

Range and Pasture Management in Central and Eastern Oregon

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All too often, pasture and range management receive a low priority even though grazed pasture is the basis of most livestock operations. In reality, forage is the basic product you market; the best way to do that is with livestock. Overall productivity is a function of both your land resources and the intensity of the management you can give them. This circular first discusses some of the general principles of plant growth, animal preferences, and reasons for poor production. Then a section apiece is devoted to irrigated pastures, seeded dryland pastures, and native rangelands.

General Principles

Forage is often wasted in pastures because of inadequate control of animals. The most common sign of wasted forage is patch grazing—a few areas overused and much of the pasture underused. Animals will repeatedly graze regrowth in small areas and will allow other plants to reach maturity. Often more than one year's growth is accumulated, which results in very low quality forage. This can happen, and often does, even when you plant a single species in a pasture. You must match the grazing pressure to the forage supply to achieve the desired use level through intensive management.

To accomplish this, subdivide pastures into several units with fences and move stock in accordance to a plan based upon the kinds of pasture or range plants. Close control of grazing livestock is the key to correct and proper forage utilization. It may be necessary to mow periodically in the absence of sufficient grazing pressure.

Whenever possible, provide your grazing animals with what they prefer to eat. This is possible whenever planted pastures, both dryland and irrigated, are available. This may be termed "*fitting the resources to the animal.*"

In this case, plant the desired species, perhaps fertilize them, irrigate if that is possible or practical, perhaps mow (or even spray) for weed control. Small-sized pastures are necessary for effective management. High forage production should be a management objective. Making good use of all that forage with your grazing animals becomes a real challenge.

In situations where pastures have not been, or cannot be, planted with other species, *fit the animals to the resources.* Match the number of animals or demand to the most opportune time for the major forage species.

Four management principles are important: (1) correct *stocking rate* for the plant species on the range or pasture unit, (2) correct *season of grazing* for those species, (3) uniform *distribution of grazing*, and (4) correct *kind and class* of



livestock for the resources you have. Maintaining forage production through proper forage use becomes the key to successful management.

You must recognize how plants grow and what their basic needs are. Each plant species is different, but effective management schemes can be developed for numerous mixtures of species. Perennial species grow differently than annuals. Perennials are dormant after they mature. Annuals are dead. The survival mechanism of annuals is their seed. That is why, to perpetuate annuals, you need to provide for seed production. This is not required for perennials every year, except that setting seed is the signal for completion of the plants' normal growth processes. Seed is required to establish new plants of most bunchgrasses, however.

Plants must be allowed those processes. As an example, perennial grasses and forbs store food (energy) in roots and crowns and draw on that food to make new growth. Grazing at the wrong time, especially if too severe and too long, can hurt the plant by not allowing it to restore energy reserves. If continued, the plant declines in vigor. This permits other, less palatable plants to increase and outcompete the desirable grazed plants.

There is great variation in the ability of different plant species to tolerate grazing. As a general rule, most *domestic* perennial pasture species are better suited to grazing than *native* species. In order for a perennial plant to start growth, it draws on energy for new leaf growth. Depending upon the species, there is a time in the growth cycle when the plant

needs to make more energy than it uses so surplus energy accumulates in roots and crowns. The process is generally complete by the time seed has been formed.

Annual grasses and forbs develop a completely new root system every year. After germination this root system must be allowed to develop. Once the annual has a root system under it, the tops can tolerate grazing. It then becomes important to tailor the use to the amount of shoot or top growth remaining since by removing all top growth the plant will be practically dead. A perennial plant, on the other hand, already has its root system in place.

Many plants, whether perennial or annual, have an ability to tiller or “stool” out. This means additional new basal stems. Some plants tend to grow more prostrate than others. Early grazing stimulates this desirable activity. As long as grazing pressure is not too heavy and openings are not made in the plant cover, damage should not result.

Mature cattle eat upright coarse species more readily than do sheep. Young animals prefer young, green plants. They do not grow well when they are forced to consume mature plants, even generally preferred plants.

Plants contain more overall nutritive value when young than after seed heads emerge. But high moisture content in young plants can limit forage dry-matter intake. Virtually all plants in immature stages contain balanced nutrition, so grazing animals seldom need more than trace mineralized salt. Animals will always prefer regrowth of a plant to the same plant that has not previously been grazed. This is because the regrowth is younger, more succulent, and probably more nutritious plant tissue.

Ranges and pastures deteriorate because of a number of reasons. Most often part of the cause is grazing control. On irrigated pastures the reasons additionally include inadequate fertilization, poor irrigation practices, poor selection of species, incompatible mixture of plant species seeded, and permitting the plant cover to open up (which allows weed invasion and rodent infestations).

On ranges and unimproved pastures, the basic cause of deterioration is grazing-related, whether from livestock, game, rodent, or insects. Other less desirable species can invade whenever bare areas open up. Look for the correct causes for pasture or range deterioration; do not confuse symptoms with causes.

You can obtain specific recommendations on forage species, fertilization, and irrigation from your county Extension agent and Soil Conservation Service personnel. However, some management factors are relatively straightforward.

Irrigated Pastures

The cost of establishing and maintaining irrigated pastures necessitates a high level of management for sufficient return to occur. Make this commitment to the high level of management at the time you start a project. Since levels of forage production can be quite high from irrigated pastures, grazing control is extremely important. Recent studies show that three yearling steers per acre or six weaned calves per acre can be grazed over an entire growing season when proper attention is paid to the level of defoliation of the species.

Close rotation is mandatory. As much as 900 pounds of gain per acre have been reported in the cold and short growing season of the Oregon high desert. More could be obtained in

other locations with longer growing seasons such as in the Treasure Valley and in the Columbia Basin.

Species Selection

The length of growing season and length of time irrigation water is available govern the species that can be planted and survive. All species must be winter hardy, but obviously a pasture in Lake County has a shorter season than one in the Columbia Basin. Simple one-grass-one-legume mixtures are more easy to manage than complex mixtures. Including a legume has two main advantages: higher forage nutritive value from a mixture of grass and legumes, and ability to fix nitrogen from the air in the soil, which will reduce the need for N fertilizer. Some species are more winter hardy than others. Very winter hardy species do not make early spring growth.

Favored grasses are orchardgrass, tall fescue, smooth brome, intermediate wheatgrass, timothy, and meadow foxtail. Each species has several varieties. White clover, birdsfoot trefoil, strawberry clover, and alfalfa are commonly planted legumes. Alfalfa for pasture requires special close rotation management, or it will decline rapidly.

Select species with an eye to their compatibility in certain attributes such as palatability, water requirement, and times of growth. Meadow foxtail and intermediate wheatgrass would be one example. The former needs and can tolerate abundant water, and the latter can get along on a short, early water supply.

Another example would be orchardgrass, tall fescue, and white clover. Whether grazed by cattle or sheep, livestock would prefer orchardgrass and white clover to tall fescue. In time, the stand would be dominantly tall fescue.

Establishment

A fine, firm, weed-free seedbed is necessary. One rule of thumb is that your heel should not sink in more than 1/2 inch when you walk across the field before planting. Visualize planting your pasture as you would your garden or a new lawn. Once the seed is planted, it is too late to do much else except irrigate. As a general rule, cultivation over 6 inches deep is not necessary. Perennial grasses have relatively deep root systems and can penetrate uncultivated soil below the plow layer.

Control of weed competition is extremely important. Whenever practical, summer fallowing before planting the pasture will help greatly as the purpose is to stimulate germination of weeds and then cultivate them out. Often, planting an interim crop that is highly competitive will be helpful in suppressing the weed potential. It will provide some needed livestock feed, too. Herbicides are available for integration into the process under special weed conditions, but this should not be necessary in most cases.

Soil from the upper 4 to 6 inches should be analyzed for available nutrients well ahead of planting time, so that you can add appropriate fertilizers and/or soil amendments. Incorporate fertilizers such as phosphorus, sulfur, and potassium into the seedbed; nitrogen can go in with the seed. If a drill with a fertilizer feeding mechanism is available, you can band all fertilizers during the drilling operation. Consult your Extension agent for specific fertilizer recommendations.

Clean seed is a must. This is determined by the percent purity as noted on the seed tag. Strive to get the cleanest, highest percent germination seed possible. Remember that desirable plants can come only from pure live seed of the



species and variety that you want. To ensure varietal purity, purchase certified seed whenever possible. Although seed prices may appear expensive, the seed cost per acre is relatively minor compared to cultural and fertilization costs.

Seeding conditions and seeding rates are both important. A good rule of thumb is to plant just deep enough so all seeds are covered. Soil should be firm both beneath the seed and above it. Only when soil is in close contact with seed will it have the opportunity to germinate rapidly and evenly. When soil is firm around seed, capillary action will allow existing soil moisture its maximum chance to provide germination conditions. And when rain does come or irrigation is applied, it will be more effective with close soil contact.

Increase the rate of seeding if the recommended conditions are not possible. For example, when seed cannot be drilled precisely and must be planted either with poor equipment or broadcast and then covered, increasing seeding rate by 50% above the minimum needed for a stand is warranted. Or when severe soil conditions exist (such as might occur with heavy clays or light sands), increase the seeding rate. When you want a dense stand quickly, more seed also is necessary. However, for most pasture species, there will be five or more seeds per square foot if only 1 pound per acre is planted. Local technicians should be consulted for recommended seeding rates.

Time of seeding is important. Spring planting is usually preferable, although planting in summer or early fall is done also. Avoid planting irrigated pastures too near to winter cold conditions. New plants need to become somewhat “hardened off” before winter sets in. Generally, 8 to 10 weeks before anticipated cold that will stop plant growth will be sufficient.

Inoculate legume seeds with an approved inoculant before seeding. This is cheap insurance. Be sure the inoculant you buy is not outdated and has been kept cool in storage. Host-specific Rhizobia applied to the seed invade the small

new roots and cause the plant to form nodules. These bacteria have the ability to extract nitrogen from the air in the soil and incorporate it into the plant—in essence, making it nitrogen- or protein-rich.

As the roots die, the nitrogen within the soil system becomes available to all plants. If legumes do not become well nodulated, their productivity is sharply reduced; quite often, they do not establish if not nodulated. Many soils have adequate supplies of the right bacteria; but if the legume has not been grown previously in the soil, inoculation will be the only source of bacteria.

Fertilization After Establishment

The primary need will be for nitrogen (N). The amount of N to use will depend on the kind of species present, the amount of growth response desired, and the overall cost to obtain a particular response. Applying nitrogen fertilizer several times during the growing season before irrigations is preferable to one large application. This will result in more uniform forage production rather than one large flush of growth with a tailing-off effect. Newly established pastures economically respond to 100 to 120 pounds N/acre. Older pastures with much Kentucky bluegrass and/or quackgrass will require 50 to 60 pounds N/acre. Consult *OSU Fertilizer Guides* 21 and 38 (eastern and central Oregon, respectively).

Irrigation

Set irrigation schedules in relation to the species demand and the infiltration capability of the soil. Optimally, plant roots should never be dry, which would mean frequent light irrigation. For clover-grass pastures this is preferable. But if alfalfa is the legume, heavy infrequent watering is better. Whenever possible, avoid irrigation when stock are on the pasture. However, sprinkling on light-textured soil while grazing is acceptable.

Grazing

Proper grazing will have more to do with maintaining high pasture production than any other single factor. Do not graze new pastures until the plants are well established. Development of a deep, healthy root system is necessary. This should be by the first fall season. Often, a new stand will be mowed during its first season of growth to control weeds and keep the planted species in a vegetative state. Sheep may be grazed earlier on a new stand than cattle because of less grazing and trampling damage.

Keeping vegetation at a height for optimum regrowth is critical. Thus, tight rotation grazing is a must. When growth gets ahead of the stock, either mow it or let a unit go and make hay. The important thing is—do not let forage plants become too tall. All plants attempt to reproduce; irrigated plants have better opportunities than those under dryland conditions. Mature plants are less palatable and nutritive. So graze uniformly and move from pasture to pasture.

The number of moves depends on the number of pastures. At least four are necessary, and more will be desirable. During the fast growth period, the time between grazings will be shorter than at other times. Many irrigated pastures are grazed 5 to 7 days and rested 15 to 21 days. You could accomplish this with four units.

Well managed pastures contribute positively to the health and productivity of your animals. Hungry livestock do not perform well. Watch both the condition of the pasture and that of the animal. Do not rely on the condition of the animal alone to control pasture rotation. Some of the time, this will work successfully. Most of the time, it will not. Therefore, closely watch the condition of the forage species and move livestock in accordance to plant needs. There will be a time lag between the time you should move stock to another pasture and the time their condition will show it.

Animal condition is not difficult to recover when abundant nutritious forage is present. But forage plants, once depleted of energy, need time to recover. Consequently, moving stock too often or too soon will simply result in less total use and will be preferable to overgrazing.

Seeded Dryland Pastures

Unless soils will not permit it, planting improved species will result in greater forage production and forage more tolerant to grazing pressure than leaving a pasture in native species. Production is related strongly to amount of precipitation, but 1000 or more pounds of forage per acre can be obtained on many dryland sites. With some species, this is 1 or more animal unit months per acre.

Plant Species Selection

Fewer species are adapted to any particular dryland site than if that same site were irrigated. Essentially, you must answer two questions: (1) What is the site adaptability? Will the plants grow and reproduce? (2) What are the uses you will make of the forage? Answers to number 1 can limit answers to number 2.

Wheatgrasses such as crested, pubescent, intermediate, and tall wheatgrass, together with other species such as big bluegrass and alfalfa are most commonly used. If you live where 18 or more inches of precipitation occur annually, you can add smooth brome and tall fescue to this list.

In forested, cooler sites, orchardgrass and timothy will produce well above 18 inches. In alkaline soils, tall wheatgrass may be the only species to survive. All of these species are winter hardy. Growth starts in March-April and will continue until moisture supplies cease.

Site Preparation

Usually, you will have to face two main decisions: (1) What is the most effective way to control the brush, trees, or weeds? (2) What level of seedbed preparation will I need? Since so many different situations exist, this circular can address only a few generalizations.

First, examine the potential for the site being considered. Are soils deep and stable enough to provide high forage production? Are there some soil conditions that warrant special consideration (rocks, clay content, alkalinity)? Can stock water be readily supplied so the seeding may receive the intensive management needed?

Consider the nature of the brush, tree, or weed problem. In some circumstances, prescribed burning may be the cheapest and most effective way to clear the area; but if plants such as the sprouting rabbitbrushes are present, fire would only allow it to increase. If cultivation is necessary for the seedbed, anyhow (often it is not—for example, after a fire, as long as a rangeland drill is used to plant seed), consider summer fallowing the site. Early cultivation will reduce the weed seed supply. Perhaps a herbicide could be effectively used to control the weeds and a range drill to plant seed.

Taken all together, several approaches may be possible: fire, herbicides, rotary mowing, followed by either a range drill or cultivation and then planting. Perhaps the main limiting factor is type of equipment available. Whatever the case, understand the nature of the competitive plants you must control. Clearing the site is a critically important step in the process to minimize reestablishment of weedy species.

Establishment

Refer back to the discussion under “Irrigated Pastures” and try to get as close to those conditions as possible. Shallow seedbeds are all that are necessary, if in fact a seedbed is prepared. A form of miniseedbed is made by a range drill. It has large discs that open a furrow into which seed is dropped and then covered with a chain or pipe.

Generally, fertilization at planting time may not be desirable since moisture can be extremely limiting, and small seedlings can be “burned” at even fairly low fertilizer rates. Consult your Extension agent for specific fertilizer recommendations.

Broadcast seeding is not recommended unless there is no possibility of using a drill. Successful establishment of a dryland seeding is risky enough without just spreading seed on top of the soil, perhaps brushing it in and expecting it to grow.

Time of seeding is important. Plant dryland pastures in either late fall or early spring. The purpose is to achieve early spring germination; so if you choose fall, plant late enough so seed won't emerge until spring.

Soil conditions can influence time of seeding. Seed heavy clays only in spring after frost incidence is minimal, as frost heaving will greatly damage and kill seedlings that emerge from either fall or too early spring seedings. Conversely, on very light soils, fall is preferable to spring since moisture

evaporates quickly and spring cultivation increases evaporation. The Soil Conservation Service will have technical information on your soil type.

Grazing

Do not graze new pastures until the plants are well established. One growing season should provide this opportunity. You could graze plants, but not too heavily, the first fall season. If in doubt, do not graze until the second year, and perhaps even then not until summer if conditions for both years have been abnormally dry. Development of a deep, healthy root system is necessary.

One exception exists to this delayed grazing recommendation: if excessive competition from annuals such as cheatgrass develops in the first growing season. In this case, close *short-duration* (1 week or less) grazing in early spring will be beneficial. The newly emerging perennials will be trampled, but grazing the competition when it is palatable will be beneficial. Be certain to remove all stock so remaining soil moisture can be used by the new plants. Seeded dryland pastures generally are best suited for spring grazing. If managed correctly, they can carry livestock from spring through fall.

To successfully accomplish this, practice rotational grazing so all forage will be consumed. Continually grazing a pasture from spring to fall will result in patchy grazing. You need to recognize that forage quality of seeded pastures also declines from spring to fall as does forage occurring on native ranges. For example, crested wheatgrass provides high quality forage from early May through June and again in the fall if sufficient precipitation occurs for regrowth to take place. During summer the forage will be less palatable and nutritious, and animal gains will not be as great as in spring. If crested wheatgrass should be your only forage available from spring through fall, a rotational grazing scheme is preferable to season-long grazing, to obtain more uniform use of forage.

Some species retain their apparent palatability later into the growing season. Intermediate wheatgrass, smooth brome-grass, and big bluegrass possess this attribute. However, big bluegrass can generally grow on a drier site than intermediate wheatgrass, which, in turn, has a lower moisture requirement than smooth brome-grass. Where moisture conditions permit, it is desirable to establish separate pastures of separate species and graze these in sequence through the season. Plants will not make growth without water, so little summer growth could be expected. However, as long as grazing is managed so plant vigor is not reduced, spring-summer-fall use can well be accommodated with seeded species.

Unimproved Pastures and Rangeland

These types of pastures are usually not fertilized, are not as intensively managed as seeded ones, and are not as productive as seeded ones. Of great importance is that the most desirable native forage plants respond differently to grazing than do many of the seeded species.

Probably the unimproved range/pasture will have some undesirable plants, often shrubs. Except in the higher mountains, precipitation will be from about 10 to perhaps 18 inches. Assuming that you cannot replace the pasture species with domestic forage plants because the site is too rocky or steep, your main option is to capitalize on the inherent soil productivity.

If most of the native species are gone, management to encourage their return is essentially futile. If some of the desirable native species exist, they need to be favored. You can do this by grazing when they will least likely be reduced in vigor, allowing them a competitive advantage over less desirable plants. This, in general terms, would be early in the season for a *short time* to remove the annuals. Be certain to do this before the soil moisture is gone. The good plants must have soil moisture to grow and hold their own against the annuals and poor perennials. Of course, the stock will eat the good plants during this period, too. But by grazing uniformly for a short time period, a balance can be tipped in favor of the good plants.

Then, after soils have dried and plants are approaching maturity, grazing at even heavy rates will not be detrimental. It is usually during midseason, about the boot to early dough stage, that native perennial plants, especially grasses, can be damaged if grazed too closely. They don't get a chance to recover because remaining soil moisture is too low. When that does happen, stay off that pasture the next year until plant maturity. This is called "deferred grazing." This will give a plant that might get hurt in one year the maximum chance to recover the next year.

If the pasture is weedy and there are some good plants interspersed in the weeds, chemical weed control could be effective in reducing competition. Available herbicides are numerous. A combination of the correct herbicide, appropriate nonuse, and then proper grazing timed to use the remaining competitive plants first, will probably be the most effective procedure. By a combination of short-duration early use and late use, competing vegetation will be consumed. The good plants should recover and perhaps set seed. Stock may plant some of the seed for next year's new seedlings to replace weeds.

In dry environments, avoid grazing these native plants at the critical times or stages of plant growth in succeeding years. As pointed out earlier, plants are more susceptible to damage from defoliation in some stages than others. By rotating the use from pasture to pasture among years, the plants will have the best opportunity either to increase their vigor or to maintain it.

Summary

Healthy, vigorous plants, whether introduced or native, are vital for good pasture/range and animal productivity. Maintaining plant health is necessary for them to survive the rigors of an often unfavorable environment. General recommendations have been made. Contact your Extension agent if you need specific details.



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