ruminal Bacteria in Cattle; by W. Majak; 1992; Can. J. Anim. Sci. 72(4):863–870. (Agric. Canada, Res. Sta., 3015 Ord Road, Kamloops, Br. Col. V2B 8A9) Investigated the factors that control and contribute to nitropropanol detoxification and suggested methods of preventing timber milkvetch poisoning under rangeland conditions.

Grazing-trial Summary Ranks Southern Forages; by Don Ball and Jerry Crews; 1993; Hay and Forage Grower 8(3):20–21. (Senior author: Extension Hall, Auburn Univ., Auburn, Ala. 36849) Summarized numerous stocker steer pasture grazing studies at Auburn and projected pasture costs and animal performance for a wide range of introduced pasture forage species and cultivars.

Habitat-Type Classification of the Pin(y)on-Juniper Woodlands in Western New Mexico; by Allison Hill, Rex D. Pieper, and G. Morris Southward; 1992; N. Mex. Agric. Expt. Sta. Bul. 766; 80 p. (Agric. Mailing Room, N. Mex. State Univ., Las Cruces, N. Mex. 88003) Developed a hierarchial classification and described 12 pinyon-juniper habitat types found on the Gila National Forest in southwestern New Mexico.

Impacts of Pronghorn Grazing on Winter Wheat in Colorado; by Stephen C. Torbit, R. Bruce Gill, A. William Alldredge, and James C. Liewer; 1993; J. Wildl. Mgt. 57(1):173–181. (Dept. Fishery & Wildl. Biol., Colo. State Univ., Fort Collins, Colo. 80523). Although winter wheat was found extensively grazed by antelope from November through April, antelope herbivory in this study did not reduce grain yields; this was attributed to antelope shifting their grazing to native pasture before winter wheat became vulnerable to damage by grazing.

In Search of Leafy Spurge Control Herbicides; by Rodney G. Lym and Katheryn M. Christianson; 1992–3; N. Dak. Farm Res. 49(6):31–35. (Agric. Mailing Room, N. Dak. State Univ., Fargo, N. Dak. 58105) The results of initial screening trials carried out to evaluate as many herbicides as possible for leafy spurge control.

Influence of Daily Versus Alternate-day Supplementation on the Production of Gestating Ewes Grazing Winter Range; by V.M. Thomas, C.M. Hoaglund, and R.W. Kott; 1992; Sheep Res. J. 8(3):85–90. (Anim. & Range Sci. Dept., Mon. State Univ., Bozeman, Mon. 59717) Concluded that alternate day supplementation of pregnant ewes grazing winter range is a viable management alternative if the ewes are in good body condition and if fed adequately in late gestation.

Interactive Effects of Fire, Bison (*Bison bison*) Grazing and Plant Community Composition in Tallgrass Prairie; by Mary Ann Vinton, David C. Hartnett, Elmer J. Ginck, and John M. Briggs; 1993; Amer. Midl. Nat. 129(1):10–18. (Div. of Biol., Kansas State Univ., Manhattan, Kan. 66506) In their study on the Konza Prairie, a tallgrass prairie site in the Flint Hills region of northeastern Kansas, the authors found that bison use was spatially nonrandom and vegetationally selective and was influenced by burning history and local plant community composition.

Native Vs. Introduced Species: The New Range War; by USDA, Agric. Res. Serv; 1992; Utah Sci. 53(3):69-78. (Agric. Mailing Room, Utah State Univ., Logan, Utah 84322) While reviewing the conceptual pros and cons in the controversy, ARS personnel concluded that introduced forage species play a useful if not vital role in maintaining, rehabilitating, and enhancing Western range ecosystems.

Noxious Brush and Weed Control; Range and Wildlife Management; Research Highlights—1992; by David B. Wester and R. Scott Lutz (Eds.); 1992; Texas Tech Univ., Lubbock, Texas (Vol. 23); 46 p. (Dept. Range & Wildl. Mgt., Texas Tech Univ., Lubbock, Texas 79409) An annual summary of the results of research directed to controlling noxious plants in Texas and to management practices subsequent to control treatment.

Plant Competition, Abiotic, and Long- and Short-term Effects of Large Herbivores on Demography of Opportunistic Species in a Semiarid Grassland; by D.G. Michunas, W.K. Lauenroth, and P.L. Chapman; 1992; Oecologia 92(4):520-531. (Dept. Range Sci., Colo. State Univ., Fort Collins, Colo. 80523). Based on their studies on semiarid grassland in eastern Colorado, the authors concluded the invasibility by native and exotic opportunistic-generalist plant species was seed limited, species specific, and strongly influenced by grazing and the type of disturbance.

Proceedings—Symposium on Ecology and Management of Riparian Shrub Communities; by Warren P. Clary, E. Durant McArthur, Don Bedunah, and Carl L. Wambolt (Comp.); 1992; USDA, For. Serv. Gen. Tech. Rep. INT-289; 232 p. (USDA, Intermtn. Res. Sta., 324 25th St., Ogden, Utah 84401) Includes 41 papers from a symposium held at Sun Valley, Idaho, on May 29-31, 1991, and focused on riparian shrub communities and their habitats; resource values, classification methods, conditions, and rehabilitation techniques are emphasized.

Rangeland Technology Equipment Council: 1992 Annual Report; by Rangeland Tech. Equip. Council; 1992; USDA, For. Serv. Tech. & Dev. Center, Missoula, Mon.; 14 p. (USDA, For. Serv. Tech. & Dev. Cen., Bldg. 1, Fort Missoula, Missoula, Mon. 59801) Comprises papers on equipment and techniques given at the 1992 RTEC annual meeting at Spokane, Wash.

Rangeland Remote Sensing: Discover New Trends in Technology and Applications; by James H. Everitt (Ed.); 1992; Geocarto Intern. 7(1):1-104. ($15, M.L. Research, P.O. Box 580122, Houston, Texas 77258) A special 104-page issue containing the 12 papers presented at a Rangeland Remote Sensing Symposium held in Washington, D.C., on Jan. 14, 1991; the objective of the symposium was to demonstrate how various remote sensing techniques can be used to assess rangelands or assist in making management decisions.

Spatial Analysis of Grasshopper Density and Ecological Disturbance on Southern Idaho Rangeland; by Dennis J. Fielding and M.A. Brusven; 1993; Agric., Ecos., and Environ. 43(1):31-47. (Fielding: BLM Shoshone Dist., P.O. Box 2B, Shoshone, Ida. 83352) Areas that had been severely disturbed by wildfires and invasion of exotic annual vegetation had significantly higher grasshopper densities over the 3-year study period than less severely disturbed areas that retained some sagebrush cover.

Sustainable Livestock Grazing in New Mexico; by Rex D. Pieper, Reldon F. Beck, Robert P. Gibbens, and Gary B. Donart; 1992; Journal of Proceedings, New Mexico Conference on the Environment, September 13-15, 1992, Vol. II. p. 847-854. (Dept. Anim. & Range Sci., N. Mex. State Univ., Las Cruces, N. Mex. 88003) Under conservative cattle grazing on research areas in southern New Mexico, no obvious downward trend for periods approaching 50 years resulted; herbage production declined during drought, while responding to favorable precipitation following droughts. The authors concluded that moderate cattle grazing in the Southwest is sustainable and that climate often exerts a controlling influence that can obscure other enviromental influences.

Trees, Shrubs, and Cacti of South Texas; by James H. Everitt and D. Lynn Drawe; 1993; Texas Tech Univ. Press, Lubbock, Texas; 213 p. ($18.95; Texas Tech. Univ. Press, Lubbock, Texas 79409-1037) Provides a color photograph, description, and ecological information on 190 woody plants, mostly native but a few naturalized, frequently encountered in the 14 southernmost Texas counties.

Weed Control in Field and Forage Crops, 1992; by Saskatchewan Agric. & Food; 1991; Sask. Agric. & Food, Regina, Sask.; 133 p. (Weed Control, Sask. Agric. & Food, Regina, Sask. S4S 0B1) Provides general information on both nonchemical and chemical weed control but gives detailed recommendations on herbicidal control; updated annually.

Yield and Persistence of Tall Fescue in the Southeastern Coastal Plain after Removal of Its Endophyte; by J.H. Bouton, R.N. Gates, D.P. Belesky, and M. Owsley; 1993; Agron. J. 85(1):52-55. (Agron. Dept., Univ. of Ga., Athens, Ga. 30602) This study demonstrated that removal of the endophyte commonly infecting tall fescue and toxic to livestock greatly reduces the ecological fitness of tall fescue, possibly allowing less tolerance to summer drought.

Capital Corral

Ray Housley
Washington Representative

The Bureaucracy is the epoxy that greases the wheel of government.
Jim Meek

The bill to make the Environmental Protection Agency a Cabinet Department that passed the Senate May 4 was significant for what it omitted rather than for what it contained in the way of details. Sen. Robert Dole (R-KS) proposed language that would force federal compensation to landowners whose property rights were "taken" by force of environmental laws and regs. The proposal never came to a vote. A similar provision in last year's Senate action on EPA helped kill the bill in the House, according to the *Washington Post*.

The Senate threw out proposals requiring economic analysis of legislation and regulations and directing the new Department to offset costs of environmental regulations. Also defeated was language giving the Soil Conservation Service full authority to regulate agricultural practices on wetlands. If the Senate version prevails, the President would have 90 days after enactment to make recommendations to Congress on wetland responsibility. Language transferring Council on Environmental Quality functions to the new Department was retained.

The bill will be in for some trouble in the House, partly because Rep. Mike Synar (D-OK) is irritated with the Administration for its withdrawal of fee increase proposals. The EPA bill will be referred to Synar's subcommittee in Government Operations, which Synar says is very busy with lots of other things. Usually reliable sources were giving final passage of the bill this year a "fair" chance, despite the apparent obstacles.

The National Cattlemen's Association has named Bill Myers Director of Federal Lands. He will also serve as Executive Director of the Public Lands Council, succeeding Pam Neal in both positions. Meyers served as Deputy General Counsel at the Department of Energy, and was an Assistant to the Attorney General earlier. NCA says Meyers has considerable Capitol Hill experience, and represented rancher clients while in private law practices in Sheridan, WY.

H.R. 1602, introduced by Cong. Bruce Vento (D-MN) is the vehicle he is using to get grazing fee increases considered. In addition to increasing fees to market value in one year and mandating an "incentives" system, the bill would prohibit subleasing of BLM grazing permits and reduce term permits from ten to five years. Rep. Barbara Vucanovich (R-NV) introduce H.R. 1750, which would retain the existing fee formula. Rep. Mike Synar (D-OK) put in H.R. 643 earlier; his bill would increase fees to market value over three years, but with no incentives provision. According to Public Land News, livestock industry leaders say they will accept a small fee hike provided it is offset by cuts in agency spending and stewardship credits.

A workshop on Ecosystem Functioning is being planned in 1994 by the Renewable Natural Resources Foundation. Keith Wadman of SCS represents SRM on the planning committee for that activity.

The General Accounting Office's most recent foray into rangeland issues is a report saying that 6 percent of Forest Service permittees control nearly half the livestock permitted to graze on the National Forest System. A GAO report last year drew similar conclusions about BLM permits as well. It was not clear whether grazing associations rather than individual members were counted as permittees in the study; that could skew the findings. A sidelight in the report is the observation that one of the "big" permittees is Sieben Ranch Co. of Helena, MT, partly owned by Sen. Max Baucus (D-MT). Baucus has been credited with being a key player in getting the President to back off on grazing fee increases.

Another GAO Report faults BLM for an ineffective data base for monitoring range improvements. The agency is urged by the report to require better accountability and issue guidance on data use in the field.

Interior Secretary Bruce Babbitt's series of hearings out west served to focus substantial interest on rangeland resource issues at the Washington level as well as elsewhere. Bureaucrats, appointees and legislators alike were giving more attention to the subject than observers could recall ever noting. Much of the attention was associated with the fee issue, to be sure, but statements by professional leaders like SRM President Gary Donart served to point out resource needs and opportunities for people who need to know.

California Desert legislation seemed to move closer to enactment following late April hearings in Washington. The Bureau of Land Management and the National Park Service both expressed strong reservations about the suitability of the huge East Mojave area for National Park status. Too much development and too much incompatible activity, they say. If it stays in, East Mojave will be the target for another National Rifle Association effort to allow continued hunting.

The Federal District Court for Nevada's decision in Fulton vs US in March held that a Forest Service grazing permit is not a contract and that contract law is not applicable. It upheld the often-tested principle that a permit is a revocable privilege rather than a transferable or assignable right.

Civilian Conservation Corps Alumni plan a rally in Washington July 16, on the 60th anniversary of the CCC. Their stated goal is to "Bring Back the CCC Camps in 1993". For information, call (314) 487-8666.

The National Biological Survey remains high on Interior Secretary Babbitt's agenda. He has appointed Thom-

mas E. Lovejoy his scientific advisor to help move the proposed "super-agency" for research along. In addition, he called on the National Academy of Sciences to give him advice on NBS. NAS has appointed a committee chaired by Peter Raven of the Missouri Botanical Garden to complete a study by fall of this year (a substantially shorter time frame than we are accustomed to seeing at the Academy and its National Research Council). Eric Fisher is Project Director (202) 334-2215.

There remains some apprehension, particularly among members of the wildlife professional community about the impact of pulling all research and information-gathering activities out of the agencies. Max Peterson, Executive Director of the International Association of Fish and Wildlife Agencies, told the committee that it needed to be more than the "cheering section" it appears. Land and resource managers are asking if the data collection and monitoring functions of NBS would supplant the activities of, say, range conservationists on public lands grazing allotments. (So far, the answer seems to be "no", but vigilance is the watchword in fast-moving organizational upheavals like this one). Meanwhile, over at USDA, researchers are asking whether the NBS model will be applied there, or even extended to include their programs as well. And don't forget the National Institute for the Environment, the other grandiose proposal to bring all kinds of research together. The politics of science is full of sharp elbows and grasping hands.

Reorganization at USDA may not be moving as fast as it first seemed it would. Secretary Mike Espy is said to have told agency heads to "forget the rumors" about reorganizing the Department, and listen to what comes now. This could mean a more deliberate, studied approach (in which a lot of folks are eager to help and advise). At the same time, several top slots at Agriculture are being kept open, and the budget that went to Congress had the old line agencies rolled into the Farm Services Agency so tightly one was hard-pressed to find any of the old familiar favorite programs.

Executive compensation at the non-profits was the subject of a recent story in the *Washington Post.* In case you missed your copy: Jay Hair gets $232,640 plus $42,689 in bennies for being President of the National Wildlife Federation. At the Nature Conservancy, President John Sawhill is paid $185,000 plus $11,576. The Wilderness Society was paying George Framptom $99,250 plus $22,827 until he jumped to Interior at what may be a slightly better package. The Salvation Army, which takes in more money than all of the above together, pays its National Commander $35,818—and no benefits. We hasten to add that professional societies which don't raise their money by contributions were not included in this survey.

Politically correct (PC) terminology recently came to the attention of Cowboy Poet Baxter Black, who suggests we refer to cowboys as "two-legged ungulate overseers".

Results of the 1993 Graduate Student Paper Contest

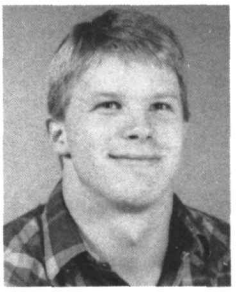
Twenty-four graduate students participated in the contest during the 46th Annual Meeting of the Society for Range Management in Albuquerque last February. Six competed as Ph.D. students and 18 entered at the M.S. and M.Ag. level. Each presentation was evaluated by a panel of 3 judges from a pool of 12 representing universities and federal agencies across the country. Final scores were determined by summing points assigned for technical quality of the research as well as presentation skills and effectiveness of visual aids. Maximum attainable score was 210 points. All participating students and their advisors are congratulated for their fine efforts.

Ph.D. Category

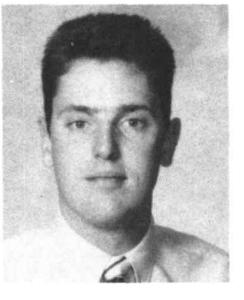
1st Place (173 points): **Russell K. Engel,** University of Wyoming. Russell is from North Platte, Nebraska, where he is employed as a research technologist for the University of Nebraska, West Central Research and Extension Center. He received the B.S. and M.S. degrees in range management from the University of Nebraska. Co-advisors for his Ph.D. program are Jim Nichols from the University of Nebraska and Jerry Dodd from the University of Wyoming.
Title of Paper: "Root and Shoot Responses of Defoliated Sand Bluestem" by R.K. Engel, J.T. Nichols, J.E. Brummer, and J.L. Dodd.

2nd Place (166 points): **Joe E. Brummer,** University of Nebraska. He was raised on a ranch near Zenda, Kansas, and has the B.S. degree in range ecology from Colorado State University and the M.S. degree in agronomy (range management) from Oklahoma State University. Joe is employed as a research coordinator for the University of Nebraska, West Central Research and Extension Center, at North Platte, and his currently completing the Ph.D. program under Jim Nichols.
Title of Paper: "Effect of Standing Dead Herbage on Utilization of Little Bluestem under Different Grazing Strategies in the Nebraska Sandhills" by J.E. Brummer, J.T. Nichols, R.K. Engel, and P.E. Reece.

M.S. Category



1st Place (171 points): K.C. Olson, North Dakota State University. K.C. is from Charbonneau, North Dakota. He obtained a B.A. degree in biology from Moorhead State University in Minnesota, and he hopes to pursue a Ph.D. in range nutrition. His advisor in the Department of Animal and Range Sciences at NDSU is J.S. Caton.
Title of Paper: "Influence of Advancing Season and Yeast Culture Supplement on Forage Utilization by Steers Grazing Native Range in the Northern Great Plains" by K.C. Olson, J.S. Caton, and D.R. Kirby.



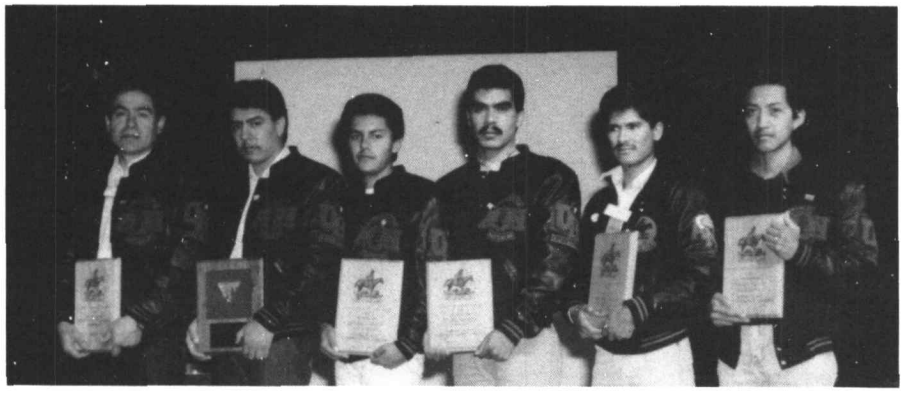
2nd Place (167 points): **Keith J. Wrage,** University of South Dakota and South Dakota State University. Keith is from Brookings, South Dakota, and he currently lives in Vermillion. He earned a B.S. degree in biology from SDSU and will soon complete a M.S. degree from USD in a joint program, taking courses at USD and conducting his research under Bob Gartner of SDSU's West River Agricultural Research and Extension Center in Rapid City.
Title of Paper: "Ponderosa Pine Canopy Effects on Microclimate and Understory Vegetation in the Black Hills" by F.R. Gartner, K.J. Wrage, and Bok Sewell.

Honorable Mention

Mary C. Gibbs, South Dakota State University, M.S. (164 points)
Paige Wolken Forton, University of Wyoming, M.S. (164 points)
Chad S. Boyd, Utah State University, M.S. (161 points)
Marit Larson, University of California, Berkeley, M.S. (161 points)
B.K. Northrup, University of Nebraska, Ph.D. (161 points)

Winning Teams, 1993 Annual Meeting

Range Plant Identification Contest



1st Place: *Universidad Autonoma Agraria—"Antonio Narro." Ricardo Vásquez Aldape (Coach), Juan Antonio Encina Dominquez, Florentino Montoya Manzano, Humberto Alvarado Raya, Juan José López Mata, Juan José Eduardo del Angel.*

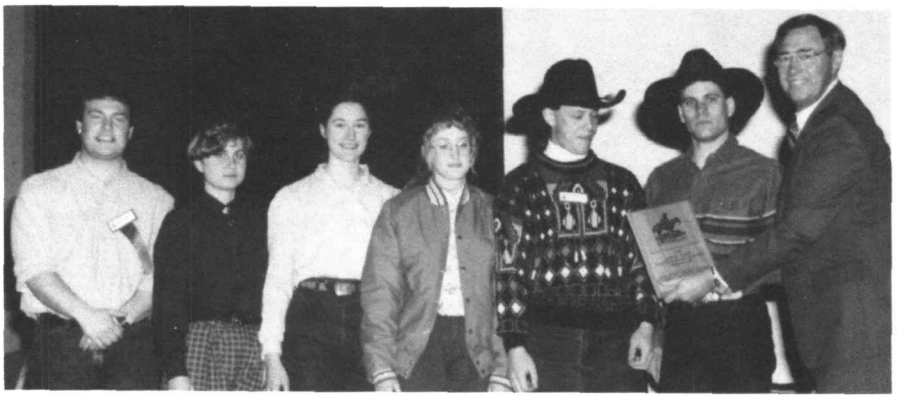
1st Place Plant I.D.—*Juan Antonio Encina Dominguez (Antonio Narro), presented by Glen Secrist (BLM).*

2nd Place: *Universidad Antonoma Chapingo. Mario J. Lopez, Silvestre Charraga, J. Ascencion Duran, L. Luis Flores, Angel S. Guevara, and SRM President Jack Artz.*

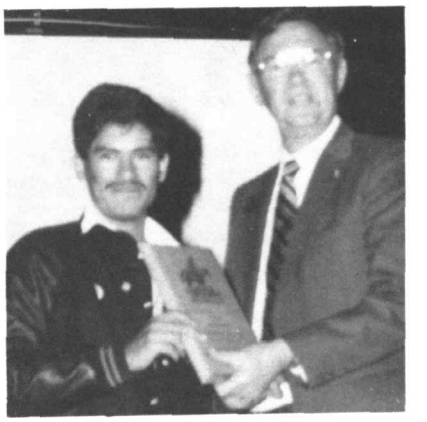
2nd Place Plant I.D.—*Florentino Montoya M. (Antonio Narro).*

3rd Place: *University of Alberta. Cody Bateman, Karen Milne, Barry Creighton, Jane Thornton, Christoph Weder, Sonya Clausen, Pola Genoway, and SRM President, Jack Artz.*

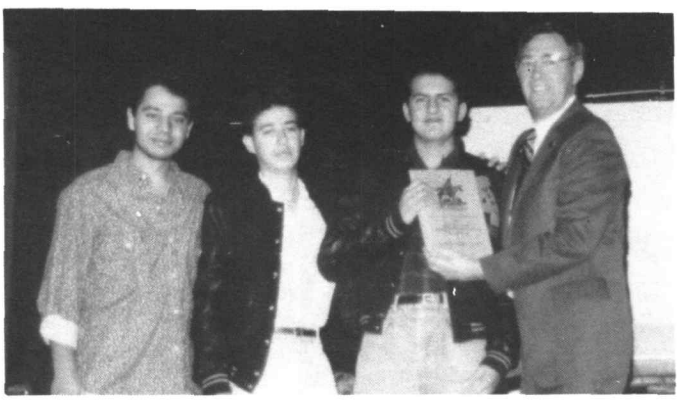
3rd Place P.I.—*Humberto Alvarado Raya (Antonio Narro).*



4th Place: *Montana State University. Matt Phillippi, Caralea Speelmon, Sierra Stoneberg, Rebecca Wolenetz, Robert Cosgriff, Jeff Roffler, and SRM President Jack Artz.*



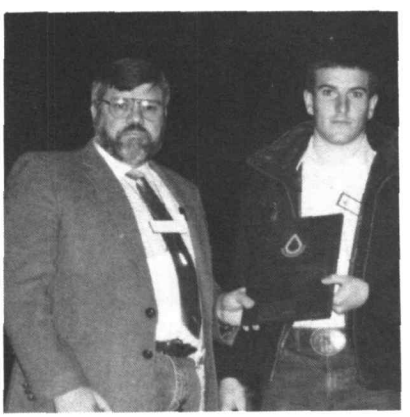
4th Place P.I.—*Juan Jose Lopez Mata (Antonio Narro).*



5th Place: *Universidad Autonoma De Nueva Leon. Rodrigo A. Collado Franco, Venancio Coutiño, Marcelo Fuentes Cruz, and SRM President Jack Artz.*

5th Place P.I.—*Juan Jose Eduardo del Angel (Antonio Narro).*

Undergraduate Range Management Exam



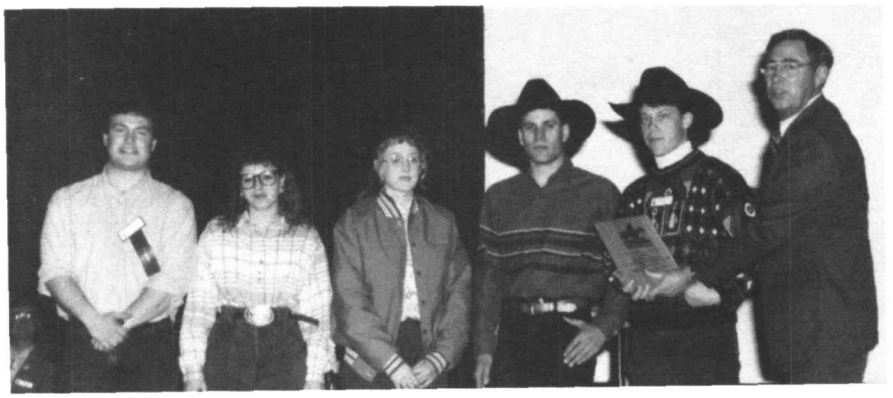
1st Place—*Cody Batemen (University of Alberta), with Keith Wadman, SCS. Bateman also received the Undergraduate Comprehensive Award.*

1st Place: *University of Alberta. Cody Bateman, Karen Milne, Jane Thornton, Barry Creighton, Christoph Weder, Sonya Clausen, Pola Genoway, and SRM President Jack Artz.*

2nd Place URME—*Barry Creighton (University of Alberta)*

2nd Place: *Utah State University. Robert Hales, James Potts, John Stewart, Bridget McCann, Eric Duffin, Hilary Minix, Earl Daly, Amy Smith, and SRM President Jack Artz.*

3rd Place URME—*Jeff Raffelson (Montana State University)*



3rd Place: *Montana State University. Mathew Phillippi, Jo Jay Raffelson, Rebecca Wolentz, Jeffrey Roffler, Robert Cosgriff, and SRM President Jack Artz.*

4th Place URME—*John Stewart (Utah State University)*

4th Place: *Texas A&M. Ned Weathers, Jodie Lloyd, Jeff Hughes, Stacie Cook, Susie Siems, Travis Haby, Eric Roalson, and SRM President Jack Artz.*

5th Place: *New Mexico State University. Steve Hilliard, Chris Abernathy, Barbara Barnett, and SRM President Jack Artz.*

5th Place URME—*Steve Hillard (New Mexico State University)*

Youth Forum Winners

1st Place—*Jason Nichols (Colorado)*

2nd Place—*Holly Alexander (Texas)*

3rd Place—*Dustin Dean (Texas)*

4th Place—*Renee Hipke (Nebraska)*

5th Place—*Jake Fenton (Wyoming)*

Kevin D. Norton, SCS, Woodward, Oklahoma receiving the Outstanding SCS Range Conservationist Award presented by Keith Wadman, SCS. Norton also received Outstanding Young Range Professional Award from SRM.

Board of Directors Meeting Highlights

The Annual Meeting of the SRM Board of Directors was held in the San Juan Room of the Albuquerque Convention Center, Albuquerque, N.M. on February 12-18, 1993. President John L. "Jack Artz presided.

A vote of confidence was extended by the Board to the efforts of **SRM/American Forage and Grasslands Council** Ad Hoc Committee and the Ad Hoc Committee was requested to continue their work in the area of sponsoring a joint publication.

The Board adopted the following **Position Statements and Resolutions** (see statements on page 143): Conservation Reserve Program Position Statement and Resolution; Resolution Concerning the Re-authorization of the Endangered Species Act; Revised Riparian Values Position Statement; and, a Species Conservation Position Statement. In addition, the Board approved **Interim Statements and Resolutions** on: Biological Diversity Position Statement; Desertification Interim Policy Statement; and, Desertification Costs: Land Damage and Rehabilitation Resolution. These items are to be reviewed by relevant Committees and the Advisory Council for finalization at the 1993 Summer Meeting.

On Budget items: The Board will study and approve an **annual budget and cash flow plan** and to charge the Executive Vice President with the responsibility of bringing these in within, or not to exceed 10% by line item on discretionary expenditures, and 20% of budget on non-discretionary expenditures, assuming revenues are within the same variance as projections. Deviations beyond the 10% and 20% respectively should be reconsidered by the Board and Executive Committee; A Budget Committee will be established and will be comprised of the First Vice President as Chair, the Executive Vice President, the Second Vice President, Chair of the Finance Committee, and Chair of the Advisory Council as an ex-officio member; the Budget Committee will develop the proposed annual budget by the 11th month of the current budget period and will submit same to the Finance Committee one week prior to the Annual Meeting for review; the Futures in Range Management Education Task Group requested up to $5,000 in up-front funding for publication of a document, which the Board will provide pending several stipulations; accepted the 1993 Proposed Budget, with a mid-year review to be held at the 1993 Summer Meeting; authorized a reimbursement to the President of up to $300.00 to cover the costs of hospitality at Annual Meetings, to include the 1993 year; and, accepted proposed changes to Travel Regulations as submitted.

A proposal for a change in stated policy in the **"Handbook on Employee Policies and Benefits"** for compensating employees was accepted. This proposal is in two phases and does not apply to the Executive Vice President and contract employees: Phase One—would be automatic adjustment of employees base salary beginning January 1 each year. The adjustment would be 1/2 of the Consumer Price Index (CPI) for the previous three quarters of the preceding year in the Denver area, unless the CPI exceeds 6%, in which case the amount of the adjustment would be recommended by the Executive Vice President and approved by the Board of Directors. Phase Two—would be a lump sum bonus payment based on merit evaluation. The pool of money to be included in this merit pool would be comprised of the other 1/2 of the CPI and an additional amount to be requested each year by the Executive Vice President and approved by the Board of Directors. Merit pay would not become a part of the base salary.

Provisions were made to protect commercial interests as: the Board will establish a **Commercial Exhibitors Liaison** to be selected annually by the Commercial Exhibitors; an exhibit coordination responsibility will be undertaken by the SRM Denver Office to maintain a record of, and be the contact for, the exhibitors from year to year, and to coordinate the annual Trade Show with the local Annual Meeting Trade Show Director; during 1993, a survey of past exhibitors and potential exhibitors will be conducted to determine future intentions for participation in the Trade Show, and to allow them an opportunity to provide recommendations on exhibiting; the Denver Office will arrange for a meeting room and time to be provided during each Annual Meeting for the Commercial Exhibitors to meet with the Denver Office Coordinator to review concerns and elect an Exhibitor Liaison; and, President Donart will charge the SRM Membership Committee to investigate concerns about Commercial memberships and to report at the 1993 Summer Meeting.

The **Texas A & M University** Department of Rangeland Ecology and Management was re-accredited for ten more years.

The committee structure of the **Conservation Reserve Program Committee** was expanded to include Section Representatives, with the quorum for the committee being based on the international, appointed committee of nine.

The **Endowment Fund Handbook** was accepted with revisions.

At the initiation of his/her term, the First Vice President will select the **Vice Chair of the Finance Committee** and the Vice Chair will assume the Committee's Chair positions during the First Vice President's Presidency.

The Board of Directors charged the Executive Vice President to work with the University of Wyoming to pursue the **Hyatt proposal.**

The Membership Committee recommended: the Section membership lists be sent bi-monthly, rather than monthly, from the SRM Office to Sections; the $5.00 Rebate program be continued; and, a Bylaw change will be submitted to the membership on this year's ballot for SRM to adopt a change to an Anniversay Date basis with the provisions that: members be allowed a one-time change in their anniversary date after which the anniversay date will then remain fixed; that a two month grace period be fixed for renewals and members will pay for postage and handling; and, delinquent member lists will be provided to Sections.

The Board of Directors of the Society for Range Management expressed **appreciation to Jerry Schwien** for his outstanding work as the Public Affairs Specialist, and commended and thanked him for the significant contribution that he has made to raising the profile of the Society and furthering rangeland management.

The **Commercial Affairs Select Committee** was sunset. The **Public Affairs and Technology Transfer Committees** were reauthorized for another five years. The **Endangered**

Species Task Group will be continued until the 1993 Summer Meeting, at which time the Board will evaluate the need for their continued existence.

The **Certification Procedures** will be revised to include a statement to read as: Certified Range Management Consultants are encouraged to use their Certification Number, and only consultants certified by the Range Consultants Certification Panel of SRM are allowed to use the phrase "Certified by the Society for Range Management."

The Board of Directors will establish a Task Group to develop a proposal on exploring **a permanent display at the Smithsonian,** and the Task Group will be linked closely with Holley Smith and the Information and Education Committee, and will have a duration of one year.

Joint Meeting of the Board of Directors and Advisory Council

The following recommendations were made to the SRM Board of Directors at a Joint Meeting with the Advisory Council on February 18, 1993 at 10:45 a.m. Chair of the Advisory Council Carolyn Hull-Sieg and President Gary B. Donart presided. Sieg presented the recommendations of the Advisory Council as listed below and the subsequent actions were taken by the Board to these recommendations:

Recommendation 1. That the Board of Directors continue the Strategic Planning process for at least another year and continue the Strategic Planning Subcommittee of the Board.

Recommendation 2. That the Board of Directors begin the implementation process on the strategic issues and work toward finalizing the vision, mission, and guiding principles by the 1993 Summer Meeting. *The Strategic Plan will be circulated to SRM Committees/Task Groups and members, and Deen Boe, Will Blackburn and Murray Anderson will continue their efforts to progress the SRM Strategic Plan.*

Recommendation 3. That the International Mountain Section Boundaries Resolution be adopted. *The Board accepted Recommendation #2 from the Advisory Council.*

Recommendation 4. That the Board of Directors adopt the Position Statement drafted by the Public Affairs Committee on "Riparian Values", with suggested changes.
The Board adopted the Revised Riparian Values Position Statement.

Recommendation 5. That the Board of Directors fully support the Grazing Land Conservation Initiative (GLCI) currently being undertaken by a coalition of organizations; and, establish a coordination Task Force answering directly to the Board of Directors which would serve as a liaison and catalyst for the GLCI involvement at the Section level. *The Board will establish a GLCI Task Group which will have a two year life and will be responsible for insuring the information on the GLCI is getting out to the Section and State levels.*

Recommendation 6. That the Board of Directors look into providing monetary support (from Endowment Fund interest or other sources) for the International Affairs Committee brochure and newsletter. *The request for funding of the International Affairs Committee's* International Range News *was deferred for lack of funds. Also, the request for funding of the brochure was deferred until the 1993 Summer Meeting.*

Recommendation 7. That the staff at the SRM Office develop brochures, fliers, and/or inserts for SRM publications that describe and facilitate the option of subscribing to *Rangelands. The SRM Staff will begin work on this project.*

Recommendation 8. That the title of the *Journal of Range Management* be changed to the *Journal of Rangeland Science. The Board deferred consideration on changing the name of the* Journal of Range Management *until a proposed action plan can be brought to the Board at the 1993 Summer Meeting.*

Recommendation 9. That the Policy Statement on the use of the Trail Boss logo prepared by the Professional Affairs Committee be adopted. *The Board noted it has two recommendations on this issue, one from Professional Affairs Committee and another from Certified Range Consultants Certification Panel. The Board deferred action on this matter until the 1993 Summer Meeting, with rewording being developed by the Executive Vice President.*

Recommendation 10. That the Position Statement on Species Conservation drafted by the Endangered Species Task Force be adopted. *The Board adopted the Species Conservation Position Statement.*

Recommendation 11. That the Resolution on Re-authorization of the Endangered Species Act of 1973 drafted by the Endangered Species Task Force be adopted. *The Board adopted the Resolution concerning the Re-authorization of the Endangered Species Act.*

Recommendation 12. That the Board of Directors consider the Society for Range Management's participation in the Minorities in Forestry II Conference. Participation may include cash funding, advertising assistance in journals and through membership lists, rental of booth space, and/or referral of top-quality minority speakers. *The Board noted funding is not available at this time. The Executive Vice President is to correspond with the organizers of the Conference noting SRM's willingness to assist where possible.*

Recommendation 13. That the Board of Directors establish a Task Force to evaluate and draft a Position Statement concerning "private property rights and responsibilities" as related to the management of United States rangelands. *The Board referred Recommendation #13 back to the Advisory Council for further work and inclusion of international considerations, and to bring this back to the Board of Directors through the normal process for development of Position Statements.*

Recommendation 14. The Advisory Council applauds the ongoing efforts by the SRM Board of Directors to request the U.S. Department of Interior to commission a complete soil and vegetation survey, and a range condition survey of the northern winter range of Yellowstone National Park as soon as possible. Also, a thorough survey of wild ungulate populations in the same area should be completed. Therefore, the Advisory Council recommends that the Board of Directors continue to actively pursue this issue, and encourage the U.S. Department of Interior to use the survey data in developing an overall rangeland management plan for the Park. *The Board will continue its efforts in working with the Department of Interior on this issue.*

Recommendation 15. That the Advisory Council take the proposed amendment (by the Nominating Committee) to the Bylaws, Article III to the membership for a vote. *The Board of Directors deferred action on the Proposed Amendment to the Bylaws for Article III until the 1993 Summer Meeting, in order to ask the Advisory Council to remove the December 1 deadline date from Section 3.*

Recommendation 16. That the Board of Directors accept the California Section's bid to host the 1998 Annual Meeting. The Board asked the Advisory Council's opinion on reaffirming the intent of the Mexico Section to make a bid for this Annual Meeting, and whether the Advisory Council would be adverse to reviewing a bid from Mexico should they desire. No objections were raised from the Advisory Council. *The Board of Directors deferred any action on selecting a site for the 1998 Annual Meeting to provide an opportunity for the Mexico Section to present a bid, for either the 1998 Annual Meeting or Summer Meeting, to the Advisory Council at their 1993 Summer Meeting.*

Recommendation 17. That the Board of Directors consider the development of a "Wetlands" Position Statement. *The Board referred the proposed Position Statement to the Executive Vice President for distribution to the appropriate SRM Committees for review, including the Watershed/Riparian and Public Affairs Committees.*

Recommendation 18. That the Board of Directors adopt the CRP Resolution and CRP Position Statement. *The Board adopted the Conservation Reserve Program Position Statement and Resolution.*

Recommendation 19. That the Board of Directors consider adopting a resolution on salmon, steelhead and trout similar to that passed by the Pacific Northwest Section. The Advisory Council would like to see the Board develop a Policy or Position Statement on this. *The Board referred the proposed Resolution to the Executive Vice President for distribution to the appropriate SRM Committees for review.*

Recommendation 20. The Advisory Council applauds the efforts of the outgoing officers-Jack Artz, Will Blackburn, and Murray Anderson; and the efforts of the other Directors. In addition, we recognize the contributions of Bud Rumburg and Ray Housley. Further, we extend our thanks to Rene Crane, Jennie Zambo, Julie Sanders, and Patty Perez, for all their help with the logistics of our work. All these people were wonderful to work with. Finally, we ask the Board of Directors to extend our appreciation to Lou Romero for facilitating our Strategic Planning Session. *The Board of Directors noted it appreciates the time, work and effort extended by the Advisory Council and thanks the Advisory Council for the invaluable input received by the Board from them.*

Advisory Council Meeting Highlights

Endowment Fund Board of Governors Report. John Hunter, Chair, reported the growth of the Endowment Fund. Interest from the fund is the only area that can be spent. Lapel pins are still on sale.

Strategic Planning Session Report. Will Blackburn distributed a draft form of the SRM Strategic Plan that was previously discussed at a workshop that Representatives of the Advisory Council attended. The discussion was on the development of the Society vision, mission, guiding principles of management to help SRM determine where it's going and how to get there, and issues to be addressed.

Upcoming Advisory Council Planning Meetings. The 1993 Summer Meeting will be held in Springfield, MO, July 9-13, 1993. The theme for the meeting will be "The Role of Grazable Forages in Sustainable Agriculture".

The 1994 Annual Meeting will be in Colorado Springs, CO, February 12-18. The theme is "Rangelands: Diversity and Responsibility".

The 1995 Annual Meeting will be held in Phoenix, AZ, January 13-31. The theme wil be "Diversity in Land and People".

The 1996 Annual Meeting will be in Wichita, KS, February 10-15.

The 1997 Annual Meeting will be held in Rapid City, SD, February 16-21.

Grazing Lands Conservation Initiative. Larry Butler distributed three associated publications. An SCS brochure provides an overview of initiative. SCS met with various interest groups to help determine rangeland priorities on private lands. A coalition of interest groups has been formed to support an initiative which seeks to: Strengthen Partnerships, Promote Voluntary Actions, Respect Private Property Rights, Encourage Diversification to Achieve Multiple Benefits, and Emphasize Training, Education, and Increase Public Awareness. National Association of Conservation Districts (NACD), American Farm Bureau Federation (AFBF), SRM, National Cattlemen's Association (NCA), American Sheep Industry (ASI), and American Forage and Grassland Council (AFGC) all support the initiative.

Executive Vice-President's Report. Bud Rumburg proposed a SRM calendar that would include dates of meetings and be used as an educational tool. Rumburg stated that the Promissory Notes for the 1839 York Street Building have sold very well.

Leadership Skills. Cub Wolfe reported the Advisory Council had requested the Committee prepare a handbook or brochure on procedures for Advisory Council use. Wolfe offered the support of the Committee in the form of workshops on parliamentary procedure, resolutions, etc..

VthInternational Rangeland Congress. Jim O'Rourke prior to this meeting had sent letters out to the Section Presidents asking if SRM Sections were interested in conducting a Pre- or Post- Congress tours and that he would like some response.

Awards Committee. Jim Doughty discussed concern for the confusion by the membership in nominating for the Fellow Award and the Outstanding Achievement Award. Doughty encouraged the Sections to nominate candidates for awards.

Chair-Elect Election. Nominations were received for the position of Chair-Elect, and a vote was taken with Martin Beutler becoming the new Chair-Elect.

SRM Position Statements

Position Statement

Riparian Values

The Society for Range Management believes that many uses are compatible with proper riparian area function and riparian values. SRM actively encourages the implementation of management strategies for riparian areas and watersheds that optimize their values while protecting or restoring riparian and watershed function.

Riparian areas are integral components of watersheds that are the transition between aquatic and terrestrial elements of the ecosystem. These lands occur adjacent to streams, springs, seeps and other bodies of surface and subsurface water. Soil moisture content is significantly higher and, in many regions, riparian areas support different plant and animal communities than adjacent uplands.

Complex hydrologic, soil, and biotic relationships in riparian areas are important to watershed function. These functions include flood energy dissipation, sediment capture, groundwater recharge, nutrient cycling, and maintenance of water quality. Riparian areas support and depend upon the watershed as a whole.

Riparian areas are essential for structural and biological diversity in the landscape. They offer important habitat elements for fish, wildlife, and other organisms. Human health and safety, and aesthetic, economic and recreational opportunities require properly functioning riparian areas.

Accepted by the SRM Board of Directors on February 18, 1993.

Position Statement

Conservation Reserve Program

The Society for Range Management supports the concept of sustainable rangeland ecosystems consistent with reasonable and prudent use. A detrimental effect to achieving this goal has been the conversion of highly erodible lands from rangeland to cropland. The Conservation Reserve Program (CRP) has been successful in achieving soil conservation, clean water, clean air and enhanced wildlife habitat.

The Society advocates that productive, sustainable, economical, and ecologically sound management systems be developed and applied on all CRP lands. This should be accomplished by keeping highly erodible lands in permanent vegetative cover. The Society also supports a strong education and information program so CRP contract holders can make informed land use and management decisions and expanded technical assistance programs that ensure all CRP producers receive conservation planning in a timely manner.

Accepted by the SRM Board of Directors on February 18, 1993.

Position Statement

Species Conservation

The Society for Range Management supports the conservation of species and the maintenance and/or restoration of their habitats through the application of sound ecological and economic principles supported by rigorous research. Furthermore, the Society advocates that legislation and laws governing the conservation of species should be implemented and managed in a cooperative manner cognizant of social and economic impacts.

Approved by the SRM Board of Directors on February 18, 1993.

Resolution

The Reauthorization of the Endangered Species Act

WHEREAS, the Society for Range Management supports the conservation of species and the maintenance and/or restoration of their habitats through the application of sound ecological and economic principles supported by rigorous research; and

WHEREAS, the Society advocates that legislation and laws governing the conservation of species should be implemented and managed in a cooperative manner cognizant of social and economic impacts; and

WHEREAS, the Society defines an ecosystem as "Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space."

THEREFORE BE IT RESOLVED, the Society supports reauthorization of Public Law (93-295 as amended; 16 USC. 1531–1543) entitled, "The Endangered Species Act of 1973" with the following amendments:

a. Redirect the focus of the Act from the individual species to the management of ecosystem function and sustainability,
b. Require external peer/technical review of the information used in the listing process and recovery plans,
c. Identify key information needs and provide for research, inventories, monitoring, and specific timelines to fill information voids,
d. Designation of critical habitat and development of recovery plans shall comply with the National Environmental Policy Act of 1969 as amended,
e. Provide a cooperative approach to the management of private lands that may include 1) development of voluntary, cooperative management plans/agreements; 2) purchase of easements; and 3) land exchange or just compensation for landowners who cede control of their property to society for species conservation.

Approved by the SRM Board of Directors on February 18, 1993.

Resolution

Conservation Reserve Program

WHEREAS, the Society for Range Management supports the concept of sustainable rangeland ecosystems consistent with reasonal and prudent use; AND

WHEREAS, a detrimental effect to achieving this goal has been the conversion of highly erodible lands from rangeland to cropland; AND

WHEREAS, the Conservation Reserve Program (CRP) has been successful in achieving soil conservation, clean water, clean air and enhanced wildlife habitat; AND

WHEREAS, Conservation Reserve Program contracts will begin to expire September 30, 1995; AND

WHEREAS, the future use and management of these lands depend on the decisions of 350,000 CRP participants; AND

WHEREAS, their decisions will be guided by USDA program policy, economics of alternative land uses, and resource potential of the land.

THEREFORE, BE IT RESOLVED THAT the Society advocates that productive, sustainable, economical, and ecologically sound management systems be developed and applied on all CRP lands. This should be accomplished by keeping highly erodible lands in permanent vegetative cover.

THEREFORE BE IT FURTHER RESOLVED THAT the Society also supports a strong education and information program so CRP contract holders can make informed land use and management decisions and expanded technical assistance programs that ensure all CRP producers receive conservation planning in a timely manner.

Accepted by the SRM Board of Directors on February 18, 1993.

Frasier's Philosophy

There was a considerable effort at the Albuquerque 1993 Annual SRM Meeting in the development of future goals and objectives for the Society for Range Management. After participating in some of these committee meetings and discussions, it seemed appropriate to "look back" and see where we came from. In this issue of *Rangelands* you will find a couple of articles from the past. I was pleasantly surprised to find that the founders of our Society had such accurate visions of the future. At the same time I am disappointed that there are so many areas where we have made very little progress toward solving the problems.

On a different note, I am pleased to report that we will have a color section in some of the upcoming issues of *Rangelands.* These color sections are an expensive item but to date we have been fortunate to find sponsors willing to pay the extra costs for the color. The color helps keep *Rangelands* a little in front of the pack.

I am a great believer in luck, and I find the harder I work, the more I have of it.

Stephen Leacock

Requiescat in Pace

Daniel A. Fulton died at Scottish Rite Park in Des Moines, Iowa, on March 22, 1993, at the age of 88. He was born on June 8, 1904, in Minier, Illinois, to William and Bertha (Fluss) Fulton. He attended school in Ismay, Montana, a town that his father helped found. Because of his father's illness, he returned from his first semester at Montana State College to manage the family sheep and cattle ranch in southeastern Montana and help care for his seven younger siblings. As a rancher, Dan worked actively with the U.S. Experiment Station at Dubois, Idaho, to develop the Targhee sheep as distinctive breed. The premier band of these sheep that he developed was one of the first in Montana.

Dan developed an extensive telephone system serving the rural community surrounding the ranch. Using his long-time interest in ham radio, he arranged a radio link to connect this isolated system to the Bell system to give people in their area access to outside telephone lines.

While a rancher, Dan was involved in many other professional activities. From 1950 to 1959, he served as a director of the Bank of Baker. He was involved in the creation and administration of the Fallon Creek State Grazing District and was later appointed by Governor John Bonner to chair the Montana Grass Conservation Commission, an agency that administered the state grazing district program in Montana. A nationally recognized leader in the livestock industry and conservation affairs, Dan was elected president of two major livestock organizations, the Montana Stockgrowers in 1956 and the Montana Woolgrowers in 1958. He was involved in the formation of the American Society of Range Management and was one of its early presidents. He served on the Natural Resources Committee of the U.S. Chamber of Commerce from 1954 until 1957. Following the sale of the ranch in 1959, the Fultons moved to Billings and later to Helena when Dan was appointed chairman of the Montana State Board of Equalization under Governors Nutter and Babcock.

In 1959, Dan was awarded an honorary Doctor of Science degree by Montana State University in recognition of his many contributions to the state of Montana. An avid Montana historian, Dan later authored *Failure on the Plains,* an account of his experiences in dealing with conflicting government policies in operating a ranch in southeastern Montana. Dan has donated his extensive western history library to Montana State University.

Life Members (continued)

Floyd A. McMullen, Jr.
Patrick C. McNulty
Joel T. Meador
Daniel L. Merkel
John Merrill
Virginia Merrill
John L. Merrill, Jr.
Donald W. Messer
Keith H. Mickelson
Wayne H. Miles
Jack R. Miller
Janice Miller
R. Keith Miller
Steven B. Miller
Willie Milliron
John E. Mitchell
M. Pat Morrison
John R. Morse
Allen D. Morton
Mark E. Moseley
John W. Mumma
Lyle D. Nattrass
Don J. Neff
Stephen A. Nelle
Donald W. Nelson, Jr.
Joe B. Norris
Kay V. Norris
Edward L. Nygard
Paul E. Nyren
Thomas M. O'Connor
Joseph F. O'Rourke
Paul D. "Ole" Ohlenbusch
Hamdy S. Oushy
Kyle Owen
C.E. Owensby
Karl G. Parker
Bob D. Patton
Gene F. Payne
Jerry L. Payne
C. Kenneth Pearse
Dorothy Pearson
Henry A. Pearson
J.F. Pechanec
Rudy J. Pederson
Mike L. Pellant
W.C. Pendray
Gregory K. Perrier
Ronald R. Perrin
Willard P. Phillips
Ellen J. Picard
Beatrice C. Pickens
T. Boone Pickens, Jr.
William D. Pitman
Rod Player
Jennifer J. Pluhar
A. Perry Plummer
Ivan R. Porter
Jeff Powell
J. Boyd Price
Jeffrey L. Printz
L. Glen Quigley
Charles M. Quimby
Clayton L. Quinnild
Klaus Radkte
Bob J. Ragsdale
Michael H. Ralphs
Dan D. Ratliff
Janis J. Reimers
William A. Reimers
Steven T. Revie
Kara Ricketts
Matt J. Ricketts
Ronald E. Ries
Laurence E. Riordan
Walter M. Risse
Larry R. Rittenhouse
Joseph H. Robertson
Winthrop P. Rockefeller
Ernest D. Romero
James T. Romo
Robert L. Ross
Elno D. Roundy
John M. Row
Philip R. Rumpel
Brad Russell
Faith E. Ryan
Warren K. Sandau
Kenneth D. Sanders
H. Reed Sanderson
Gary D. Satter
Ted Scherer, Jr.
Al F. Schlundt
Harold B. Schmidt
Joe M. Schmidt
Ervin M. Schmutz
Martin R. Schott
Charles M. Schumacher
Milton Sechrist
Donald J. Seibert
Douglas V. Sellars
Harold E. Shamley
Daniel L. Sharp
Gail E. Sharp
Weldon O. Shepherd
Thomas N. Shiflet
John A. Shrader
M. Silia
Chester L. Skilbred
Jon M. Skovlin
Arthur D. Smith
Michael A. Smith
Sydney E. Smith
Terry J. Smith
Floyd L. Snell
Carol A. Sparks
Thomas L. Sparks
Steven M. Spencer
Bill Stark
Stan Starling
Warren J. Stevens
Robert L. Storch
James Stubbendieck
Sherman R. Swanson
Faisal K. Taha
Charles E. Taylor
Nora Taylor
Paul G. Taylor
Peter W. Taylor
Wayne F. Taylor
Clair E. Terrill
Courtney A. Tidwell
David P. Tidwell
Stan Tixier
Lynn D. Todd
T.W. Townley-Smith
George T. Turner
Robert B. Turner
Dee Moore Vanderburg
Robert E. Wagner
A.H. Fred Walker
Mrs. A.H. "Fred" Walker
Ronald M. Walters
Carl L. Wambolt
Clinton H. Wasser
Fred L. Way
J. Wayne Weaver
Noel H. Wellborn
Dick Whetsell
Steve Whisenant
Warren C. Whitman
Gerald D. Widhalm
Kay W. Wilkes
Calvin E. Williams
Clayton S. Williams
Robert E. Williams
W.A. Williams
Robert M. Williamson
Terry Wilson
Leaford C. Windle
H. Peter Wingle
Gale L. Wolters
Jerome H. Wysocki
Jim Yoakum
Albert L. van Ryswyk