HIGH DESERT RANCH & FAMILY

Harney County Extension Service, 450 N. Buena Vista #10, Burns, OR 97720, 541-573-2506, Fax 541-573-8387 Summer 2008
http://extension.oregonstate.edu/harney/

Inside Stories Page

Have a fun & safe summer.

See you at the Harney County Fair Sept. 2-7.

A NOTE FROM THE AGENT

Every day, the news seems to be dominated by reports of the rising costs of fuel and food. I've certainly noticed my wallet getting a whole lot lighter after a visit to the grocery store or the gas pump lately.

Inflation has similarly hit the livestock industry hard over the last few years. Total cow/calf production costs have risen about 25 percent since 2005 and will likely take a big jump this year as feed costs stand out as the 800-lb. gorilla in the room. Breakeven calf prices for 2008, figured against total costs, will likely be in the $120 to $130 cwt range. When calf prices are projected to be around $115 cwt, it is absolutely essential that cow-calf producers know their production costs and seek ways to control, manage, and/or reduce them. This would be a great time to gather some records and take advantage of the OSU Extension Service by spending some time with your local county agent, State Beef Extension Specialist and Extension Ag Economists to develop a plan that will help you to become more efficient. Please see the article, *Managing Cow-Calf Production Costs*, on page 2 of this newsletter for some strategies that may be considered for managing input costs of the ranch. We will also be holding a meeting to discuss practical options for lowering operating costs from 10 am to 2 pm on July 31st at the Eastern Oregon Agricultural Research Center (please see insert for details).

Amidst unprecedented increases in operating costs, one bright spot came in the form of rain that was received during late May and early June. This may have saved our bacon in many respects on range pastures this year. The spring drought we were experiencing was setting us up for an extremely poor year for rangeland forage production; really the last thing that was needed considering how feed costs are shaping up this year.

Dustin Johnson

Harney County Rangeland/Livestock Extension Agent

Managing Cow-Calf Production Costs

Dustin Johnson & David Bohnert

Introduction...

We've all noticed our wallets getting a whole lot lighter after a visit to the gas pump or grocery store lately, but how is inflation impacting the break-even prices for cow-calf operations? Cow-calf producers have seen energy, fertilizer, freight, corn and hay prices increase over the past few years. As the cost per cow increases, so do break-even prices for weaned calves.

The national average annual cash cost to carry a cow increased from $351 in 2005 to $366 in 2006 to $391 in 2007 (Fig. 1). The average cash cost of $423 to carry a cow in the Northwest trumped all other regions in 2007 (Table 1). Assuming a producer has an 85% weaning percentage, an average weaning weight of 550 pounds and the average cost of $391 per cow, it took a nationwide average price of $83.64 cwt to break-even last year. Assuming the same weaning percentages and weights, it took an average price of $90.48 cwt for a producer to break-even in the Northwest last year. When adjustments for depreciation, unpaid family labor and management, and the use of equity capital are included, the cow-calf producer needed to receive average calf market prices that were substantially greater than $90.48 cwt. The average price for 550 lb. steer calves was $119.67 cwt in 2007 and is projected to be down slightly to around $115 cwt in 2008. Record high energy expenses will continue to have a compounding effect on other input costs, increasing the break-even for cow/calf operations in 2008. When profit margins are so tight, it is absolutely essential that cow-calf producers know their production costs and seek ways to control, manage, and/or reduce them.

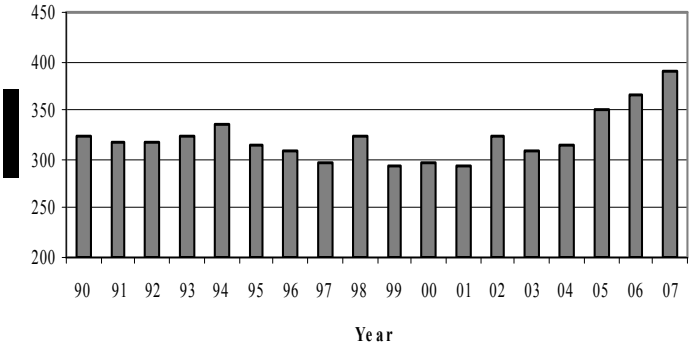

Figure 1. National annual average cash cost per-
Source: 2007 Cattle-Fax Survey. Costs do not include depreciation, opportunity costs or return to management. cow

Table 1. 2007 regional cash costs to carry a cow. Source:2008 Cattle-Fax Survey.

Region	Cost
Northwest……..	$423
Southwest……..	$418
South Plains……...	$393
Midwest…….	$383
Southeast……...	$338
U.S. ……...	$391

Where to start...

A good starting point is to collect your production costs and divide them into categories. Common categories include purchased feed, raised feed, grazing, cattle, indirect, and interest costs. Too many categories will result in confusion and too few categories will not provide you with enough detailed information to manage production costs. Dividing production costs into categories for your financial records may be done by hand or with a computer program. Once you have defined cost categories, you can easily determine the amount you are spending in each category. The use of categories will offer you a closer look at the types of inputs you are using and what they cost. Now you can begin to evaluate opportunities to lower input use or costs, select alternative inputs, and/or eliminate these inputs if their use is not profitable. The key to lowering your unit cost of production is being able to estimate the effect that a change in production costs will have on pounds of calf production. Do not hesitate to consult with others (fellow ranchers, extension agents, lenders, accountants, veterinarians, etc.) when making decisions.

Factors to consider for lowering production costs...

The following is an itemized list of factors to consider as opportunities to lower your production costs or unit cost of production (adapted from Prevatt 1997).

Purchased Feed Costs

- Develop a purchasing plan for feed (amount to spend, type of feedstuffs, quantity, quality, etc.).
- Minimize the need for the use of purchased feeds.
- Have feed analyzed for nutrient content.
- Use purchased feeds based on nutritional needs of the cow-herd (lactating, gestating, dry, growing).

Purchased Feed Costs Continued...

- Buy purchased feeds in volume and at seasonal low prices when storage is feasible.
- Identify alternative feeds and by-product feedstuffs and compare nutrient costs.
- Develop feed rations based on forage analyses.
- Minimize feed losses during storage and feeding.
- Compare alternative feed, storage, and feeding costs.
- Buy feed by weight and quality (%DM, %TDN, % CP) instead of bulk measurements (bale, roll).
- Use limit feeding techniques (fat, salt, rolling out hay, etc.) when practical.
- Consider whether forage variety selection can lengthen the grazing season and thus lower purchased feed needs.

Raised Feed Costs

- Develop a plan that describes your anticipated raised feed needs.
- Compare the costs of raising, harvesting, and storing alternative raised feeds.
- Compare your cost of harvesting raised feed with custom harvesting rates.
- Compare your cost of raised feeds with alternative purchased feeds.
- Minimize harvest, storage, and feeding losses.
- Consider weather, labor availability, and machinery readiness to minimize harvested feed losses.
- Consider feed storage facilities to minimize feed losses.
- Borrow, share, and/or rent machinery and labor with neighbors.
- Use limit feeding techniques when practical.

Grazing Costs

- Develop a grazing plan to better utilize your forage resources. This plan should include a monitoring plan to track changes in forage resources (e.g., plant composition; production, cover, density, frequency of perennial grasses) in relation to changes in animal performance (i.e., cow body condition, weaning weights) overtime.
- Where possible, incorporate legumes and/or other forage varieties into perennial pastures to improve forage quality and extend the grazing season.
- Perform weed control to improve forage quantity and quality when investments are justified economically. This should be evaluated in both the short-term and over the long-term.
- Where feasible, improve forage utilization with changes to grazing management (i.e., timing, frequency or duration of livestock use, grazing rotation, range improvements, etc.).
- Utilize crop aftermath when possible.
- Consider stockpiling certain forages for use as standing hay.
- Provide animals having the highest nutritional requirements access to the highest quality pasture.
- Match the period of the highest nutrient requirements of the cow's production cycle (lactation) to the period of the highest seasonal nutrient content of forages (usually when forages are actively growing during the spring).
- Look at winter grazing opportunities (with caution) to reduce purchased or harvested feed costs. Make that cow work for you, instead of you doing all the work.

Cattle Costs

- Develop a cattle management plan (production, reproduction, nutrition, herd-health, feeds, forages, marketing, etc.).
- Adopt a controlled breeding season to reduce management and labor costs.
- Review cow-herd records and cull open, defective, low producing cows and especially older cows to lower production costs.
- Retain only the essential number of replacement animals to achieve the desired herd inventory. Developing replacement animals is expensive.
- Evaluate buying versus raising replacement animals.
- Consider leasing high quality bulls, cows, and replacement heifers.
- Perform preventative herd-health practices to reduce "emergency" costs and losses.
- Compare prices of herd-health products.

Cattle Costs Continued...

- Reduce cow frame size over time if needed to lower total feed requirements.
- Sort cows into groups based on nutritional needs to improve/reduce management and feed costs.
- Use caution when selecting inputs to increase weaning percent or weights during high cost or low beef market price years. The cost of some inputs will exceed the revenue generated by their use.

Indirect Costs

- Identify overhead items that are not essential to maintain production and eliminate them.
- Monitor utility costs and manage their use.
- Maintain only essential inventory items of farm supplies.
- Compare insurance coverage and rates.
- Plan vehicle, machinery, and equipment use to reduce labor and operating costs.
- Control and monitor family living withdrawals.
- Be selective about educational (i.e., only attend OSU-sponsored education events☺), travel and entertainment opportunities.

Interest Costs

- Develop a financing plan and review financial records to identify time periods that loans will be needed and when they may be repaid.
- Minimize the use of borrowed money during low beef market price years. Delay purchasing machinery, equipment, pasture renovation, facility improvements, etc. until market conditions justify these capital expenditures.
- Thoroughly evaluate all capital purchases that require financing to ensure they result in profitable investments and have a reasonable payback period. Compare interest rates and financing charges among financial institutions (negotiate when possible).
- Consider consolidating debt when necessary to reduce debt servicing requirements.
- Consider reducing borrowed funds by liquidating non-essential or non-productive assets.
- Consider liquidating assets (land, cattle, timber, machinery, etc.) in advance to avoid making delinquent payments or defaulting on loans.

Summary…

The largest cost of carrying a cow through the year is feed, but livestock specialists will be the first to say "starving a profit" out of a cow cannot be done. As soon as corners are cut on nutrition, calving percentages decline dramatically. A cow's primary objective is to take enough nutrients from what she consumes for maintenance of her body condition. Only if that requirement is met, will she go into reproduction mode. Without getting the nutrition she needs, she will not breed back, might abort a fetus or won't produce sufficient amounts of milk for her calf. It is important to minimize the cost of feeding while still maintaining the nutritional requirements of the cow.

The take-home message is that inflation and rising energy costs are decreasing everyone's profit margins. Cow-calf producers need to keep adequate records to monitor the increase in their average cost per cow. By collecting and organizing production cost data, cow-calf producers will be able to determine their total production costs, costs per breeding cow and cost per hundredweight of calf production. The process is simple, but it requires a lot of discipline to continuously record and tabulate production cost data. Without production cost data, cow-calf producers cannot evaluate profitability, nor can they make informed decisions about what pays and what does not. The chances of making correct management decisions is extremely limited if cow-calf producers do not know their cost of production. However, by knowing their production costs and being able to estimate the effect that a change in production costs will have on the pounds of calf production, cow-calf producers will improve their chances of making profitable management decisions.

Reference

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Off-Site Water – How does it influence cattle performance, pasture distribution, and water quality?

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Introduction

Water is the most important nutrient for livestock production but it is often neglected. I don't want to trivialize the need for the other five nutrients (carbohydrates, protein, fats, minerals, and vitamins); however, a deficiency of water will cause stress, sickness and death much faster than a deficiency of any other nutrient. This is because water is such a large component of the body. It makes up approximately 60 to 70% of the total weight of the animal. Table 1 provides a list of approximate water requirements for cattle, sheep, and horses. In this article I will discuss some issues relating to the interaction of water availability and cattle. Specifically, the issues that I will address are: 1) the influence of water quality on performance; 2) the influence of off-site water on grazing behavior and pasture distribution; 3) the ability of off-site water to improve water quality and decrease use of riparian areas; and 4) the economics of off-stream water developments.

Table 1. Approximate water requirements[a] in gallons per day for different classes of livestock.

Animal	Requirement	Range of Consumption
Dairy cow	20	15-25
Beef cow (pair)	15	12-20
Yearling cattle	10	6-14
Bull	12	7-20
Horse	10	8-14
Sheep	2	2-3

[a]These values are meant as a guide only. Water intake and requirements are influenced by a number of variables including temperature, dry matter intake, stage and type of production, etc.

Cattle Performance

Water is an important nutrient for rangeland livestock production and is often provided directly from ponds or dugouts. This can result in poor water quality through fecal and urine contamination.

A series of studies by Agriculture and Agri-Food Canada evaluated three types of water sources for water quality and animal performance. The sources were direct access by cattle to pond water, access to pond water that was pumped to a trough with no direct access to the pond by cattle, and water pumped from a well, spring, or river to a trough.

Initial data reported in 1996 suggested that pumping water from a dugout to a trough increased performance of cows, calves, and steers (Figure 1). Briefly, pumping water from a dugout to a trough increased average daily gain by approximately 0.5 pounds. In a later study, cow performance was not affected by water source; however, weight gain of yearlings and calves was increased by approximately 20% with non-pond water. When comparing the clean and dirty pond water, there was about a 5% increase in yearling and calf weight gain with the clean water. The increased performance was attributed to greater water consumption and forage intake because cattle avoided water that was contaminated with as little as one-half of 1% fresh manure by weight. Also, cattle with access to fresh water spent more time grazing and less time resting than cows offered both types of pond water.

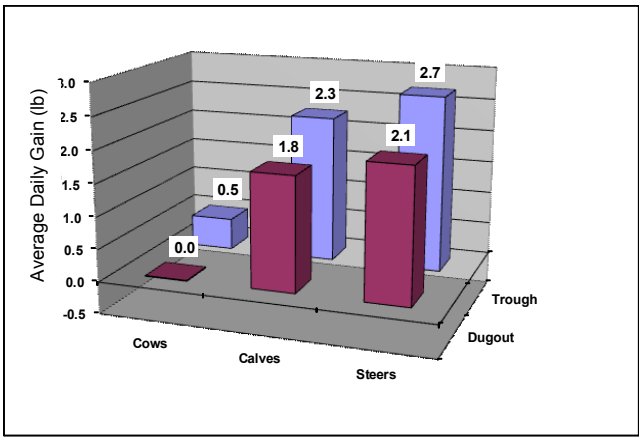

Figure 1. Average daily gain. Dugout versus trough water

Grazing Behavior and Pasture Utilization

Cattle are attracted to riparian areas and often use them at disproportionately higher rates than adjacent uplands. To address this issue, the Eastern Oregon Agricultural Research Center in Union conducted a study to determine if off-stream water, pumped from a stream to adjacent uplands, could alter cattle distribution, performance, and grazing behavior. Marni Porath, working with Tim DelCurto and Pat Momont, found that off-stream water resulted in increased weight gain by cows and calves compared to those with access to the stream only. In addition, cow/calf pairs with access to off-stream water troughs spent less time in riparian areas and grazed a greater distance from streams, especially during the heat of the day (Figure 2), compared with cattle without off-stream water. Similarly, in a case-study conducted on Sawtooth Creek in Harney County, Dave Chamberlain and Mark Doverspike compared a solar powered, off-stream watering system with watering directly from the creek. Having a source of clean water 50 to 100 feet from the stream diverted cow use from riparian areas to uplands as long as good forage was available on the uplands.

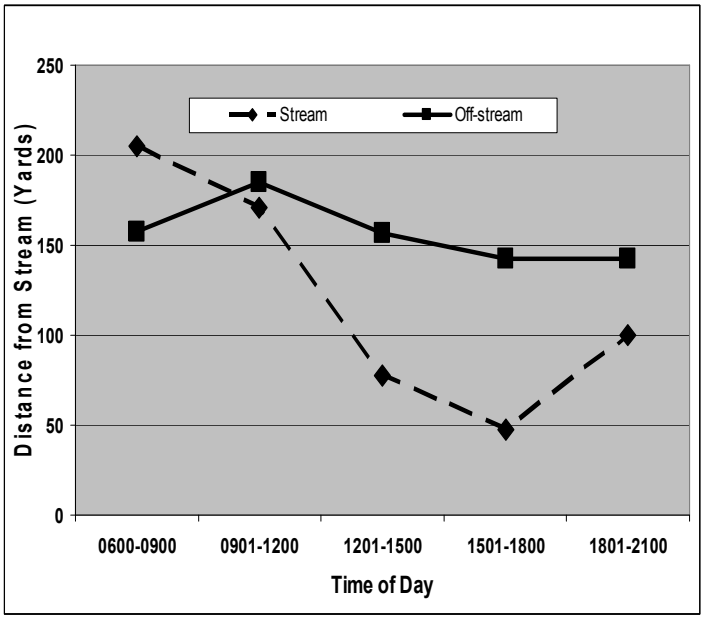

Figure 2. Average distance of cows from stream as influenced by time of day and stream or off-stream water – observed grazing period was middle to late July.

Water Quality and Riparian Ecosystems

Riparian zones account for only about 2% of the land in Eastern Oregon but they tend to receive a disproportionate amount of use by grazing livestock and wildlife. Consequently, recent concerns about water quality and wildlife and fisheries habitat have focused attention on livestock management practices in these areas. A few years ago a study was conducted on Bear Creek in Central Oregon during the winter feeding period. It compared off-stream watering in a trough with watering directly from the creek. Results showed that use of a trough, off-stream, was more than 99% effective in attracting cows away from the stream during periods of the day when thirst was the driving behavioral force. Also, the trough reduced the time cattle spent in the stream by 90% and, thereby, reduced fecal and urine pollution of the stream. In addition, a comprehensive study in Virginia looked at off-stream watering sources on stream bank stability and water quality. The researchers noted that, when given the choice, cattle preferred water from a trough 92% of time compared with the time spent drinking from a stream. More importantly, stream bank erosion was reduced by almost 80%, while fecal coliform and streptococci were reduced by 51 and 77%, respectively. Off-stream watering can be effective in improving water quality and maintaining a properly functioning riparian zone by reducing the time cattle spend in or near a stream.

Economics of Off-Stream Water

Off-stream water sources can improve cattle performance, grazing distribution and pasture utilization, water quality, and help maintain proper functioning riparian zones. The next logical question is - what is the economic return of providing off-stream water. Economists and animal scientists from Oregon State University and the University of Idaho used available data and plugged it into a bio-economic model based on an average 300 cow/calf operation that relies on both public and private lands. The result was an increase in annual net return ranging from $4,500 to $11,000, depending on the position in the cattle cycle and amount of annual precipitation. Therefore, regardless of crop year precipitation and market prices, use of off-stream water should yield a positive net return for ranches dealing with riparian grazing concerns. However, before deciding to implement an off-stream water program you need to ask yourself a few questions. These include: 1) what percent of the pasture is unused because of poor grazing distribution; 2) what is the value of the additional pasture that would become available to you (increased days grazing for your cow herd) if additional feed resources had to be purchased/leased; 3) is calf and/or cow performance suffering because of poor grazing distribution or water quality;

4) are your cattle spending a significant amount of time in riparian areas and degrading the site; and 5) could water developments, such as developing a spring or well, reduce the amount of time and money spent hauling water.

Summary

The implications of this work are that implementing off-stream water into a grazing plan can be effective in improving water quality and animal performance, altering distribution patterns of cattle, and reducing the potential impact of grazing on sensitive riparian areas. I hope I have provided you with some useful information on managing water resources. If you have any questions don't hesitate to contact me at the Eastern Oregon Agricultural Research Center in Burns (541-573-8910; dave.bohnert@oregonstate.edu).

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Grazing After Fire in Sagebrush Rangelands

Jon Bates and Kirk Davies

Eastern Oregon Agriculture Research Center

Grazing after Fire

Big sagebrush steppe is one of the major vegetation types of Harney County and eastern Oregon. Fire has been a natural disturbance and prescribed management tool that removes sagebrush and shifts community vegetation from shrub-grass co-dominance to grass dominance. Primary goals of post-fire management are the recovery of ecological processes (hydrologic function, energy capture, and resource capture), preferred plant communities, wildlife habitat, and economic use. In sagebrush steppe plant communities these goals are achieved by recovering the system to one initially comprised of desirable perennial grasses and forbs.

After fire, it is often recommended that burned areas be rested from grazing to promote recovery of herbaceous vegetation, permit seeded species to establish, reduce the potential undesirable weeds to dominate, and allow surface litter to accumulate to stabilize soils and decrease erosion. However, there is limited information available that may assist managers in determining the need or length of grazing rest required to permit rangelands to recover. This article reviews evidence currently available in the scientific literature on grazing after fire in sagebrush rangelands and suggests potential management courses of action.

Available Research

Defoliation studies, which involve clipping individual plants, suggested that timing of grazing after fire is important in plant recovery. Heavy defoliation during spring growth the first year after fire reduced bunchgrass recovery and caused high mortality of bluebunch wheatgrass and Idaho fescue (Bunting et al. 1998). Late season defoliation when plants had stopped growth did not affect the subsequent recovery of Idaho fescue, bluebunch wheatgrass and squirreltail (Bunting et al. 1998; Jirik and Bunting 1994). These clipping studies may not provide a good indicator of grazing impacts to vegetation. The heavy defoliation applied is equivalent to very high use, a practice neither recommended nor typical of grazing management in sagebrush rangelands.

Studies in Utah (West and Yorks 2002) and Nevada (Bruce et al. 2006) conducted at plant

community and landscape scales provide a better gauge of livestock impacts after fire. In the Utah study, perennial grass cover was less in grazed versus ungrazed areas 18 years after wildfire on sagebrush steppe. Unfortunately, the authors were unable to provide much information on the grazing regime. Though grazing was judged to be moderate the lack of information on timing and duration make it difficult to evaluate grazing impacts. In the Nevada study, there were no differences in herbaceous recovery between moderately grazed (50% utilization) and ungrazed pastures the second and third year after wildfire in Nevada. Grazing in this study did not occur until after grasses had completed their annual growth cycle in mid-summer. Both these fore mentioned studies reported initial increases in cheatgrass after fire but found no differences in cheatgrass cover between grazed and ungrazed treatments.

In a six year study just completed at the Eastern Oregon Agricultural Research Center (EOARC), cattle grazing impacts were evaluated after prescribed burning big sagebrush communities (Bates et al. 2008). Treatments included no grazing on burned and unburned sagebrush steppe, two summer grazing applications after fire, and two spring grazing applications after fire. At the conclusion of the study none of the grazing trials had an effect on short-term community recovery after fire. Herbaceous response variables (cover, density, and production (Fig 1)), bare ground, and litter did not differ among grazed and ungrazed burn treatments. In addition, all burn treatments (grazed and ungrazed) had greater cover, production, and grass seed yield than unburned areas by the second or third year after fire. The results demonstrated that properly applied livestock grazing after low severity fire will not hinder the recovery of herbaceous plant communities in Wyoming big sagebrush rangelands.

These recent studies in the Great Basin suggest a couple points; first –timing, utilization, and duration of grazing burned rangelands are more important than imposing a specific period of rest; second – rangelands in good shape can be grazed the first year after fire but areas should be deferred until mid-late summer. At this point, grazing sagebrush steppe in the spring the first two years after fire should be applied cautiously until additional information becomes available.

Considerations

The results and interpretations of the fire-grazing studies in sagebrush steppe studies must be evaluated in proper context. In the study at EOARC the trials were performed on a distinct sagebrush site; the fire resulted in minimal, if any, mortality to perennial bunchgrasses; there was lack of a significant weed presence; and grazing protocols were strictly controlled.

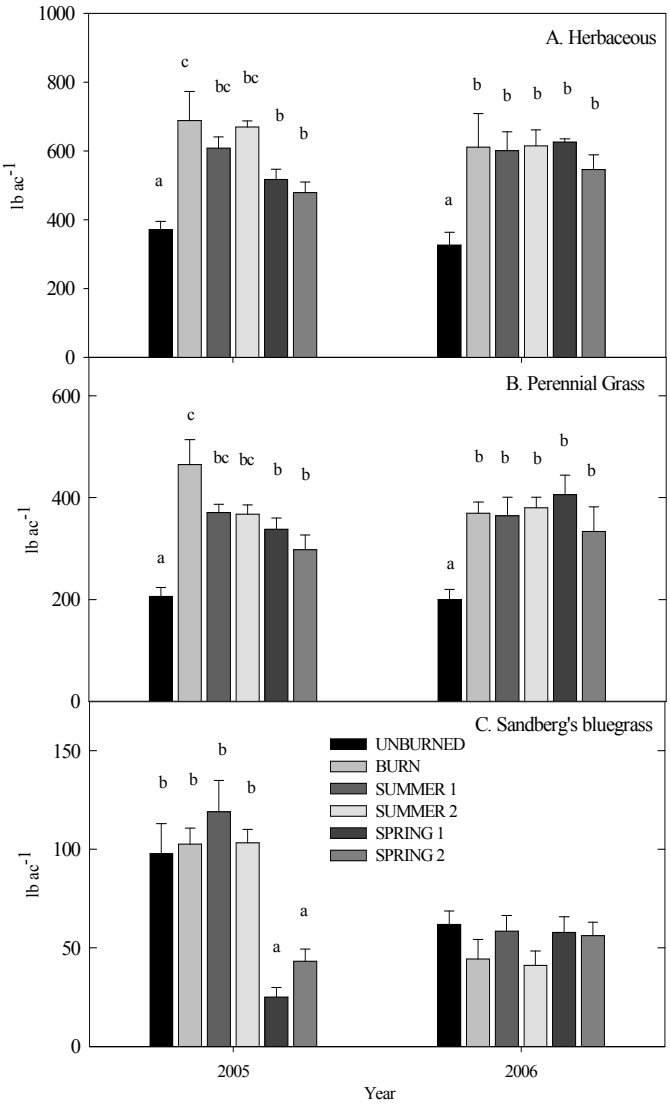

Figure 1. Production values (lb ac^{-1}) for A) Herbaceous, B) Perennial bunchgrasses, and C) Sandberg's bluegrass for the various burn and grazing treatments in big sagebrush steppe, 2005-2006 at the eastern Oregon Agricultural Research Center, Oregon. Values represent means $\pm$ one standard error. Different lower-case letters indicate significant differences ($p<0.05$) among the treatments within year. The Summer 1 treatment was grazed the first through third year (August, 2003-2005) after fire. The Summer 2 treatment was grazed the second and third year (August, 2004-2005) after fire. The Spring 1 treatment was grazed the second and third year (May, 2004-2005) after fire. The Spring 2 treatment was grazed the third year (May, 2005) after fire.

One or more of these elements will vary in other situations and in combination with weather events will generate a host of post-fire recovery scenarios. For example, more severe fires causing higher bunchgrass mortality such as experienced with many wildfires may require more years of deferment or carefully controlled use to permit surviving plants to produce seed and establish new plants. Grazing of areas that are seeded will likely require two years of rest or until new plants cannot be tugged out of the ground. Other potential scenarios involve grazing after fire in cheatgrass dominated areas and recovery of shrubs such as bitterbrush, sagebrush and deciduous species (aspen, riparian communities). For example when grazing is deferred until late summer for grass recovery livestock might increase usage of bitterbrush or aspen which reduces their growth and recovery. With spring grazing livestock concentrate on herbaceous plants and bitterbrush growth is enhanced.

Time and resource limitations mean that research cannot test every potential scenario manager's encounter after wild or prescribed fire. However, when available knowledge is gathered together a one recipe approach to post-fire grazing management has its limitations and is not an appropriate means for post-fire vegetation recovery. In the mixed grass prairies of the central United States it has been concluded that because of variable vegetation responses to fire and grazing the use of broadly applied rules are also inappropriate for managing post-fire plant communities. Management should not be hasty in disregarding past recommendations for grazing rest after fire in sagebrush steppe, however, mounting evidence also indicates that post-fire grazing decisions can be more flexibly applied to meet vegetation recovery goals.

Developing a Recovery Plan

Post fire grazing management should be developed based on a variety of factors including the plant communities affected by fire, understanding pasture characteristics such as terrain and water sources that influence livestock movement, and clearly defined recovery objectives. The first question to ask is not how fast livestock can be put back out on burned areas. The central question is how vegetation is to be managed for recovery with sound grazing prescriptions. So before grazing can be resumed – initial recovery goals need to be achieved. This might include getting seedlings established or achieving certain level of perennial grass density. Thus, rest or deferral periods are likely to vary depending on the area. At the same time vegetation recovery goals should be appropriate for the type of plant community or communities concerned.

This means making sure that sites are ecologically capable of meeting recovery goals that are set. When making evaluations look at what the plants and soil surfaces are telling you – this means evaluating plant vigor, ground cover, reproduction and recruitment of new plants, and erosion indicators. In our area in most cases its probably best to wait and not graze the first spring or two after fire because you want to look over burned areas in May and June to see what the plants are doing – for instance if the area needs more of the bigger perennial grasses, then manage for reproduction and recruitment of new plants. This probably means grazing in winter or deferring grazing until after seed shatter in summer or potentially a short grazing season in the early spring.

This is a big subject which can't be covered in much detail in this venue. If you have any questions or bone-to-pick give us a call at the research center (Jon Bates, 573-8932; Kirk Davies, 573-4074).

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Photo Monitoring Your Range

Dustin Johnson, Harney County Rangeland and Livestock Extension Agent

How often have you heard or even said, "This field looks so much better than it did 20 years ago...there's a lot more grass…the cover of desirable plant species has improved…wildlife habitat is better than it used to be." Generally, range management has improved over the years and I have no doubt that these statements are accurate, but a problem arises when other people are not sure they believe what they're hearing. Even though improvements have been made, potential critics may still see problems and wonder if the range manager is providing a biased description of the observed changes. For those who have not been around to see the improvements, the slow rate at which arid rangelands often change can make it seem as though managers are not doing enough.

So what can you do? You've heard it for years now - MONITOR! Rather than making your life more difficult, a monitoring program can actually greatly simplify it. A monitoring program can 1) help determine the benefits gained from changes in grazing management or investments in range improvements; 2) facilitate a better understanding of rangeland plants and how they interact with each other, the environment and grazing animals; 3) build confidence in the management strategy; and 4) provide stories of success and failure (as the case may be) that can be shared with others as learning opportunities. And because most of us tend to remember only the very best and very worst, our memories often fail us when it comes to recognizing gradual changes over longer periods of time. With monitoring, you can rely on the data that are collected and stored, instead of your memory. Your data can provide you with concrete proof of successes and help you identify management strategies that did or did not work.

There are many monitoring techniques. This article discusses one of the simplest, cheapest and quickest methods -- Repeat Photo Monitoring. A series of photos taken of the same spot over time can accurately demonstrate change on the range. This article provides an introduction to repeat photo monitoring and explains how it can be used as an integral part of a comprehensive range monitoring program.

Much of the following discussion of photo monitoring is written in the context of a public land grazing allotment. However, the practices described and the benefits derived from photo monitoring are directly applicable to private lands as well. Monitoring can be a valuable planning and assessment tool for grazing management regardless of land ownership.

Why use repeat photo monitoring?

Repeat photo monitoring is a simple and quick technique for monitoring rangelands. A properly located photo point allows you to detect changes in important rangeland attributes including plant species composition, total plant cover, litter, spatial pattern of plants, and soil erosion. Changes in these attributes are important for determining how the condition of the range is changing over time in response to your management (e.g., timing, intensity and frequency of livestock grazing, distribution of use, stocking rates, etc.) and factors that are external to your management (i.e., inputs from Mother Nature; e.g., weather, fire, insect infestation, etc.).

Repeat photo monitoring on public land grazing allotments…

If you are a Bureau of Land Management (BLM) or United States Forest Service (USFS) grazing permittee, it's likely that photo points have already been established in key areas (i.e., permanent monitoring sites) on your allotment. Ask your Range Con for a map that shows the location of key areas and the types of monitoring studies that have been conducted at these sites in the past.

Should I establish new photo points? If so, where and how many?

If permanent photo points have not been established on your allotment you can set them up yourself, but it is probably a good idea to involve your Range Con or resource specialist with the agency charged with managing the allotment. They can help you locate photo points in key areas. In range monitoring studies, key areas are chosen as a sample to represent the average response of a pasture or vegetation type to grazing management or factors that are external to management (i.e., inputs from Mother Nature or those factors that are beyond the control of the manager such as weather).

Similar to all forms of rangeland monitoring, repeat photo monitoring requires well-defined management objectives and careful selection of key areas. In most range monitoring studies, the objective is to detect changes in the primary rangeland resources of vegetation (e.g., cover, density, composition, etc.), soil (e.g., stability, erodibility) and water (e.g., quality) due to grazing management, fire, weather, and other environmental variables. An inventory of range sites, vegetation types, and utiliza-

tion patterns helps determine where and how many key areas should be located. One key area is probably adequate to monitor a relatively uniform area such as an irrigated pasture on flat terrain, but a typical eastern Oregon ranch or allotment may need several key areas to adequately represent the different types of country and variation in inputs from grazing management and Mother Nature. Remember, key areas are intended to represent the typical grazing activities for a larger area. Consequently, don't locate key areas where livestock never graze (e.g., more than a mile or two from water, steep slopes, etc.), or where livestock normally congregate (e.g., within 1/4-mile from watering points, fence lines, or at pasture corners).

Misleading conclusions can result if a change occurs in a key area because of local events, such as a fire or insect infestation, but not in the larger area the area was chosen to represent. For this reason, it's generally beneficial to have more than one key area per pasture or vegetation type so that you can be confident a change is general rather than due to local conditions. On the other hand, it is pointless to establish a key area if you don't have time to monitor it. Begin by establishing a few key areas in the highest priority areas of the range, and add more as time and your increasing experience allow. The important thing is to get started!

Note: If your objective is to monitor an "environmentally sensitive area" (e.g., riparian area, endangered species, wildlife habitat), the area monitored is commonly referred to as a critical area rather than a key area. Critical areas are generally treated with special consideration because of inherent site factors, size, location, conditions, values, or significant potential conflicts among uses. Critical areas represent smaller parts of a management unit that are more important to managers, such as critical habitat for wildlife, areas having threatened or endangered species, highly erodible areas, or riparian areas. If management objectives are specific to maintaining and improving a small piece of land such as a riparian area, then it may be appropriate to select a critical area as a monitoring location.

Establishing photo points…

Preferably, take both landscape and close-up photos at each photo point. At a minimum, take a landscape photo of the key. For initial setup, you will need a compass, steel post(s), one 5 ft. long, ¾ in diameter PVC pipe, one ≥ 2ft. long rebar stake, 2 ≥ angle iron stakes if taking a close-up photo, hammer, spray paint and a map and/or Global Positioning System (GPS) unit to record the photo points location.

For repeat photos, you will need the camera, compass, the 5 ft. long, ¾ in diameter PVC pipe, map and/or GPS unit. You may also need the notebook to help locate the photo points. While in the field, the notebook will also be helpful to orient yourself to changes over time, and to prompt you to record useful observations.

Landscape photographs

- Permanent photographs of a landscape are useful for detecting changes in vegetation and for visually documenting changes measured with other monitoring methods.
- If you have historical photographs, new pictures allow you to immediately see changes over time.
- Landscape photos should be taken from the same designated point marked by the rebar stake. Place the PVC pipe over the rebar stake (Fig. 1). Place camera atop the PVC pipe to take the photo. This keeps the camera height and angle consistent.
- Include a distinctive landmark in the background or another steel post so that the photos can be consistent from year to year (framing the same scene consistently will increase your ability to observe and demonstrate change over time).
- Identify the photo with an identification card in the picture (Fig. 2), include the date, photo point identification, location and direction of photo

Write a location description in your notebook so that you can relocate the photo point. Use a witness post (e.g., T-post) or other permanent marker. Record a compass direction and the distance in feet or paces from the witness post to the photo plot. Take photos from the witness post to the plot and vice versa to aid in finding the plot later .

Figure 1. Photographer demonstrating how to take a landscape photo.

Date:

Plot No:

Location:

Direction:

Figure 2. Example of a photo identification card.

Close-up photographs

- Close-up photos of the ground show specific characteristics of an area such as soil surface, ground cover by vegetation, and organic litter. A quantitative analysis of these small plots is not likely to yield useful information, but they can help show specific characteristics.
- Permanent photo plot corners (usually a 3 x 3 foot square) can be marked by the two angle irons stakes (Fig. 3). You may want to spray paint the exposed part of the angle iron to make it easier to find next time. The rebar stake used to mark the location for the landscape photo will also mark where to stand while taking the close-up photo. When taking the photos, use two 6-foot folding rulers or a 3 x 3 foot square made of PVC to accentuate the plot. Place the camera over the center of the plot at a standard height and take the photo.
- Always identify the plot with an ID card in the picture; include date, photo point identification, and location.

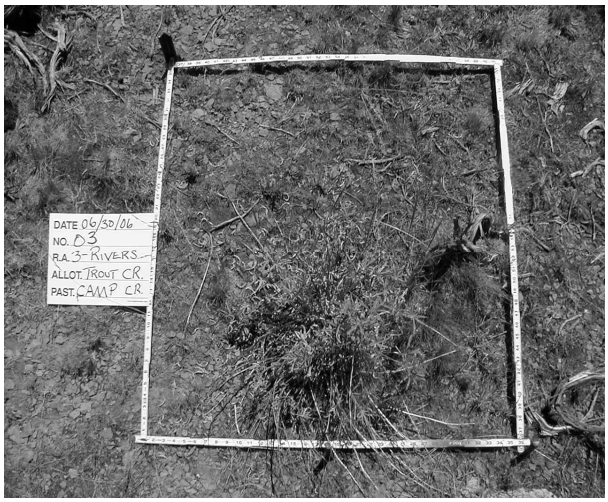

Figure 3. Example of a 3 X 3 foot close up photo.

When to monitor…

Be consistent from year to year. The exact date is often not important (unless monitoring objectives require consistency of date) because seasonal conditions vary from year to year. Examples of when you might want to monitor, might include one or more of the following: 1) stage of growth of a particular plant (e.g. cheat grass heading out, blue bunch wheatgrass in the boot stage of phenology, etc.); 2) just before and after the grazing season (I suggest both); or 3) at the end of the growing season.

Which times to use depends on what you are managing for (objectives) and when to best identify response to your management and Mother Nature. For example, if you are attempting to identify response to a particular grazing management strategy such as early season grazing, you might want to combine #2 and #3 listed earlier. Using #2 will show what you started with and what it looked like just after grazing. However, early season grazing should result in sufficient soil moisture to allow regrowth after grazing and #3 will show that response.

Equipment needed…

35mm or Digital Camera

- A pocket size camera is more convenient than the larger cameras with multiple lens options. If your camera supports multiple lenses, you'll want to keep the lens size consistent for repeat monitoring. Wider angle lenses (28 or 35mm) will provide a better landscape perspective. If the photo is intended to show a more closely defined area, a 50mm lens might be more effective. If you take digital photos, be sure to print and store photos in plastic photo storage sheets. Storing photos digitally on a computer is tenuous at best. They have been known to gobble up Master's theses, PhD dissertations and other works representing hundreds of hours of drudgery; please print your photos and if you insist on storing them digitally, back them up often.
- Use nonwhite photo description cards to record date, location (allotment or pasture name), and photo point number to include in each picture. Write with a broad felt tip pen in bold letters on the photo description card. Writing must be bold enough to show up and be legible in the picture.

Notebooks:

Store prints and any field notes together in a notebook. You might want to keep a notebook foe each pasture or allotment at home with all prints and notes.

Maintaining a second field notebook for prints and photocopies of notes is a good idea to help locate photo points and other observations. The field notebook is likely to take a beating.

- Place the slides or prints in storage sheets that are non-pvc and non-acidic to protect them from deterioration. If using print film, store the negatives in a separate, labeled envelope for each roll of film.
- Use a sticky label on the back to identify the print. Include photo plot number, location, date, type of film used (e.g. Kodak ASA 100), and other relevant information (e.g. cattle just off, end of growing season, etc.).
- Get your film processed or digital photos printed and label the prints as soon as possible after taking the pictures. Your memory will be fresher and this will keep the job small and easy to do.

Other observations…

While out monitoring, have your monitoring field notebook with you and record any relevant observations. You can do this not only when you are monitoring, but also while out performing other activities such as checking on or moving livestock. These observations will help explain the changes you're seeing with your monitoring program. You can file those notes directly with the photos once they have been developed and make photocopies for your field notebook. Previous notes will help trigger your memory for making and recording relevant observations. The following examples of observations to record:

Weather

- Precipitation and how it compares to seasonal, annual, and long-term trends.
- Temperature and how it compares to seasonal, annual and long-term trends.

Vegetation

- Flowering of seed setting dates
- Recruitment (seedlings) of desirable plant species – presence/absence, abundance
- Physical disturbance
- Poisonous plants – presence/absence; location
- Utilization of vegetation
  - Which plants were grazed?
  - Which plants were not grazed?
  - Distribution of livestock utilization.
- Insect damage
- Juniper encroachment
- Sagebrush encroachment (especially riparian)
- Abundance and kinds of weeds

Riparian

- Browsing of willows or aspens
- Presence/absence of streambank vegetation
- Amount of woody and herbaceous vegetation
- Dry-up dates of springs/stock water
- Headcuts[1]
- Bank stability[2]/water turbidity[3]

Soil

- Amount of bare ground
- Soil crusting[4] - Presence/Absence
- Surface soil litter[5] - Amount and distribution
- Soil compaction[6] - Presence and extent
- Soil texture[7]
- Erosion[8] - evidence of soil or surface litter movement, rills, gullies, etc.

Wildlife

- Wildlife sightings
- Wildlife use

Other

- Archeological sites (arrowheads, etc.)
- Recreation impacts
- Weather events (floods, storms, etc.)
- Open gates, down or cut fences, etc.
- Livestock on-off dates, weights, body condition, etc.

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[1]The development and upstream movement of a vertical or near vertical change in bed slope of a stream, generally evident as falls or rapids. Headcuts are often an indication of major disturbances in a stream system or watershed.

[2]The properties of a stream bank that counteract erosion, for example, soil type, and vegetation cover.

[3]Turbidity is a measure of the murkiness of water, reflecting the amount of sediment in the water.

[4]Soil crusting results from rains breaking down soil aggregates into particles that cement into hard layers at the soil surface when drying occurs rapidly.

[5]The uppermost layer of the soil, made up of freshly fallen or slightly decomposed organic (usually plant) materials.

[6] Soil compaction is the changing the nature of the soil such that there is a decrease in the volume of voids between soil particles or aggregates; it is manifest as an increase in bulk density and a severely compacted soil can become effectively impermeable.

[7]Numerical proportion (% by wt.) of sand, silt and clay in a soil. Texture can be coarse (sand particles predominate), medium (silt particles predominate), or fine (clay particles predominate).

[8]The wearing away of the land surface by water, wind, ice, gravity or other natural or human forces that detach and remove soil particles or rock material from one point for deposition elsewhere.

OSU Harney County Extension Service

High Desert Ranch & Family Newsletter

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CALENDAR:

June– 24th-Range Field Day, 2008. Jordan Valley Community Hall, Jordan Valley, OR. Program topics include western juniper ecology, medusahead management, fire and grazing interactions on sagebrush steppe rangelands. Contact Dustin Johnson at 541-573-2506 for more information.

July– 7-9th—Western Juniper Management Field School. A hands-on 2.5 day course at the Northern Great Basin Experimental Range near Burns, OR. Class begins @ 1pm on Monday, July 7th and ends Wednesday, July 9th at 4pm. For more information, please contact Hugh Barrett, Instructor at (360) 609-7249. To register, contact Ashley Seim, OWEB at (503) 986-0186 or ashley.seim@state.or.us.

9-10th—Assessing Riparian Condition: Workshop for 2008. The workshop includes one day in a class room setting and one day assessing the condition of streams in the field. There is no tuition, but space is limited. See insert for more information or contact Dustin Johnson @ 541-573-2506. Contact Karen Moon, Harney County Watershed Council at (541) 573-8199 to pre-register.

24th– 10 am—2:00 pm. Winter Feeding Forum. Crook County Extension Office, Prineville, OR. See insert for more information or contact Dustin Johnson at (541) 573-2506 or Barbi Riggs at (541) 477-6228.

31st: 10am—2pm. Winter Feeding Forum. Eastern Oregon Agricultural Research Center, MP 4.62 Hwy. 205, Burns, OR. See insert for more information or contact Dustin Johnson at (541) 573-2506 or Barbi Riggs at (541) 477-6228.