

## Rangeland Weeds and Overgrazing in the American Southwest: An Interview with Michael Gregory (Fall 1985)

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*The plants referred to as “weeds” in this interview are not weeds by an ecological definition; they are introduced species or species that can only exist in disturbed areas. They are called weeds for economic reasons, because they displace forage grasses that are more valuable to the livestock industry.*

Grazing is a dominant economic use of vast acreages in the western United States. The numbers involved are staggering. For example, the Bureau of Land Management administers 174 million acres of public land in 11 western states. Currently it issues permits for 11.5 million animal unit months (AUM, equivalent to one cow and one calf grazing for one month) per year (1). Weed problems on grazed lands are also staggering. Examples include 4 million acres of grassland dominated by cheatgrass (*Bromus tectorum*), 75 million acres by juniper (*Juniperus communis*), and thousands of square miles of closed stands of big sagebrush (*Artemisia tridentata*) (1).

The primary weed problem caused by overgrazing in the southwest is brush invasion. Native brush species are an important component of undisturbed vegetation in the Southwest. However, as land is overgrazed, brushy hardwood species increase in abundance. According to Michael Gregory, there are four important brush species: “In the Sonoran deserts and low elevation rangelands they worry about mesquite (*Prosopis juliflora*), a leguminous hardwood. In the northern (‘cool’) desert, sagebrush (*Artemisia* sp.) is the big one. As you go further east, you’ve got oak. In Texas, it’s shinnery oak (*Quercus* sp.) You also have what they call interior or Arizona chaparral which is indigenous to the mid-elevations in the Southwest. It is primarily an oak brushland (*Quercus turbinella*).”

### The Invasion of Brush

The process by which these species invade is a complex ecological question, according to Gregory. “There’s lots of argumentation about this. What I’m giving you is one point of view, which will be hotly contested. Generally speaking, when you get too many cows in there, they wipe out the grass cover and that’s the beginning of overgrazing. The grasses don’t reseed and weakening of the root structure allows erosion to take place. Those two processes together eliminate the grass because they wipe out both the seed and the conditions for germination. What seed is produced has no place to take root. Most of our soils are hard clay, or sandy, neither of which is conducive to growing seed unless it’s wet and the soil has some humus content. So, when you wipe out the seed bank you don’t get the grasses rebuilding. The deeply rooted brush does grow because it can go down deep for water and doesn’t depend as much on a surface microenvironment. Erosion causes a deeper water table; rainfall runs down the gullies rather than soaking in from the top. That’s an ideal situation for mesquite and other brush. Once this process sets in, it’s exacerbated by the other grazers, especially jackrabbits. Much higher populations of jackrabbits occur in an overgrazed grassland than in a well balanced one.”

These hardwood brush species can be beneficial in some respects. Mesquite, for example “is forage, for both livestock and wildlife because of its high nitrogen content. It’s a nitrogen-fixer, so it enriches the soil. Also, you find that in overgrazed areas the grasses tend to cluster up around the mesquite because the mesquite is thorny and difficult for the critters to eat. Consequently, the grasses can hide underneath it and in many places you’ll find islands of vegetation protected by clumps of mesquite.” These benefits aside, brush species are considered undesirable range species because they do not provide as high quality nutrition, and can out-compete grasses for water. Gregory feels that the situation is “like forestry. It’s a monoculture system they’re trying to set up, all grassland. They try to wipe out anything competing”

Weed problems on overgrazed land have been in the making for over a century. “During the late nineteenth century the herds of cattle in this part of the country were just enormous. Even the cattlemen agree that it was heavily overgrazed. We also had a serious drought hit the west in the 1890’s as part of a global warming trend. At the same time, range fires, that had formerly killed brush and favored grass, began to be controlled. Earthquakes lowered water tables in some areas. All these factors combined to wipe out the grasslands and cause the brush invasion.

“My particular county (Cochise County) was one of the most heavily grazed areas in the west during the 1890’s. Some people have estimated that we had over 100,000 head of cattle in this county alone. This is far more cattle than the land could sustain. On some semi-desert grasslands down here they figure as few as one grazing cow per fifty acres is ecologically sound. We obviously had more than that at one time and in many areas still do.

### Brush, Cattle, and Ecology

“A turn-around came in the forties. The land management agencies, especially the Forest Service, started assessing rangelands closely with the new concepts of ecology that were coming in then. Some of the most serious of the problems were stopped, but obviously not everywhere. In general, the public lands tend to be more overgrazed, especially BLM land, which is probably the worst grazed land in the country. The average density of cattle on BLM acreage in Arizona is three cows per acre and a large percentage of the land is, by the agency’s own calculations, in unsatisfactory condition. The range resource is not viewed as a complete ecosystem in which livestock are invaders, but simply as a source of forage production.

“Currently on some of our National Forest land we figure from 30% to 70% of the land is overgrazed; land that the Forest Service itself says is in poor condition.” In the Coronado National Forest, where Gregory has worked extensively, the Forest Service has calculated that its lands are overgrazed by at least 73,000 AUMs. It has proposed slightly reducing livestock numbers, but they would not be brought within carrying capacity for 60 years or more (2). “Figures in the most recent draft plan propose to end overgrazing sooner, in twenty or thirty years, but only if the federal government increases funding for range management. “

This slow progress toward good grazing management means that weed problems will continue to increase during the foreseeable future. A permanent restoration of overgrazed land would require a significant shift in policy. Gregory said, “The most important step is to get cattle off highly

disturbed areas. Right? And that's something they hardly ever seem to do." It is not sufficient to reduce overall grazing levels without considering special needs of particular areas. For example, "If you have a stream running through 1500 acres, you need some kind of management to keep the cattle away from the stream. Otherwise, it's going to be overgrazed even if you have only one or two cows in there. The stream is what the cattle will hit, so you've got to do some intensive management to keep the cattle out of the areas you're trying to improve. Just cutting down the numbers isn't going to solve the problem if the areas are sensitive. One of the most popular forms of grazing management is called rest/rotation and various versions of that are what are practiced on most grazing lands. However, the rest periods are often too short. The best thing in many cases is just to eliminate the cattle."

### Brush, Cattle, and Herbicides

Herbicides are often used instead of ecologically sound grazing management programs. Gregory explained, "2,4,5-T was the herbicide of choice for most of these ecosystems. Now, they're switching to others, 2,4-D and picloram are very popular for use on sagebrush and chaparral. Tebuthiuron (Spike 80W), a potent nonselective herbicide developed for range use in the Tucson office of the United States Department of Agriculture's Agricultural Research Service (USDA-ARS), is very popular these days all over the southwest. We've been having a lot of conflict with it because we do have a practical alternative, also developed in the Tucson office of the USDA-ARS, Bob Dixon's land imprinter [see NCAP News 3(4):2, "Land Imprinting to Stop Desertification"]."

Citizen's groups in the southwest have challenged herbicide programs based on many of the same arguments that have been used to support pesticide reform in the Pacific Northwest. In addition, there are tactics specific for grazing in the southwest. Stocking levels are an important starting point. Gregory outlined the process. "The way the Forest Service rates the carrying capacity of the land is really pretty good. The science of ecology in this country *began* with range studies. They calculate the amount of the plant that is there to replenish and grow, how much basal area of vegetation there is per yard of land, etc. The formulas are all worked out so we look at their own numbers and see if they're taking their own advice. Usually that works pretty well, and we find that they're not "

Correlated with overgrazing is "soil loss and watershed condition. We look at how much soil loss they're going to have. Only a certain amount is allowed by law and usually they're permitting more than that for the short-term benefit of the cows."

Other problems related specifically to herbicide use in the southwest are caused by residues in the soil and water. "Herbicides settle in stream bottoms. That's a problem here for several reasons. For instance, the streams dry up at certain times of the year. The herbicide is there, in the dust, and can become airborne again. Also, the cattle eat the dirt. A surprisingly high percentage of what actually goes into a cow's belly is dirt because when they go after a plant they're pulling up dirt along with it. They're able to directly convert some of the minerals. So herbicides get into the cattle, and some, like dioxin, have already been shown to accumulate in the beef tissue."

## Brush, Cattle, and Economics

Economics is the strongest argument. Gregory commented, “The cattle industry in the west is not economically viable. On most of the ranges of the west it doesn’t make sense to raise cattle at all because it can only be done with government subsidies.” In 1981 grazing revenues for the federal government were 24.9 million dollars. Costs of range management and payments to local governments in lieu of property taxes totalled 58.5 million dollars. The net loss was 33.6 million dollars (1).

“DeConcini (D-AZ), my Senator, has recently introduced a proposal to make the present grazing fee schedule permanent, meaning that we will continue to subsidize the ranching industry. The argument against the pesticide programs is that if you’re only doing it to protect rangeland, a subsidized industry anyhow, it’s not worth doing. The ranchers should take their cattle to Florida or Kansas, places where it rains and there’s plenty of grass.”

## Footnotes

(1) Ferguson, Denzel and Nancy, 1983. *Sacred Cows at the Public Trough*. Bend, PR: Maverick Publishing Company.

(2) Gregory, Mike and Paul Hirt. 1983. Coronado a Cattle Factory? *Forest Planning* 4(4):10-13.