
VIEWPOINTS

Semidesert Ecosystems—Who Will Use Them? How Will We Manage Them?

The use and ownership of Southwestern semidesert ecosystems are changing. It is time to take stock to see where we have been, where we are, where we are going. Our objective in the past has been to maximize livestock production. We have attempted to identify, evaluate, and solve a whole complex of problems related to forage and livestock. We have planted grass, controlled brush, and improved grazing systems. While there has been some concern on the part of public land administrators regarding the impacts of these practices on esthetic and recreational values, the impacts have not been fully evaluated.

The area we are considering includes the relatively flat lands and lower

slopes of included mountain ranges within 100 miles or so of the U.S.-Mexican border in Arizona, New Mexico, and Texas. It is essentially the "Desert Plains" of Weaver and Clements (1939). It includes such vegetation types as desert grassland, creosotebush, sand dune mesquite, mesquite-grass, and former grasslands now occupied by mesquite. Average rainfall ranges from 8 to 18 inches, and elevations are mainly from 3,000 to 5,000 feet. Perennial grasses are the most important forage producers, but much of the area now supports more shrubs and less grass than it once did. Cattle grazing is the primary productive use.

We No Longer Have the Range to Ourselves

Semidesert ranges no longer are the almost exclusive province of ranchers, range researchers, and public land ad-

ministrators. Absentee owners, speculators, miners, sportsmen, and other recreationists are claiming an increasing voice in what happens on the land. Public concern about esthetics, habitat destruction, or the balance of nature, has at times been great enough to halt projects to control shrubs or predators. Widespread concern about how public lands are managed has greatly increased planning costs of public land administration. To some extent it limits management choices for private landholders as well. As Byerly (1970) has indicated, we must now solve the problems of agricultural production with methods that are socially and economically acceptable. Maximum sustained production of forage and livestock is no longer an adequate and complete range management objective. We need the support of varied interest groups—not just the ranchers.

Added to restrictions imposed by non-rancher interests is the loss of land to other uses. Open-pit mining is locally impressive and removes the land from forage production permanently. Open-pit operations require space not only for excavation but for roads and power lines, places to dump the overburden, mill sites, pipelines, and ponds for mill waste as well. Massive as they are, however, I doubt that mining operations will destroy more than a fraction of a percent of the total semidesert land area.

Land speculation is booming—perhaps too strongly. Campbell (1970) reported more than 2,400 remote subdivisions in Arizona. Five-dollar-per-acre grazing land sells for \$1,000 to \$15,000 per acre. Land occupied by successful subdivisions will not produce range forage again. The relative success of remote subdivisions now is due in part to the fact that many residents of such areas are relatively independent financially. They don't need a job in town. Many are retired. But, successful remote subdivisions, like mines, won't occupy more than a small part of the semidesert any time soon. Other ill-placed, poorly-financed land speculation projects may only interrupt livestock and game production. At worst, there still will be enough grazed semidesert ranges to utilize all of our skills for the foreseeable future.

Continued Livestock Production

The economics of ranching have changed greatly within our memory. In 1939, Mont Saunderson reported the investment per animal unit in ranch lands to be from 71 to 108 dollars. Now we are in a land boom. A recent ad in the New Mexico Stockman listed ranches from \$600 to \$1,100 per animal unit. Gray (1970) reported investment per animal unit in ranches in the central mountains of New Mexico to be around \$1,200. But ranch income has not increased correspondingly. At current prices for ranches and cattle, net return to capital and management for Arizona cattle ranches is very low or even negative (Smith and Martin, 1970). Frank Boice (1967) stated that a cow could not service a debt load much over \$250. If a cow can service a debt load of not more than \$250, why are ranches bought at \$1,200 per animal unit? Andrews and Luden (1965) suggest that many purchases of range land are for purposes other than livestock

production. Sargent (1967) listed 10 motives for owning farm or ranch land, and found that those who purchased land for motives other than agricultural production were in stronger competitive position than the rancher.

Eventually the boom in ranch land may end. Smith and Martin (1970) report that a high percentage of Arizona ranchers are nearing retirement age. This means that large numbers of ranches should be coming on the market within the next 10 years or so. Only time will tell whether buyers will be plentiful enough and prosperous enough to maintain current prices. Meanwhile, the only economical way for a rancher to increase his livestock operation may be to increase forage production on the land he has. Mesquite control, for example, can in many cases provide forage for additional cows at \$200–\$300 per head. Reseeding and improved grazing systems are additional possibilities.

Recreational Possibilities of the Semidesert

Perhaps the greatest attribute of the semidesert is its mild winter climate. Other things that appeal to leisure users of the semidesert are the grasses, shrubs, trees, wildflowers, birds, and mammals that appeal to the amateur naturalist. There is a place, too, for rock collectors, and those who fashion furniture, curios, and table decorations from native products.

For the city dweller, one of the greatest values of the semidesert is open space or solitude; a place to get away from it all. Because of its size, the semidesert provides greater opportunities for solitude than do the relatively small, intensively used mountain or lake sites. Also, when the preferred sites are full, and temperatures are not too high, people will use semidesert as an alternative.

Recreation and livestock production don't necessarily conflict. To urbanites, the sight of cattle, horses, or sheep may be almost as great an experience as seeing deer, elk, or rabbits. The chance of seeing a cow or deer depends in part on numbers. Thus, to strive for high forage production and increased stocking may be a good recreational objective as well as good range management. The chance of spotting livestock or game also depends on how far you can see. Brush can be so thick that the

chances of seeing any animal are almost nil.

Grazing intensity affects wildlife populations by changing the habitat. Heavily grazed ranges, for example, appear to be preferred by jackrabbits and Gambel quail, but harlequin quail and cottontails do better where grazing is light. Grazing by cattle may very well maintain better forage and cover for deer than would be maintained if no cattle were grazed. Conversely, deer or other browsing animals may help keep brush from crowding out the grass. Scenic values of many semidesert ecosystems can be enhanced by creating appropriate patterns of grass, shrubs, and trees, and by stocking with appropriate mixtures of livestock and game.

Pollution and Range Management

Negative products of semidesert ecosystems include silt, mud, flash floods, and dust. The outputs of such products are increased by improper use of off-road vehicles and by improperly located land developments, as well as by poor range management. Airborne dust benefits no one. It grinds up machinery, consumes a large part of the energy spent in domestic and commercial housekeeping, and adds to the discomfort of persons suffering from respiratory ailments. It can be a serious hazard on highways and landing strips.

Less critical, but universally objectionable, are the fine suspensions of dust and smoke that obscure the detail of distant views. A haze of dust doesn't enhance the appearance of a city, a mountain range, or a star-studded sky. Here we can sympathize with the astronomers. Southern Arizona is a center for astronomical research—mainly because cloud cover is infrequent and because the air has been relatively clear. But smoke and dust are blurring our vision. Much of the suspended material in our semidesert atmosphere is dust kicked up by automobiles, trucks, earth-moving equipment, or farm machinery. Some may originate on sparsely vegetated ranges.

Road systems and traffic control must be improved if the character of semidesert ranges is to be maintained. Heavily traveled roads should be surfaced for dust control. All roads should be designed to minimize erosion. Off-road vehicle travel is particularly destructive and should be eliminated, except perhaps for limited areas designated for such use. Vehicular control

is especially critical near population centers.

This is one area where range managers can help—in the clean air fight. Effective vegetation cover not only helps keep dust out of the air, but also retards runoff and erosion, and helps keep silt out of streams and reservoirs. We don't have all the answers, but we do have more know-how than any other group on the techniques of establishing vegetation on semidesert ranges.

Meeting Society's Needs

Despite apparently unfavorable trends, I think livestock will continue to be produced on semidesert range. I think this for several reasons.

First, much of the semidesert grass-shrub region is rather drab and inhospitable most of the time. Only small, selected areas offer water, shade, or dramatic scenery, although the number of attractive spots can undoubtedly be increased.

Second, the contribution of semidesert ranges to the national food supply, though relatively small now, is important and can be increased. Keller (1970) has theorized that range lands can produce as much as 20 to 40 times the current level. The productivity of many semidesert ranges could be increased greatly by applying current knowledge. We should learn how to increase food production from range lands before the need for such production becomes critical.

A third reason is that livestock can be produced on the range without seriously disturbing the environment. This has been stated very well by Dr. Gerald Thomas (1971). He thinks we should not advocate mechanized agriculture on a world-wide basis. His reason is that, on cultivated lands in the U.S., we expend about 10,000 calories of fossil fuel to produce 3,000 calories of food energy. Thomas doubts that such an extravagant energy budget can be sustained on a world-wide basis. It contrast to cultivated agriculture, animal products from range lands are produced mainly from current, or very recent, solar energy with a very low fossil fuel input.

Finally, and perhaps most important, the semidesert range area provides the livelihood for an important segment of our population. In my opinion, those who prefer to live on the land are better off there. Those of us who do not live on the land will likewise

be better off if ranchers stay on the range. The rancher makes positive contributions to the national welfare through the animal products he produces and the recreational facilities he provides or helps maintain. Furthermore, simply by remaining a rural dweller he avoids adding to people problems that reduce the quality of life in our cities.

How Will We Manage the Range

We now come to the point of how we will manage the range. The key individual, as I see it, will continue to be the rancher. In the future he may well spend more of his time and derive part of his income from services he provides for recreationists. Hunting privileges have become an important source of income to ranchers in such areas as the Edwards Plateau region in Texas. I think this is only the beginning. As recreation begins to contribute to the rancher's income, his management decisions will require consideration of recreation values as well as livestock production. Opportunities for diversification may include dude ranching, guiding hunters, developing stock tanks for fishing, restaurant enterprises, and camping facilities to mention only a few.

In the future we will share the semidesert range with more people. Semidesert ecosystems possess a number of qualities and yield a variety of products that make them desirable for human activity. Our concern here is for those range ecosystems that will continue in extensive uses. Acceptable goals for these areas should include:

1. Enough of the kinds of vegetation needed to control dust and erosion, to optimize production of herbage and browse, to provide escape cover for wildlife, and to provide forage for livestock and wildlife.

2. Esthetically pleasing vegetation patterns, including openings where livestock and game can be seen, and scattered larger trees to break the monotony of the landscape and to provide shade for picnicking, loafing, or livestock.

3. Road and trail systems that allow public access and use without undue damage to the ecosystem.

Let's Tell Our Story

We also have an educational role. The general public needs a balanced view of range ecology and management.

Perhaps the most urgent message we must convey is that range ecosystems are complex and delicate, that ecological problems rarely have simple solutions, and that the solution in one habitat may not work in another. We must provide the public with resource information that is ecologically sound. The sound practice may be less dramatic than the highly publicized pat answer, and harder to sell, but sell it we must.—*S. Clark Martin*, Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Tucson, Arizona.

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