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UNDERSTANDING WORKING RANGELANDS

Grazing Systems Management

ACHIEVING MANAGEMENT GOALS BY BALANCING LIVESTOCK GRAZING WITH TIME AND SPACE

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The earliest grazing systems date back to the domestication of livestock. Nomadic herds men moved livestock from one range site to another, probably following the patterns of forage quality and quantity and the availability of water. Grazing systems became more structured, employing fencing and developed water, over 500 years ago in Europe, when human population pressures demanded greater productivity from agricultural land.

Early ranchers in North America herded or turned livestock loose across open range. Without fences and with natural sources of water found only in limited locations, livestock moved from one site to the next based on the availability of forage and water. The invention of barbed wire in the late 1800s led to better control of livestock and the development of grazing systems in North America. Specialized grazing systems, such as rotation of grazing between pastures, were first conceptualized before the turn of the twentieth century (Smith 1895) and became a focus of range researchers and managers



Photo: Lawrence Ford

Working rangelands are public or privately owned open space lands that are managed with livestock grazing and rancher stewardship. Their management contributes to the production of a variety of ecosystem services, including: food, clean water, weed control, wildlife habitat, fire fuel reduction, carbon sequestration, pollination, aesthetic views, cultural heritage, recreational and educational opportunities, and open space conservation.



by the 1950s (Holechek et al. 1998). Today's livestock producers use a variety of grazing systems, ranging from very simple to complex, to achieve their management objectives.

The textbook definition of a grazing system is “the arrangement of grazing and non-grazing periods within the maximum feasible grazing season” (Vallentine 1990). Practically speaking, most ranchers do not use the term “grazing system,” but they often use some systematic and recurring strategy of grazing and non-grazing periods and movement of livestock during the grazing season.

The grazing season is the period during a year when grazing is feasible or practical. In the San Francisco Bay Area and other low-elevation rangelands of California dominated by annual plants, the grazing season is typically year-round, whereas in mountain areas where it snows, the grazing season is usually limited to summer. The Bay Area grazing season begins in the fall, when the first rains initiate the germination of annual plant seeds and growth of the scattered perennial grasses after their summer dormancy. The green-up progresses as the annual plants grow slowly until about February; then, with warmer weather, they grow rapidly for 6 to 12 weeks. They are usually mature and dry by late May (George et al. 2001a). The cycle begins again with the first good rain in the fall of the next year.

Although both the grazing season and the growing season of annual rangeland begin in the fall, the grazing season may continue through the summer after plant growth has stopped and plants

dry due to lack of soil moisture. Ranchers grazing year round must manage their rangeland so that enough dry forage is left in fields at the end of the growing season to sustain livestock through the dry season. Many ranchers also feed supplements including hay to pregnant and lactating mother cows in late summer and early fall, when the dry grass is not nutritious enough to sustain them (George et al. 2001b). Livestock that aren't supporting offspring can be maintained on dry standing forage but may lose weight and drop body condition (Renquist 2005).

When properly implemented, a grazing system can help ranchers achieve management objectives related to rangeland forage and livestock production as well as conservation and ecosystem services. It is unlikely that there is one “best” grazing system for all properties or ranchers. Determining the best grazing system for a site should be based on

- the type of vegetation being grazed
- management objectives for the site (e.g., systems that require a lot of fencing may interfere with wildlife movement)
- livestock species and class
- evidence that a particular system will be able to achieve all or most of the objectives
- considerations of trade-offs or risks associated with a grazing system

- practical considerations, such as the availability of water and fencing
- costs of labor and materials for improvements and implementation

Most grazing systems are built upon the following systems, which can be used individually or combined.

CONTINUOUS GRAZING

Continuous grazing, the simplest grazing system, is very common in low-elevation California. With continuous grazing, animals have free access to the entire field or property year round or for a defined grazing season (Heady 1961). Multiple fields in a site may separate different groups of animals, but if the animals are not rotated, they are continuously grazing within each field. Alternatively, an entire property can be composed of one field that is continuously grazed. This system is easy and inexpensive to implement and is feasible and effective in most situations. It is often the best choice unless there is strong evidence that a more complicated grazing system will more effectively achieve the grazing objectives. Continuous grazing at moderate stocking rates on annual rangelands should result in a patchiness of grass height and density, providing a heterogeneous vegetation structure that can maximize individual animal performance as well as habitat diversity (Ratliff 1986; Briske et al. 2008).

With continuous grazing, the stocking rate must be light during the growing season relative to available forage, because adequate dry forage must remain to carry animals through the dormant or dry season and into winter if the animals will be present during those seasons. Even under a light stocking rate, one problem under continuous grazing is that livestock have preferred grazing areas. These areas are typically in close proximity to water, shade, or supplemental feed (Holechek et al. 1998). Excessive use in preferred areas can be minimized with improved livestock grazing distribution through herding or strategic placement of attractants, such as water development, mineral licks, or supplemental feed (George et al. 2007).

SEASONAL GRAZING

Seasonal grazing takes place on a particular site for only part of the year. Seasonal grazing can be continuous or rotational within the season of use. In the Bay Area, most grazing systems on private ranches are year round rather than seasonal. Seasonal grazing is sometimes prescribed on public lands or to achieve a specific objective on lands owned by private land trusts, to avoid recreational conflict, or where access to forage is limited by lack of livestock water or by the presence of snow or inundation. Seasonal grazing may also be used to minimize the time livestock will spend on the property.

A stocker calf operation, using weaned calves grazing pasture or rangeland or being fed forage, is usually most suitable for properties requiring a seasonal grazing system. A cow-calf operation, which is the backbone of the U.S. beef industry and the most common beef operation in California, is highly dependent on year-round rather than seasonal grazing because the mother cows must have somewhere to live all year (see the publications *A Year in the Life of a Beef Cow* and *Bay Area Ranching Heritage* in the “Understanding Working Rangelands” series).

ROTATIONAL GRAZING

Rotational grazing systems rely on more than one field, with animals moved between fields depending on forage condition and availability or based on other objectives. Rotational grazing systems are generally more expensive to implement and operate than continuous grazing because they require more fencing and watering locations and more time to operate. Rotational grazing has many forms and can work well in circumstances such as irrigated pastures, seasonally wet meadows, fields with special habitat, sets of fields with differing plant composition, and when the needs of a diversified livestock operation must be met.

SEASONAL SUITABILITY GRAZING

Seasonal suitability grazing (Holechek 2004) describes the way many ranchers manage grazing and forage. It has a flexible rotation schedule that fits the needs of the ranch operation. Often, the ranch is subdivided into several pastures that are used in a flexible rotation,

taking advantage of available forage, available water, shade, or other characteristics of a pasture. Sometimes the ranch is subdivided into different vegetation types, such as fencing off meadows from uplands. It may include installation of riparian pastures so that riparian areas can be managed separately. A few ranchers accomplish rotation without internal fences. Instead they have several water troughs and rotate by alternately opening and closing (filling and emptying) the troughs, forcing the animals to move for water.

HIGH-DENSITY, SHORT-DURATION GRAZING

High-density, short-duration grazing, also known as the Savory grazing system, as practiced by followers of Allan Savory as part of “holistic resource management,” is a type of rotational grazing that uses frequent rotations through multiple fields. In this grazing system, high numbers of livestock graze each field or area within a field for a short time before being moved to the next one. Animals may be moved as often as several times per day. Rotational grazing systems can adhere to this high-density management, or they can use lower numbers of animals per field and less-frequent movement.

Holistic resource management (HRM, started by Allan Savory and taught in the Ranching for Profit school, www.ranchmanagement.com/school/school.html) of rangeland and other natural resources has some of its origins in the science-based model called ecosystem management (Peine 1999). The term “ecosystem management” is also used by advocates of HRM and is often coupled with the Savory grazing system. Many people concerned with rangeland management wrongly equate HRM with the Savory grazing system described above. Most of HRM is about planning, setting personal goals, and decision-making in addition to the practice of high-density short-duration grazing.

Claims about improved forage productivity, soil health, and biodiversity of the high-density, short-duration grazed grasslands are largely unfounded (Briske et al. 2014) and may neglect the special habitat management needs of individual or groups of endangered species, as is required by regulatory agencies. High-density short-duration grazing can also present some risks to resource conservation on California annual rangelands related to biodiversity requirements

for structural heterogeneity (varying vegetation heights), increased soil erosion, and, if the timing is not right, increased pest plants. A more prudent approach to any specialized grazing management is to address each component of the ecosystems present and target the grazing timing and intensity to key locations for desired control or benefit of groups of similar components.

REST AND DEFERMENT

Deferment is the delay of initiation of grazing, usually after the beginning of the grazing season, to achieve a specific management objective. Deferment is sometimes used to enhance seed production of perennial grasses where seed availability is a limiting factor for establishment of new grass plants (George et al. 2013). Deferment can also be used to enhance habitat such as riparian areas or bird nesting habitat during critical periods. Rest is similar to deferment. In the western United States, rest has been defined as taking place for a year or longer (Howery et al. 2000), but “rest” can be used interchangeably with “deferment” to simply mean any time between grazing periods.

TARGETED GRAZING

Targeted grazing is the intentional use of a specific kind of livestock at a determined season, duration, frequency, and intensity to accomplish defined vegetation or landscape goals (Launchbaugh 2006). Goats are often used for targeted grazing, but cattle and sheep are used as well, depending on the landscape goals, the site, and availability of livestock. The concept of targeted grazing has been around for decades and has been called prescribed grazing, spot grazing, and managed herbivory. The main difference between good production grazing management and targeted grazing is that targeted grazing emphasizes managing livestock as a service for vegetation control and creating desirable landscapes over the purpose of livestock production. For example, strategic application of increased stock density may be used to manage weed populations (Launchbaugh 2006; DiTomaso et al. 2008) or to reduce smaller-diameter wildfire fuels in strategic locations (Nader et al. 2007).



SUMMARY

Annual rangelands in California, including those in the San Francisco Bay Area, have traditionally been managed with year-round continuous grazing. At an appropriate, moderate stocking rate, this grazing use has produced desirable results: specifically, a heterogeneous landscape that not only optimizes individual animal performance but also provides for a variety of ecosystem services such as wildlife habitat and watershed management (see the ANR publication *Benefits of Grazing* in the “Understanding Working Rangelands” series).

FAQs

- Q. How is seasonal grazing different from rotational grazing?
- A. Seasonal grazing means that grazing occurs only during part of the year on a given site; it should be contrasted with year-long grazing. Rotational grazing involves movement of animals between various fields as contrasted with continuous grazing, where no animal movement occurs. Seasonal grazing can be continuous within the specified grazing season or rotational within the specified grazing season.
- Q. Is continuous grazing practiced because some ranchers don't want to take the time to move their livestock around?
- A. Not necessarily. In many cases, especially at light to moderate stocking rates and depending on the site's natural resources, there is simply nothing to be gained by moving livestock between fields. In some cases, the heterogeneity of habitat structure that results from less rotation is beneficial for biodiversity.
- Q. Does continuous grazing result in overgrazing or complete defoliation?
- A. Continuous grazing can result in any level of grazing or forage use, depending on stocking rate and distribution of livestock.
- Q. What is the best grazing system for the land?

- A. There is no such thing as a “best” system. Professional range managers and ranchers have differing opinions about how grazing should occur; the grazing system should be based on the landowner's and possibly other stakeholder's objectives for the land and on the rancher's business and animal health objectives.

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