

NEED FOR ROTATION GRAZING

The idea that overstocking--too many animals--is the main cause of range deterioration has long prevailed. This idea developed from the grazing history of the western range. Grazing was started in the 1860's and 1970's and in a short period of 20 to 30 years extensive areas were heavily depleted.

(The Western Range 1936) The major finding of this report--at once the most obvious and obscure--is range depletion so nearly universal under all conditions of climate, topography, and ownership that the exceptions serve only to prove the rule.

The existing range area has been depleted no less than 52 percent from its virgin condition, using depletion in the sense of reduction in grazing capacity for domestic livestock. Practically this means that a range once capable of supporting 22.5 million animal units can now carry only 10.8 million.

Excessively large numbers of livestock had been grazed on the ranges for as long as possible each year. It seemed obvious that the range deteriorated because of overstocking.

"White man allowed too many of his grazing animals to use the range. He overstocked the range almost from the start. How else explain the depletion of the range by more than half? (The Western Range, 1936)."

So what to do to prevent further deterioration of the range.?

(The Western Range, 1936) First and by all odds most important, the reduction of stocking to the actual present grazing capacity. Since present stocking of the entire range area, now 17.3 million animal units, is 60 percent in excess of its estimated capacity, it will have to be reduced by about 6.5 million animal units.

The guiding principle should be stocking year after year with the number of animals which each unit will support each season without injury to the range. The outstanding need for restoration and the wide fluctuations of climate and hence of forage production require conservative stocking for satisfactory results, and this under most conditions should leave from 20 to 30 percent of the palatable growth of the important forage plants during average years. In addition, stocking should be low enough to prevent injury to watersheds and tree growth, and should be properly correlated with wildlife and recreational requirements.

These recommendations imply that the range can be maintained under continuous grazing if stocked with some proper number of animals, some moderate number. Put another way, it has been believed that a range could carry a given small or moderate number of livestock year after year without injury to the range--that it had grazing capacity for such numbers.

These views have been widely held by many from the earliest days of grazing to the present time.

Jardine and Anderson (1919) "Grazing capacity, as used here, means the number of stock of a given class or classes which a range unit will support for the period of grazing allowed. The ideal sought is the maximum number of stock which the unit will support each season over a period of years without injury to the range tree growth, or watershed, or unwarranted interference with game and recreation. If this ideal is to be realized, both overgrazing and unnecessary undergrazing must be avoided."

Stoddart, Smith and Box (1975) "Grazing capacity, then, has come to be regarded as the maximum animal numbers which can graze each year on a given area of range, for a specific number of days, without inducing a downward trend in forage production, forage quality, or soil."

They gave rise to the proper or moderate stocking, continuous grazing system of grazing management. This is the most widely accepted and practiced grazing system in the western United States. It is currently employed on the Tuledad-Home Camp Area.

Livestock numbers have been reduced greatly on most ranges since peak numbers were grazed. On the project area, for example, from an estimated 65,000, and probably more, to ^{about} 8,000 at the present time. Stocking is moderate and even light in many cases yet the more accessible and usually the more productive areas on the range are continuing to deteriorate. This results from the unalterable grazing habits of livestock. Livestock graze the range selectively, by species and areas. They consistently graze the more

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palatable plants and accessible areas closely and, invariably, beyond proper-use level. The pattern of use is very uneven, but much the same from year to year. Plants grazed closely one year tend to be grazed closely the next. So under continuous grazing at any stocking level, the more palatable and accessible plants are gradually killed out. Livestock then graze on less desirable plants. This process leads progressively to ever enlarging areas of deterioration. Unfortunately, the best plants and best grazing sites are destroyed first.

The problem posed by selective grazing is illustrated in figures _____. Close cropping on such sites is unavoidable. With continuous grazing the more palatable plants are killed out gradually and replaced by less desirable ones. In the process the plant cover is thinned and soil erosion occurs.

Clearly there is no way of maintaining vegetation on such sites under continuous grazing at any stocking level. But it can be done if the range is periodically rested from use and plants are provided opportunity to grow and reproduce without interference.

Clues to how a desirable plant cover can be restored and maintained as the land is grazed by livestock come with understanding how the vegetation is deteriorated with the type of grazing used on the Tuledad-Home Camp area in the past--namely continuous grazing.

Damage with continuous grazing results basically from the grazing habits of livestock. They graze certain preferred species and areas closely and regularly in about the same way from year to year. With such use the plants die ultimately because of the lack of food. Then other less preferred plants are grazed leading in time to larger and larger areas of deterioration. The grazing habits of livestock are unalterable. There is no way of controlling the degree of use of species and areas while the land is grazed.

The problem of grazing management is posed in figure —. How can the vegetation on such sites be restored as the land is grazed. Even with light stocking such sites are over utilized. The only way the vegetation can be restored is by periodically resting the area from use and allowing natural forces to hold sway and effect re-vegetation.

The cause of vegetation deterioration under livestock grazing use therefore is not heavy stocking as commonly thought but continuous grazing. The vegetation cannot be maintained with the lightest stocking under such use. But it can be maintained with the heaviest stocking if the vegetation is rested from use periodically so the plants have opportunity to grow and reproduce normally. Such rest is provided objectively with rest-rotation grazing.

of vegetation on such sites is unavoidable under continuous grazing. The grazing habits of livestock and resulting problems created with continuous grazing have pointed out repeatedly by many who have observed range conditions () () () ().

Destruction of the better plants and sites is accepted as inevitable under proper-use management:

Just as there are certain sacrifice areas, there are also some sacrifice plants--species with high animal preference but never abundant in the stand. These "dessert" or "ice cream" plants are usually killed out when the hardier, more abundant, and somewhat less highly preferred key species are properly utilized, a fact that entails little economic loss (Sampson, 1952).

Though small in acreage wet meadow, riparian and basin aquatic types on the Tuledad-Home Camp Areas are exceedingly valuable for wildlife, livestock grazing, recreation and esthetics. Under the proper use continuous grazing concept they classify as sacrifice areas.

Can such sites be grazed by livestock and at the same time improved? The answer is yes, simply by resting the range from use periodically so plants can complete their life functions normally. In this way maximum production of vegetation and highest yield of all renewable resources can be realized.

THEORY OF CONTINUOUS MODERATE GRAZING

Most people, including scientist, stockmen and others have firmly believed that the basic cause of range deterioration is over stocking, too many animals-- "White man allowed too many of his grazing animals to use the range. He overstocked the range almost from the start. How else explain the depletion of the range by more than half? (The Western Range, 1936). -- and that the range can be maintained by grazing with a moderate number of animals and paying proper attention to the season of grazing, the kind of animals grazed and livestock distribution measures such as riding, herding and salting. Emphasis has been livestock numbers.

From the earliest days of grazing to the present time it is believed that the range can be maintained by grazing with some proper number of animals.

Jardine and Anderson (1919)

Grazing capacity, as used here, means the number of stock of a given class or classes which a range unit will support for the period of grazing allowed. The ideal sought is the maximum number of stock which the unit will support each season over a period of years without injury to the range tree growth, or watershed, or unwarranted interference with game and recreation. If this ideal is to be realized, both overgrazing and unnecessary undergrazing must be avoided.

Stoddart, Smith and Box (1975)

Grazing capacity, then, has come to be regarded as the maximum animal numbers which can graze each year on a given area of range, for a specific number of days, without inducing a downward trend in forage production, forage quality, or soil.

Clearly the vegetation cannot be maintained over the entire range areas on preferred grazing areas and all, with continuous grazing at any stocking rate because of the selective grazing habits of livestock. But the vegetation can be maintained even on the most heavily grazed areas if it is periodically rested from use.

Cause of Range Deterioration

*Some of this published
But continuous grazing may not
pinpointed as the cause of
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--and that the range can be maintained by grazing with a moderate number of animals and paying proper attention to the season of grazing, and other livestock management measures. This led to the belief that the range could be grazed continuously and maintained if it was grazed with some moderate number of animals. This idea has prevailed over time and led to the continuous moderate system of grazing -- the most widely accepted and practiced grazing system in the west.

But overstocking, too many animals, is not the basic cause of range deterioration. Rather it is continuous grazing. Assumption that plants can be grazed to a proper level through regulation of stocking is unrealistic because of the grazing habits of livestock. Livestock graze the range selectively, by species and areas. They consistently graze the more palatable plants and accessible areas closely and invariably, beyond proper use level. The pattern of use is very uneven, but much the same from year to year. Plants grazed closely one year tend to be grazed closely the next. So under continuous grazing at any stocking level, the more palatable and accessible plants are gradually killed out. Livestock then graze on less desirable plants. This process leads progressively to ever enlarging areas of deterioration. Unfortunately, the best plants and best grazing sites are destroyed first.

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Hormay (1970)

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The selective grazing habits of livestock and the damage from them with continuous grazing have long been recognized.

Roth (1901)

"Cattle. The cattle prefer the open parks, usually along the creeks; they dislike the denser woods, rough and steep ground, and high elevations. They feed chiefly on grass and refus weeds, and take little browse (except in some of the southern reserves). Cattle feed less closely than sheep, and being free, each animal travels only when it wants to, mostly to and from water. They use much less of the entire area of the reserve, and take only a portion, often the smaller portion, of the feed.

That cattle do no damage at all, as is so often claimed, is not true. Cattle cut trails on all hillsides, particularly in the vicinity of water. They are filthy about watering places, standing often for hours in and about the water and trampling many springs into unsightly mires; occasionally they browse; they bark trees by rubbing, and they naturally trample seedling trees, just as any other animal would. Being loose footed, there should be less trampling; but this is not always the case, since cattle by their very laziness are apt to stay more persistently on any given small area. That cattle do less harm to the range is only partly true. They crop it less closely, but choosing only grass and leaving the weeds, many a cattle range has been changed into a 'weed patch.' That overgrazing and consequent increase of all injuries is possible with cattle as with sheep is self-evident, and has been fully established on a number of ranges."

Roth (1901)

"Sheep. In a fresh camp the sheep spread out at once in the morning and feed away from camp. But after some nights of bedding in the same spot, the ground about the camp ceases to have palatable feed, and the sheep merely travel over it, usually in a dense body, with from 10 to 50, traveling in the characteristic single file. This soon cuts the ground and grass along definite lines, and in a couple of weeks there are dozens of rut-like trails leading in all directions from the camp. This naturally grows worse, and each day sees more of this cutting of trail than the preceding, since the distance becomes greater and greater. That this evil is worse with larger bands than with smaller ones, and that it is worse on the poorer and closer-cropped ranges and during unfavorable seasons, is self-evident."

Duce (1918)

Cattle. "To every explorer in the arid canon country of southern Colorado the steep-walled arroyo trenched in the center of the flat alluvium bottom is a familiar sight...The development of these arroyos seems to have been contemporaneous with development of ranching...

"Cattle make trails along the line of easiest passage, usually the center of a canon...Their trails grow rapidly and the writer can recall many which are five feet wide and a foot and a half deep. These trails effect erosion in two ways. First they form channels for the passage of water; second because of the absence of vegetation they form channels of easy erosion. Their compact surfaces are also hard places for the water to sink into the soil...

"The influence of cattle on the vegetation of canon bottoms as a whole is rather difficult to estimate, yet it must be considerable. The writer has seen in canon pockets inaccessible to cattle deep grass so matted and tangled as to preclude any thought of erosion and cause maximum absorption, while in the same canon where the cattle have ranged, the bottom is nothing but a trampled field of dust which offers maximum opportunity for erosion and minimum opportunities for absorption...We may, therefore, summarize the effect of cattle by saying that they increase the rapidity of the run-off and the rate of erosion by destroying vegetation, by compacting the soil and forming channels for the passage of water."

Larin (1962) Russian observations

Cattle. "The most radical change in the plant composition of the pasture is directly caused by grazing...A strong species selection occurs on pastures as the result of the various degrees of palatability of the plants. The highly palatable plants are the first to be taken; even their aftergrowth, when produced, is preferred by the cattle to other plants on the pasture. When there is a sufficient quantity of these plants and of their aftergrowth, the other plants, which are slightly less palatable, and especially those which are only palatable to a small extent, remain practically untouched.

"Numerous experiments have shown that after three to four years of grazing the plants of high palatability, which are consumed four to five times per summer (six to seven times in the forest zone), either perish or become very considerably thinned out. At the same time the density of the plants of medium and low palatability increases. The next step is that those of medium and low palatability disappear from the grass stand, and finally, even those which are least palatable are eaten. Only the completely inedible perennials remain on the pasture, or those plants of high palatability which have a rapid seed formation in spring, or plants with procumbent leaves (often rosetted) and shoots...At the same time, a great quantity of annual plants appear on the pasture. These plants are better adapted to a compact and desiccated soil horizon...

"It is natural that under conditions of free grazing, when the grazing is begun in spring, the animals begin by eating up the youngest, most tender and sweetest grasses...When the spring is sufficiently warm, these plants, which are cropped by the cattle during the very first days of grazing, will grow back to a height of seven to ten cm after seven to eight days. These new, freshly-grown plants (aftergrowth) are usually greener, more succulent, and more nutritious than the plants which have not been cropped. There are, therefore, given preference by the animals and are eaten first...Under free grazing conditions, plants cropped during the first seven to ten days of grazing can be used three to ten times per summer. As has been pointed out earlier, plants which have been cropped frequently show a decline in yield as early as the following year; on the third to the fifth year they perish completely."

The grazing habits of livestock are unalterable and destruction of plants on certain areas unavoidable with continuous grazing under any stocking level. The problem that has not and cannot be solved with continuous grazing is illustrated in figures _____ and _____. But plants, even the most palatable and closely grazed can be maintained on such areas if the range is rested from use periodically long enough for plants to grow and reproduce normally.

1 Proper use standards defining the proportion of the plant crown
2 that can be removed without interfering with the normal growth of
3 the plant have been established for many species from clipping
4 and grazing studies. Proper use values range from about 25 percent
5 for some species to as high as 75 percent for others. However, no
6 way has been found to get livestock to graze the various forage
7 plants on the various range sites to proper use standards or less.
8 No combination of stocking rate, season of grazing or livestock
9 distribution measures has prevented close use of palatable species
10 on preferred grazing areas. This^{has}/led to the view that destruction
11 of the more palatable forage plants on choice grazing sites is
12 inevitable. This thought has been expressed as follows: "Just
13 as there are certain sacrifice areas, there are also some
14 sacrifice plants--species with high animal preference but never
15 abundant in the stand. These 'dessert' or 'ice cream' plants are
16 usually killed out when the hardier, more abundant, and somewhat
17 less highly preferred key species are properly utilized, a fact
18 that entails little economic loss." The question may be asked,
19 after the ice cream plants are destroyed what is sacrificed
20 next?

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