Pasture Management

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There are many variables related to determining the number of animal units (AU) that can safely graze a pasture over time without causing damage to the soil or other natural resources. Some of the more important factors to consider include: soil type; climate; plant composition; type and age of livestock; topography (aspect and slope); water availability; presence of sensitive areas (unstable slopes, endangered species, wetlands, etc.); overall site condition; and grazing system/livestock management.

SOIL TYPE

Not all soils were created equal nor are all soils suitable for intensive grazing use by domestic livestock. In general, sandy soils produce the least amount of forage and clayey soils produce the largest quantities under proper management. Soils that have a low inherit fertility, are shallow or easily eroded will require special attention and may only produce enough cover to protect the soil and help prevent competition with undesirable weeds and toxic plants.

CLIMATE

Annual rainfall amounts and distribution patterns are extremely important in determining carrying capacity. Forage production is very low during periods of drought or in years when most of the rainfall occurs at the beginning of the season. Late season rains on the other hand usually produce higher forage yields although sometimes limit the number of livestock that can safely graze a wet spring pasture. Climate also plays an important role when pastures are irrigated. For example, less water is needed and applied in favorable rainfall years and more water is necessary in low or unfavorable rainfall years. In years of drought, it may not be possible or economically feasible to irrigate pastures when water is in short supply. Livestock herds will need to be adjusted accordingly.

PLANT COMPOSITION

Managing pastures for the most desirable plant species for grazing can sometimes take several ears to fully establish. Ideally, combinations of early and late maturing annual and perennial grasses and legumes planted in different pastures will offer the rancher the most options. Simple mixtures of grasses combined with one or two legumes produce as much or higher quality forage than complex mixtures. Simple mixtures also simplify grazing management, which is important in keeping up production, desirable plant composition and dense ground cover. In some cases, pastures may need to be established from scratch or reestablished depending on previous land uses, existing plant composition, amount of undesirable plants and overall site conditions. Brand new pastures can be very expensive to establish and can take up to a year before they are ready to graze. Grazing intensity on new or reestablished pastures should be gradual and in concert with a proven grazing system.

LIVESTOCK

As with soil, not all livestock were created equal nor do they use the pasture resource in the same way. One animal unit (AU) is equivalent to one mature cow weighing up to 1000 pounds. Other livestock equivalents are as follows: one horse = 1.2 AUs; one sheep = 5 per AU (6 per AU if goats are under the age of one year). Horses, sheep and goats can graze plant materials closer to the ground because of the nature of their mouths, tongues and/or teeth. Goats are mainly browsers, and although they do not tend to graze continuously, as cattle do, they can still overuse a pasture if not properly managed. In general, livestock will consume about 2-3 pounds of

dry weight forage per day per 100 pounds of body weight after they are weaned.

TOPOGRAPHY (Aspect and Slope)

The steepness of the terrain and slope orientation to sunlight or aspect has a direct relationship to the productivity of the pasture. For example, south facing slopes that get more sunlight generally produce better than north facing slopes that generally get very little sun and have more brush and tree cover. The steeper the terrain the lesser likelihood that livestock will graze or graze evenly. Steeper slopes usually produce less forage because soils are usually shallower, and they have a higher hazard of erosion. Livestock herds need to be managed accordingly on hillside pastures so that they do not cause damage to slopes or soil.

WATER AVAILABLITY

All livestock operations require ample water supplies to support the intended livestock herd. Horses and cattle need approximately 10-15 gallons of water per day per head while sheep and goats only require about 2-3 gallons per day per head. It takes a large amount of water to irrigate pastures and keep grasses green and growing throughout the year. Irrigated pastures along the Central Coast area of California normally require an application rate of 2-3 inches of water every 10-14 days during hotter weather and less during cooler weather. Most soils cannot take water at a rate higher than 0.3 inches per hour and therefore sprinkler systems should be designed to deliver 3 inches of water over a 12-24 hour period. A sprinkler discharge of 7.5 gallons per minute will apply 0.3 inches of water per hour. If sprinklers are spaced at 40-foot intervals, then there would be 9 sprinkler heads in each acre applying 67.5 gallons per minute per acre or 4,050 gallons per hour per acre for 10 hours within the 12-24 hour period. This is equal to 40,500 gallons of water being applied to each acre irrigated every two weeks or so throughout an irrigation season that lasts approximately 5-6 months. Using an average of 10 irrigations taking place during that time period and realizing that some applications will not be as much because of variations in climatic conditions, soil type and other factors, it can take as much as one acre foot of water (326,000 gallons) to keep one acre of pasture irrigated throughout the dry season. It is important to point out that additional irrigations (as many as 5 in the first 30 days) will be required for any brand new pastures being established. In addition, livestock should be deferred from grazing pastures during irrigation. Animals may return to graze 2-3 days after irrigation.

PRESENCE OF SENSITIVE AREAS

If sensitive wildlife areas or other important biotic communities exist within pasture areas or areas accessible to livestock then special provisions may be necessary to insure that these areas are protected. On some ranches, sensitive areas will need to be fenced out and may significantly reduce the total number of acres that livestock are able to graze. Other sensitive areas of concern include unstable slopes, eroded gullies and ravines that present a hazard to livestock and a likelihood of getting worse if accessible to livestock. Other areas such as riparian areas and important water bodies, may also be off limits to livestock.

OVERALL SITE CONDITIONS

Previous land uses and land management practices are important factors to evaluate when planning a grazing system and determining future conservation needs and pasture management objectives. Past land use practices have caused serious damage to soil and plant resources in some areas requiring a great deal more time, expense and effort in maintaining pasture production levels and/or preventing more damage from occurring to the natural resources. In some cases, the damage has been so severe that the land is rendered useless for grazing or for any other type of farming activity. A prime example of this sort of land abuse is found along the San Mateo County coastline. Hundreds of acres have been destroyed from poor farming practices and land use activities over the years reducing or completely eliminating the economic suitability for farming or livestock production. Existing surface drainage and storm water runoff patterns is a site condition often neglected in the planning stages of pasture development. Intermittent drainage swales, low spots, roads, livestock trails, impervious surfaces such as roof tops or pavement and other areas that might increase, divert and/or concentrate runoff should be evaluated and addressed to prevent future drainage and erosion problems and damage to pasture areas.

GRAZING SYSTEMS AND LIVESTOCK MANAGEMENT

Continuous grazing is probably the most common and

least effective method of livestock management. This can be a serious problem because livestock are selective in the plants they graze, including goats. They also tend to concentrate around watering facilities and feeding areas when left in large open fields. Under continuous use, these areas almost always become overgrazed and damaged by the animals. Grazing management by some form of pasture rotation is a common and desirable technique for smaller pasture operations (Note: a small pasture operation in this context is considered to be something less than a thousand acres). Pasture rotation provides an opportunity for the pasture to rest after grazing use, and allows the manager to irrigate part of the pasture while livestock are grazing somewhere else. Care should, however, be taken not to place too many animals on too little pasture. Overgrazing, soil erosion and damage to the plant community is almost certain if livestock numbers are increased and not closely monitored. Grazing and resting plants on pasture land in a planned sequence gives the more desirable plants a chance to regrow, compete and multiply, thus gradually increasing the amount of high quality plants available per acre. This improved pasture condition increases livestock production, reduces soil erosion and helps to conserve water. By resting pastures, you can also allow overgrazed areas to become productive. The design of panned grazing systems vary somewhat because of the variables explained above, but no matter what system that is selected the end result will be the same, that is, a pasture that is more productive and can sustain more animal units for a longer period of time.

COMMONLY ASKED QUESTIONS

How many animal units can be sustained on one acre without supplemental feeding?

This is a very site-specific question. There are too many variables involved to come up with an exact number. There is, however, a rule-of-thumb valve that is sometimes used by range and soil conservationists to help them estimate the number of animals a rancher can safely manage when there isn't good data or information on determining factors listed above. In general, a "good" irrigated pasture is capable of supporting about 1½ animal units (without supplemental feed) per acre for the size month grazing period, usually between mid March and mid September, stocking rates can be gradually increased over time anywhere from 10-200% depending on the level and intensity of management, skill and knowledge of the pasture manager, the grazing system selected, the amount of supplemental feed that is provided and actual site conditions, including all the variables listed above. Keep in mind, that livestock numbers would need to be significantly reduced, or completely removed from some pastures, during the winter months when plant growth is slow, soil is wet and prone to compaction and soil erosion. Forage production on the best pasture/range site soil can be as much as 4500 pounds per acre per year under the most favorable, non-irrigated conditions on the Central California coast. Available forage to livestock during the grazing season would be approximately 3500 pounds on the best soil because 1000 pounds must be left for erosion control, seed source (if animal grass) and to prevent the invasion of undesirable plants. In addition, even in heavily utilized pastures, there is forage left virtually untouched (approximately 10%) because it is where manure has been or it's unpalatable for one reason or another.

ANIMAL WASTE

Spreading livestock manure onto irrigated pastures will provide nitrogen, phosphorus, potassium, sulfur and other nutrients in varying amounts. Generally, manure application can be expected to stimulate grasses to a greater degree than legumes. Plants growing around livestock droppings are often unpalatable. Spreading these droppings with a harrow, before irrigation, will help improve forage quality. If animal manure amounts are so great that spreading causes plants to be smothered and/or otherwise become surrounded by rank forage then grazing livestock may in fact avoid the grass all together. An excess of manure, coupled with poor natural drainage and/or inadequate drainage management could cause a water quality problem and an environmental health concern. Contamination of groundwater source is a very site-specific issue. If the pasture(s) in question are in a groundwater recharge area then there is a likelihood of groundwater pollution if these areas have been spread with manure and other conditions are present that would allow for nutrient infiltration into groundwater supplies. County Environmental Health Services might be better source of information pertaining to the affect animal waste has on groundwater supplies when it is incorporated into the soil.

EROSION

Soil erosion usually occurs when vegetative cover is removed and soil is left unprotected during the winter months. Soil erosion in pastures is usually the result of poor grazing management. Over stocking a pasture and allowing livestock to graze forage down to bare ground is probably the single fastest way to destroy the pasture and soil resource. Livestock can be very disruptive to soil in other ways as well. If animals are allowed to graze during periods of irrigation of heavy rainfall they can compact the soil ad destroy plant cover. Livestock trails can also cause the soil to erode specially on steeper slopes where runoff water finds its way into the ruts that are formed by the animals. Areas along water courses such as streambanks are particularly susceptible to erosion caused by livestock, especially if alternate watering facilities are not adequate., Riparian areas are also prone to overuse by livestock seeking shade and riparian growth to browse on. If livestock are not well distributed over the pasture the likelihood of overgrazing and potential for soil erosion becomes greater. Other areas that have the potential for erosion include paddocks, access roads, parking areas and adjacent fields where runoff from these unprotected surfaces is increased and concentrated. Houses, barns and other buildings and impervious surfaces also increases and can concentrate runoff increasing the hazard for erosion. Drainage control provisions should be included in all existing and future development plans for buildings, roads and other development. These provisions should indicate how increased runoff will be controlled so that soil erosion does not occur. Some riparian areas may need to be fenced out and any existing erosion should be treated so that it does not get worse. Eroded areas small in size can be regarded, seeded and deferred from livestock. Additional treatment may be necessary if the erosion is in the form or gullies and or exists on steep slopes. Selecting and maintaining a planned grazing system that meets the conditions of the site and the rancher's objectives is one of the best ways to manage the soil, and all related natural resources that may be impacted by the grazing of livestock.

What is the maximum percentage of food derived by supplemental feeding before the operation would no longer be considered a grazing operation and be more of a feedlot?

Generally speaking, livestock operations that involve the containment of a large number of animals (usually cattle), in a relatively small area, that derive 100% of their feed from a supplemental source, are, by definition, "feedlots". Containment areas are usually completely denuded of vegetation and require daily management of manure. If grazing intensities and/or stocking rates were such that pastures could not be sustained, even if all food supplies were supplemented, and the livestock completely consumed or destroyed all of the vegetation and caused soil compaction, as is the case in "feedlot" operations, then you would probably have a "feedlot" situation.

What is the impact on the maximum number of animal units per acre from rotating the animals from one pasture to another?

As mentioned above, stocking rates can be gradually increased when a proven "graze-rest" type grazing system is employed by a skillful manager provided site conditions are desirable. The maximum number of livestock, under conventional continuous grazing management, could be increased 2-3 times, but only during the dry season using a sophisticated grazing management system in combination with supplemental feed, paddocking and irrigation. Rotational grazing type systems are more efficient and cause less impact on the soil and other natural resources.

The Livestock and Land program is operated through a partnership between Ecology Action and the Resource Conservation Districts of Santa Cruz, San Benito and Monterey Counties. For more information, visit www.livestockandland.org or call 831.426.5925 x 132.

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