

THE VALUE OF REST

EDITED AND COMPILED BY BARBARA WIES

PRODUCED WITH ASSISTANCE FROM NEVADA RANGELANDS RESOURCES COMMISSION



Pronghorn antelope graze in irrigated fields north of Buffalo, Wyo. When lands are cared for, everyone benefits, wildlife banquets. Photo © Cynthia Baldauf

When it comes to the value of *resting* land, opinions are as varied as wild plants. That's because a carefully prescribed time and duration of rest in one area might be of great benefit, but the same prescription just won't fit someplace else. As every rancher knows, conditions of rainfall, heat, wind, water supply and soil vary from season to season and from one side of a hill to the other. Rest can restore an

area to abundance or cause its resources to literally dry up and blow away.

Ruminants (cattle, buffalo, deer, antelope, sheep, elk, etc.) need good grass. In one of those marvels of nature's harmony, they also create the conditions that allow good forage to flourish, even in dry and brittle environments. Once you understand how rest works, you can never look at a patch of ground in the same way again. ■

CONFESSIONS OF AN ENVIRONMENTALIST

I LOVE ANIMALS, NATURE AND THE GREAT OUTDOORS. IT TOOK YEARS TO REALIZE IT WAS A GENETIC DEFECT. BY HANK VOGLER

Yes, I knew at a very early age that I loved animals, nature, and the great outdoors. I now have come to the realization that it is a genetic defect. Yes, the dread mutant gene. It makes you want to raise animals, irrigate meadows, work for nothing and, last but not least, do this while being despised.

For years I hid it. Relatives would ask, "So what are you going to do when you grow up?" Well, I knew better than to say agricul-

ture. That would only cause a lecture on the futility of that profession. So I would say that I was leaning toward nuclear fusion. This would stop the questions. In the 1950s, few even knew what that was. My advisers knew what they were talking about. My family had been in agriculture for generations. They, like me, were environmentalists of the truest form.

We lived at the end of the road. No TV, a

crank phone, radio at night, and knowledge of lots of card games, puzzles and parlor tricks. You ate well. You had to pull string tied to the end of your bed for a light switch. The house was built before electricity, so all the conduit ran outside the walls. Porcelain pull switches hung from the 12-foot ceilings and required an extension string. The bed was always cold but once you got in, you warmed right up. Clothing was simple. You had chores

to do after school. You always knew that the ranch came first. Making do was a way of life.

Haying started the day after the fourth of July. You were responsible for a small John Deere tractor called an MT. It had a John Deere Number 7 mower behind. You learned the lingo. Yes, the cutter bar, inside shoe, outside shoe, guard plate, gear box, breakaway bar, and the pitman. The pitman stick had metal on both ends and a wooden center. If you got through the whole summer without breaking the stick, you were a hero. Three seasons and you were a legend.

Snipe hunting was a joke played on city cousins. Also, if you were the first mower to the currant berry bush, you wanted to go slow or you would have the drizzles the rest of the day, as they were sweet and good, but powerful.

Grain harvest started in mid-August. John Deere Number 55 combines were all fine-tuned by my grandfather and George Hoffman. If you have never had grain chaff run down your neck, you haven't lived. At the very least, you feel like you will itch to death. And when you add a few flying ants to the mix you will wish to be dead.

The first thing in the morning, you must grease and fuel the green lumbering beast. There are two million grease zerks on an old combine. You must get inside and grease the straw walkers and clean the shaker screens. So by the time your day starts, you are already covered with chaff. If you scratch once, you are doomed for the rest of the day.

The next thing you head for is the spot you left off the night before. As you approach the last swath, you notice it has moved. The ducks and geese have been harvesting all night. You line up with the unharvested spot that the geese haven't eaten and pull the lever that engages the header and all the rest of the gears and belts that are needed to turn the crop into grain. You hear a loud thump thump. You want to cry but you know better. After all, it's your fault that you didn't check under the Jackson feeder. Yes, in the night, the ducks would get into the header of the combine and eat the thrashed grain from under the auger.

Very often they will get up into the Jackson feeder. When you remove the plate to add grease, you should look very carefully for Donald Duck or pay the consequences. Yes, the thump you heard was the duck going through the rub bars. You now have puree of duck all over the shaker screens. You must clean them off or they will plug. More chaff and lost time. Now all of a sudden the noise

B. MARIE JARREAU-DANNER, BURNS TIMES-HERALD



Birds no longer fill the sky at the Malheur Wildlife Refuge. This flock is on private land nearby where birds can still find living marshland.

SUSAN HAMMOND



With nothing to stop them, noxious weeds choke the waterways making irrigation impossible and deterring wildlife access.

SUSAN HAMMOND



Blitzen River in the Malheur refuge is choked with perennial pepperweed and thistle. Unrestricted, they are overgrown and fall into the water to infest lands downstream.



Malheur Wildlife Refuge lands are being burned to remove excess vegetation. In earlier times, this vegetation provided food for livestock. Now this valuable resource goes up in smoke.

of the combines has scared the geese and ducks. The sky turns black with formation after formation, wave after wave of waterfowl. The sun is shaded out. Alfred Hitchcock's movie, "The Birds," won't hold a candle to this scene. Away they all go, back to Malheur Lake. The sandhill cranes just sort of step aside of the combines, as they have been protected for years.

I don't think granddad wanted to be all that generous with the wildlife. We just lived in the shadow of the Malheur Wildlife Refuge. The refuge had a large marsh, almost jokingly called a lake. You could practically walk across it. The manager had been there since the '30s. He knew how to raise wildlife. Sixty some different ranchers had permits to run livestock and hay the refuge. The canals and irrigation system were endless. As soon as the hay was harvested, water was turned back out. It made pasture for the cattle and feed and protection for the wildlife.

The variety of animals was endless. Most years the refuge turned a profit. Yes, they sent money to the federal treasury. The ranch families contributed to the local economy, raised their families and handed their ranches on to the next generation. If it ain't broke, don't fix it.

What was wrong with this picture? Well, I guess plenty. The cake at the retirement party for the manager wasn't stale yet and the tornado of destruction began. People were bullied to leave. The rules were changed to "protect the environment." The irrigation system was destroyed. The water was allowed to fill the lake, rather than being used. This was crazy. What had worked for years didn't need change. Now all of a sudden the lake stayed artificially high. The private land near the refuge was rendered useless. Families'

lives were being destroyed.

How could this happen in America?

Well, it did and it didn't take long either. The only saving grace is that the wildlife left the refuge system in droves, moving to private land, seeming to prefer the company of domestic animals to fern fairies. Now the refuge has become a haven for predators. The meadows are long gone. The once productive marshes have turned into patches of tall white top and Canadian thistle. The budget of the refuge has become a black hole. On private land noxious weeds like that would have caused a law violation and litigation.

I didn't discover America. Neither did

SUSAN HAMMOND



Lands near the Malheur Wildlife Refuge are still grazed and hayed. Canada geese can find plenty of sustenance here.

you. The wilderness ended in 1492. Get over it! William Jennings Bryant liked to say, "Burn a city to the ground and it will spring back from the ashes, as if by magic. Destroy agriculture and weeds will grow in the streets of every street in America."

Look around. Is that a weed I see?

Where have all the ranchers gone? Where have all the farmers gone? And the loggers and miners? The answer, my friends, is blowing in the wind and it's blowing harder every day. ■

Hank Vogler and his family run a sheep outfit in eastern Nevada.

FENCE ON THE BORDER



The fence divides Oklahoma and Colorado. The Oklahoma side (left) is Oklahoma school land and is in cow-calf rotation, grazed for a total of 30 days in 2002. Three head of horses were added to the pasture in mid-February 2003, but no cattle at the time this photo was taken in mid-March. On the Colorado side (right) is the Comanche National Grassland. It was grazed for approximately 61 days in summer 2002 and shows a nice colony of sand bluestem growing out of a yucca plant. The Colorado side has always had moderately stocked seasonal use. Photo: Richard R. Riddle, range program manager, Comanche and Cimarron National Grasslands.

A WALK IN THE GRASS

GOOD BIOLOGY AND HEALTHY PASTURES. BY WAYNE BURLESON

Pasture management is based upon biological principles, an end-result kind of monitoring. This means we formally collect information after grazing—which is behind a potential problem, not in front of it. Shouldn't we monitor in front of something negative? In that way, we can see a wreck coming (in pasture management, it's usually overgrazing) and prevent it before it happens.

Suggestion—learn the following three biological principles and then go pasture walking.

BITE A SHOOT, KILL A ROOT

Think of a shoot as new plant growth just after it's been grazed. It's either new plant growth coming out of a previously bitten-off stem (new shoot growth) or the tillering of a new plant starting to grow from the base, root bud, or a rhizome of a grass plant. You have to get down on your hands and knees to see this growth. If your animals are biting off this new fresh growth, I suggest that you're shrinking the root systems of the best money-making plants you have in your pasture. That's something serious to look for.

So the solution is to go on a walkabout, with your animals still in a pasture. See if this "Bite a shoot, kill a root" is occurring. That is, see if you find a lot of severe (very close to the ground) blunt-end re-grazing occurring. Are gobs of new green plants trying to grow that are being grazed upon? If so, *it's time to move the cows!* It's better to control the amount of time spent grazing than the amount removed.

OVER-REST KILLS THE BEST

Over-rest is the flip side of overgrazing. It's bad and, worse yet, over-rest pays none of your bills. It produces zero income. It's sometimes tricky to see; it can be hidden in the grasslands. Over-rest can occur side by side with overgrazing. Remember to first look at the individual plants in your pasture. Later, try seeing the whole pasture to better understand the bigger picture. If you can do this, you begin to hear the voice of the land.

When you're out there scouting the pasture, wander around and see exactly where your animals are grazing and not grazing. Look for long-term rest areas (no disturbances). Just walk around a long-rested corner of a pasture sometime (no disturbances for over five years), pull back all the old dead litter off the plants and you may find the centers of plants completely dead.

Again, that's learning how to calculate a solution while you're in a pasture and then

change management right on the spot to fix things. For example, if you find over-rest, go get the animals, drop them in this corner with a block of salt, make them happy, figure out how to water them (use temporary quick fencing). Graze the over-rested area and let the overgrazed area rest.

DOWN YELLOW LITTER FEEDS LITTLE SOIL CRITTERS

This principle, I think, is one of the most important to truly understand and use when monitoring a pasture with the animals still there. As you walk around, look for pieces of broken-off grass that are yellow in color; yellow means it's current. Old gray color means it's very old grass. If you find no litter, this indicates that either you are currently overgrazing or have overgrazed the previous year, or moisture is adequate and the litter has melted into the soils. The point here is to monitor with the questions in mind: "Where is all the litter going? Has it melted or are your animals eating all of the old grass? Did the wind or moving water take it away? What's happening here right now?"

I like to see a pasture covered with down yellow-colored litter as an indicator that someone is doing a good job of managing.

I truly think that good pasture management goes hand in hand with good soil management. After all, it's the soil that tells the plant how much it can grow if it rains or not. We cannot control the weather, but we can control what goes on between the plants on the soil surface. How? Again, by walking a pasture and monitoring proactively with the cows still in the pasture. Think more deeply about why you would want to leave grass behind.

LEAVING GRASS BEHIND

- Allows for faster plant regrowth.
- Increases overall forage production.
- Provides for plant soil health and increases organic matter.
- Feeds wildlife.
- Feeds the small critters that live in and on the soil.
- Keeps the soil covered.
- Reduces raindrop impact and slows erosion.
- Cools the soil with shade and conserves moisture.
- Catches blowing snow.
- Provides for next year's livestock forage and can help to prevent grass tetany.
- Adds to a drought reserve.

Prevents overgrazing. ■ Increases the biological capital (the part of a pasture that your animals eat).

So remember these three biological principles. After all, healthy grasslands make more sense than allowing your most nourishing plants to become stressed by cows staying too long in a pasture. A good plan is to grow all the grass you can during fast plant growth and then delegate this healthy forage out over the rest of the year to feed your animals. But don't forget to also feed the little critters that live in soil. ■

Wayne Burleson is a pasture management consultant working out of Absarokee, Mont. Contact Wayne at 406-328-6808, e-mail <rutbuster@montana.net> or see <<http://www.pasturemanagement.com>>.



This grass plant is killing itself because it is never grazed. Decadent material overshadows everything and stifles its ability to thrive.



A healthy, grazed plant with new green material coming in. Hooves have left little depressions in the soil to trap shade and moisture.

JAMES D. KEYES, UTAH STATE UNIVERSITY EXTENSION, SAN JUAN COUNTY

BEWARE OF REST

IT MIGHT NOT BE WHAT YOU WANT. BY ALLAN SAVORY

The adverse effects of partial rest on grasslands in low-rainfall, very brittle environments cannot be offset by any known technology. Fire (to deal with the symptoms of partial rest, such as herbaceous and woody plant invasion) only aggravates the problem. The only way to offset partial rest is to apply animal impact (by domestic or wild animals) at a high enough level. This can be achieved through a combination of increasing animal numbers, amalgamating herds or ranches in collaboration with neighbors, and/or herd effect.

Herd effect is the very high animal impact achieved on land at any given time by large groups of animals. Even ultra-high stock density with small herds does not achieve the same level of animal impact that very large herds do even at low stock density. Large herds tend to push animals into dense brush, up steep slopes, etc., which small herds, no matter what the density, don't do.

Only two things in a brittle environment result in a high percentage of bare soil between plants over vast areas of land—too few animals wandering around and fire.

Too few animals wandering around leads to both overgrazing of plants and a high level of partial rest. The problem can be examined in terms of Holistic Management tools. Grazing is being applied as overgrazing. Animal impact is applied too little and too long. Rest is applied as partial rest over a prolonged period. The most confusing of these is partial rest. It is essentially the result of the bulk of the soil surface and plants not being adequately disturbed

by large herbivores that dung, urinate and trample, and in the process promote biological decay, increased plant volume (bulk), biodiversity and soil cover.

In my travels of late I've observed something occurring too frequently to ignore. A number of ranchers in low-rainfall brittle environments have found their land to be stagnating. After about three-to-four years of continuous improvement, their monitoring shows that ground cover, in particular, has stopped increasing. The bare soil between the plants stays at the same percentage year after year.

In Holistic Management we don't monitor to see what happens, but to make happen what we want to happen. All too

often we forget how essential this is. The ranchers I visited said they hadn't taken action to overcome the stagnation, mainly because they didn't know what to do. In some cases they hadn't taken time to adequately interpret their monitoring results, which would have given them some clues. Or they misinterpreted what they observed. In most cases, they simply ignored the results and carried on, hoping things would improve "once we get some decent rain."

On these ranches, very few plants were overgrazed, thanks to grazing planning. None had used fire. Thus, the persistence of bare ground could only be due to rest. And since they did have animals on the land, we had to look at the level of partial rest they were applying. (Partial rest occurs when animals are on the land, but there are too few of them to disturb the soil adequately.)

In each paddock they were alternating their use of the

tools. While animals were in the paddock they were using grazing with partial rest. While animals were out of the paddock they were using total rest (during the planned recovery period for the plants). The next time the animals were in the paddock, grazing and partial rest were applied, then total rest, and so on, year after year.

Stopping or minimizing the overgrazing of plants can explain the initial three-to-four years of improvement on the ranches, but



Stockmen examine a lush enclosure of high-quality perennial grass that has been grazed for just a day by 700 head of cattle. The herd was then removed so that the plants could recover. Outside the fence is land that has been over-rested and needs the stimulation of livestock. If that lush grass inside the fence is left to rest, it will die back to bare ground, too. The key to good plant growth in brittle environments is planned intervals of herd impact interspersed with adequate time for plants to recover. Photo Allan Savory

clearly the tool of rest (partial rest followed by total rest) was the dominant influence. Rest, either partial or total, is probably the most powerful tool known to us for promoting biological decay and enhancing biodiversity in nonbrittle environments, but it has the opposite effect at the other end of the brittleness scale and especially so in low-rainfall areas.

I asked if there was any place on the ranch where things had not stagnated. Some initially said "no"; others immediately said "yes." In fact, when we looked, they all had pockets of improvement somewhere on the land. These areas were always located either in the smallest paddock on the ranch, or where livestock had been periodically crowded. In each case the land had continued to improve where animal impact was repeatedly highest.

One of the ranchers had several exclosures (totally rested plots) scattered on his ranch. When these consistently looked the same as the surrounding land, he broke up his large herd and went back to four herds, as there seemed to be no point in keeping all the animals together. What he had missed was the evidence that despite lumping his cattle into one herd, the paddocks were so large and the herd so



Here, the land on the left had been totally rested for nearly 60 years; on the right livestock have continued to graze at a very low stock density (partial rest) over the same period. The effects of partial and total rest in brittle environments are similar.

small that partial rest remained the dominant influence. The effects of partial and total rest in brittle environments are very similar, as I discuss at length in my book, "Holistic Management: a new framework for decision-making."

If rest is responsible for the stagnation, then increased animal impact is the obvious remedy. The only other tools available for managing ecosystem processes—technology, fire, and small organisms—cannot do it.

Remember that by far the greater portion of soil cover in brittle environments is derived from litter rather than the basal area of perennial grass plants. In planning grazing, it is necessary to be constantly aware of the need to give grazed plants sufficient recovery periods to allow them to not only reestablish their roots, but also to grow sufficient material above ground to both feed the animals and provide litter.



In 1992, left, Cockatoo Creek at Kachana Pastoral Company looked like this. After several years using holistic management, above, the area has recovered. The only input is livestock and this riparian area is green year round.

However, litter can only be kept in place against the forces of wind and water by sufficiently close plant spacing (spacing gets closer with animal impact and gets wider with rest). When there is a high percentage of bare soil combined with very poor plant spacing, most litter is lost. For this reason it is more important to get more plants of any form growing (with animal impact) than to try to accumulate litter (by increasing rest beyond the time a plant needs to fully recover). This is especially so where the range has been reduced to mainly rest-tolerant grasses, such as the grammas, aristida and tobosa that dominate so many western-U.S. rangelands.

I'm the first to acknowledge that all ranchers face difficulties in achieving adequate animal impact to overcome the adverse effects of partial rest in brittle environments. This is particularly so where productivity, and thus stocking rate, is low. Many ranches are too small to support herds of adequate size while achieving the desired graze/trample-to-recovery ratios. In that case, a rancher might seriously consider amalgamating his ranch with a neighbor's to form one management unit. Ranchers have long done this in Africa to manage shared herds of wildlife, finding it greatly to their advantage.

Some ranchers are limited by the lack of adequate water for large herds and must use their ingenuity to develop low-cost delivery systems. Techniques to achieve sufficient animal impact frequently enough are still under development, but the creativity in this area is

impressive. If you are committed to improving your land, nothing can stop you from overcoming these obstacles, as people everywhere are demonstrating. ■

Allan Savory is a wildlife biologist and founding director of the Savory Center for Holistic Management, Albuquerque, New Mexico <www.holisticmanagement.org>. He helps ranchers on several continents.

OKLAHOMA TALL GRASS PRAIRIE

PHOTOS: BILL PHILLIPS, RESEARCH ANIMAL SCIENTIST, USDA-ARS.



Pastureland in Oklahoma that has not been grazed, burned, or sprayed since 1976. Note the large amount of ground litter and the presence of woody species. The area to the left of the fence has been used and has healthy grass.



Cows graze much of Oklahoma's tall grass prairie. This area has been grazed for almost 100 years.

FROM THE GROUND UP

NOTES FROM A FORMER FEDERAL LANDS MANAGER. WORDS & PHOTOS BY ED DEPAOLI

One of the mistakes the preservationists make is to believe rest can be stockpiled. It can't. Just like our idle obese segment of the U.S. population, over-rest is causing range vegetation on some ranges to deteriorate, stagnate and die.

Rest is necessary and vital to all living organisms. The key is to provide it at the right time, for the right duration, at the right location.

To blindly advocate rest for long durations in hopes of solving problems only creates others. Our medical professionals no

longer recommend long inactive stays in the hospital. Patients are urged to get up, move, and get going. It hastens their recovery. The same is true for range vegetation.

A rest period is necessary but activity, in the form of grazing use, is also necessary. If, for example, desirable perennial grasses produce a good seed crop the first year following a fire, they should be grazed to shatter and plant that seed. All perennial grasses require some seed coverage by mineral soil to germinate and take root. Grazing can provide this. Without it, the majority of a

crop of seed is wasted.

The current federal agency policy of a blanket two-year rest period following fire or reseedling avoids looking at the land to see what is really needed, what is really going on. This look should come first, before a blanket recommendation for two years of rest is imposed, regardless of reality. ■

Ed Depaoli has a degree in range from the University of Nevada, Reno. After retiring as area manager for the BLM's Lakeview District, he moved to northern Nevada to ranch.



These pictures were taken in April 1996 on the east side of Palomino Valley near Reno, Nev. All are of the same canyon, taken at the same elevation. The owner of the ungrazed portion, above, had it fenced and livestock excluded. We lease the grazed portion, below, and grazed it completely from July to November each year. Note the dead, matted, unusable grass from the unused portion versus the green vigorous growth from land that had been grazed the previous year (1995).



50 YEARS OF UTAH HISTORY

Photos and text from "A Photographic History of Vegetation and Stream Channel Changes in San Juan County, Utah" by Earl C. Hindley, James E. Bowns, Edward R. Scherik, Paul Curtis, and Jimmie Forrest, supported by San Juan County, Charles Redd Foundation, Utah State University Extension, July 2000.

TOP RIGHT: Dry Valley. This photo was taken in 1940, and shows a Civilian Conservation Corps' reseeding program administered by the BLM. The Dry Valley area is north of Highway 163 and the road to Grand Canyon overlook in San Juan County, Utah. Photographer unknown. BLM, Salt Lake City, Utah.



RIGHT: Dry Valley, 59 years later, showing a healthy and diverse plant community with mature four-winged saltbush and shadscale. Threeawn grass has mostly been replaced by more productive Indian rice grass and needle-and-thread grass. Many other plant species also thrive here. The area is still grazed by cattle. PHOTO: Earl C. Hindley, 1998.



Lockhart Canyon. This 1927 photo shows a U.S. Government Survey camp in Lockhart Canyon, Utah. The view is south across BLM-managed land. The soil has a very low available-water capacity and annual rainfall is 7-to-9 inches. PHOTO: A. A. Baker, U.S. Geological Survey, Denver, Colo.



Lockhart Canyon. This 1999 photo was taken just after heavy cattle use. It shows an increase in shrubs and much-improved ground cover. Since 1927, a small riparian zone has developed along the drainage area. Livestock are drawn into the area by nearby springs and seeps. PHOTO: Earl C. Hindley, 1999

REST-ROTATION, RECOVERY

BRINGING BACK A COLORADO WATERSHED. BY BEN BERLINGER. PHOTOS BY TONY ARNHOLD, SOIL CONSERVATIONIST, NRCS, TRINIDAD, COLO.

All of these photos are of riparian areas located in the Purgatoire River Watershed Project. This project was funded under the Natural Resources Conservation Service (NRCS) Small Watershed Program (PL-566). It was approved for funding in 1992. The project covers about 111,000 acres of the northwest portion of the watershed that is located in western Las Animas County in extreme southcentral Colorado.

One of the primary objectives of the project was to restore the structure and function of the major riparian areas within the watershed. To accomplish this, riparian areas were targeted where landowners agreed to implement prescribed grazing management that would replace the continuous season-long grazing that had previously taken place. These areas were then fenced, if needed, and off-stream livestock water was developed to enable several pastures (including the riparian pastures) to be properly stocked and rotationally grazed. This controlled the frequency and intensity of the grazing periods while allowing adequate opportunity for the grazed plants to recover. The project was successful in restoring health to the riparian areas in the watershed. ■



Bowman Ranch is located on the lower Burro Canyon tributary to the Purgatoire River. Photo taken in April 1995 showing effects of historical season-long grazing.



Arcadia Partners, Inc. ranch is located on the Riley Canyon tributary of the Purgatoire River. Taken in April 1994 under poor grazing practices.

UTAH WITH AND WITHOUT GRAZING

These photos were taken on Monday, March 24, 2003 on BLM land just east of Canyonlands National Park. The first two photos are in an area called Hart's Point. The picture on the far right is of an area called Dry Valley. Photos are by James Keyes, an agricultural natural resource extension agent and rancher in San Juan County, Utah.

The land on the left side of the fence has been grazed this spring. The right side has been closed off to grazing for over 40 years. You can see how the decadent and live sagebrush have overshadowed the rest of the plant community allowing no variety of plant species.





Bowman Ranch two months after implementation of prescribed grazing management. Note the installation of the riparian pasture division fence to facilitate the rotational grazing management program. Taken in October 1998 after five years of prescribed grazing.



The riparian vegetation has responded through the establishment of a diverse plant community consisting of grasses, sedges, rushes, forbs and woody plants. Many of the cottonwood and willow shrubs were planted using cuttings of switches and poles obtained from the NRCS plant-materials center in Los Lunas, New Mexico as well as from local native cuttings in the area. As a result, this riparian area has moved toward proper functioning conditions.



Arcadia Partners, Inc. ranch showing Riley Canyon riparian area after a single growing season of prescribed grazing. Fence shows the development of a livestock watering point using the stream for providing restricted livestock watering access since off-site water was not feasible to develop in this area of the canyon. Note the vegetation that has established and is being maintained even within the livestock watering access point.



The same area in April 1999 before spring green-up shows the positive effects of five years of prescribed grazing management. Proper stocking rates combined with a 12-pasture rotation controlled the frequency and intensity of grazing periods and allowed time for the grazed plants to recover. Improved vegetation composition has restored proper structure and functioning conditions to this riparian area. The stream has narrowed and deepened. A flood plain now exists to help dissipate energy from flooding. Native cuttings as well as switches and poles from the NRCS plant-materials center in Los Lunas, were used to plant cottonwood and willow shrubs.



(Same enclosure as photo at left) Land to the right of the fence has been grazed and shows a variety of grasses with space among the sagebrush for plants to thrive. Where cattle have been excluded for 40 years, sagebrush carpets the ground, shutting out other growth.



The left side of this fence has been heavily grazed this spring, while the right side has been excluded for over 40 years. The grazed side has been hit very hard, and is also suffering the effects of drought. There doesn't appear to be much difference in the two sides.

REST, ROTATION AND RESEARCH AT MONTANA'S MATADOR

PHOTOS BY SUSAN MARXER

The Sage Creek Rest-Rotation Research Project at the Matador Ranch in Montana shows how properly managed grazing can actually enhance vegetative cover and provide

excellent filtration during periods of severe runoff. The area to the left of the fence has been grazed under a rest-rotation plan since 1976. The plot on the right has been closed to cattle during that period. The grazed area is clearly the more vigorous and healthy. The area in the photo is part of the Basin Creek Westslope cutthroat trout fishery with "huge" native fish.



The Long Creek Study was a five-year cooperative study between the Forest Service, Matador Cattle Company and Montana State University to scientifically measure the effects of livestock grazing on stream channel shape and vegetation. The pasture was completely rested in 1992 and 1993 to allow willows to get better established. Beavers, however, were left on their own. Not only did they use up whatever willows they



Bear Creek in the Centennial Valley showing unrestricted beaver activity. The creek contains pure Westslope cutthroat trout. Matador Cattle Company is working with federal agencies to restore habitat.

could get, the dams they built with cinquefoil collapsed sending more silt downstream in 1992 than could happen in many years of grazing. Most of the variation in vegetation is due to timing and amount of rainfall and temperature.



ABOVE: Lone Butte pasture in late August 1990 after grazing. It will be rested for 35 months to allow the willows to become better established. BELOW: Same site in early July 1993 after 35 months of rest. Where are the willows?





LEFT: Another area of Lone Butte pasture, August 25, 1990, with a green swath of willows in the middle distance. RIGHT: This shows the same area August 27, 1993, after a day of grazing. The difference in climate tells a lot about ranching in Montana. The absence of willows tells a lot about beavers.



Lone Butte pasture photos before and after three years of rest. In 1993, the stream banks gape and the willows are gone.



Clayton and Ray Marxer on the first day of monitoring, August 25, 1990.



Landon Meadows on the Matador Ranch, Summer 1991. Tall grass almost hides Ray Marxer. PHOTO: Dale Marxer.

WHAT DO WE WANT THIS LAND TO BE?

PERMANENT MOONSCAPE OR DYNAMIC GROWTH?
STORY BY NORM LOWE, PHOTOS BY DAN DAGGET.

A lot of expert proof and argument exists in the literature for all sorts of grazing and nongrazing scenarios that should be right for the land. Proof is pro-

vided from one extreme showing a domino effect of grazing leading to the ecological downfall of the whole American West; to the other extreme indicating that grazing can be

the only viable tool to sustain healthy ecosystems in the West.

Amazingly, the term “grazing” isn’t even defined in scientific research articles about the effects of grazing on the land. Readers are left to assume a convention about grazing being one specie of commercially raised livestock left to wander leisurely over a piece of land until some determined level of forage use is made.

Could this convention even have meaning on naturally dynamic rangelands, such as African savannahs, where over 30 ungulate species of all sizes, many rodent species, and hundreds of insect species graze and impact an area sustainably over thousands of years?

Clearly many of our outspoken issues about grazing center on unspoken beliefs. The conventional wisdom that maintaining low stocking levels (or better yet, total exclusion of grazing) is best for the land may actually be the crux of the underachievement of our rangeland ecosystems.

Back in 1993 a group calling itself Six-Six (started by six ranchers and six environmentalists) set their mind to test claims that grazing animals could actually be good for the land. I got involved volunteering my range-



Norm Lowe, left, and volunteers monitor a study plot inside a five-acre enclosure on Babbitt Bros. CO Bar Ranch in Arizona, April 27, 1993. The area is about to receive its first treatment using 173 cattle after having winter grazing only for 175 years. In the background are the San Francisco Peaks.



Monitoring a study plot on Wupatki National Monument, April 27, 1993. This plot is 50 feet north of the impact enclosure and has had no grazing since 1989.



Study plot on Wupatki National Monument directly north of impact enclosure, October 2000. There is much more standing plant life, though most is dead, with live plant spacing from random point at 3.67 inches.

monitoring skills for a test site.

Bill Cordasco, manager of Babbitt Ranches, provided the group with an interesting study site by fencing a five-acre enclosure on

NORM LOWE



May 1993. Milling cattle are trampling plant litter into the ground. Inside the five-acre impact enclosure are 173 head of cattle.

private C O Bar Ranch land bordering Wupatki National Monument. It is located 25 miles north of Flagstaff, Ariz. This area of the national monument had just been fenced from the ranch in 1989, providing the opportunity to monitor the long-term effects of rest from grazing.

This area of the ranch is part of a 38,000-acre pasture that has historically received winter/early spring-only cattle grazing. In May of 1993 I installed three sets of study plots; one to monitor effects of intense animal impact followed by rest within the enclosure; the second to monitor effects of winter grazing on the C O Bar pasture; and the third to monitor effects of total rest from cattle grazing on the monument.

During October of each of the next 10 years I monitored all three sites with photo points, sketch plots, line intercepts, random point and frequency transects, and monthly precipitation recording. Each October a herd of about 1,000 cattle coming off Forest Service land are trailed past the enclosure area on their way to the winter pasture.

In May of 1993, a sequence of short animal-impact trials with long rest periods was started by putting 173 cattle on the enclosure for 48 hours. The purpose of the trial was to replicate effects of herd impact on the ground, yet on the first trial the animals ate all forage including the litter on the ground.

Most of the Six-Six group feared we had just created five acres of permanent moonscape, and ranch cowboys reminded us that we could have just looked at any corral to see the predictable bare-dirt outcome. Five months later 400 cows were put in for 20 hours. Despite less-than-normal precipitation of 7.5 inches over the next 12 months, vegetation displayed the dramatic growth response shown in the photo on page 49. In spring of 1995, 175 cattle were put on the plot for 28 hours; in October of 1997, 860 cows were put on the plot for four hours;

OWENS CREEK ALLOTMENT, 1949 & 2000



This slope above Owens Creek shows gully formation with unstable banks. The allotment was grazed by approximately 3,546 head of cow/calf pairs from June 16 through October 15. Precipitation that year was 110 percent of average. Photo by Arthur Cramer, September 27, 1949, Denver Public Library, Western History Collection.

INSET: A photo of the same site in 2000 shows abundant grass. The allotment is currently managed using a deferred-rotation grazing strategy. From September 25 to October 5, 2,188 cow/calf pairs grazed here. Precipitation for the year was 80 percent of average. Photo: Bob Mosher, U.S. Forest Service, October 13, 2000.



WEST MUDDY CREEK, MULE PARK ALLOTMENT



A note on the back of this photo pointed out the channel cutting and the "poor-to-depleted range where ranchers once cut hay." Precipitation that year was 110 percent of normal and 500 cow/calf pairs had grazed from late June. Photo by Arthur Cramer, September 27, 1949. Denver Public Library, Western History Collection.

RIGHT: In late summer 2000, the benefits of a four-pasture rotation system show even though the rainfall was a mere 80 percent of average. The pasture was grazed by 713 yearling cattle from June 6 to 21. BELOW: This is the same rotation-grazed pasture a quarter mile from the view in the two previous photos. The picture was taken in late July 1998 after 600 ewe/lamb pairs grazed "late and lightly." In 1998, rainfall was only 80 percent of average. Photos: David Bradford, U.S. Forest Service.



Material and information supplied by Floyd Reed, U.S. Forest Service, forest rangeland management specialist for the Grand Mesa, Uncompahgre and Gunnison National Forests.

and the enclosure has been rested since.

I found that monitoring the same spots every year showed how very dynamic desert ecosystems are, as no two years were the same. If any two years are randomly compared with each other, differing trends can be noted. Careful annual mapping of the basal area of plants within the sketch plots revealed that even bunchgrasses change their presence and form significantly from year to year. I also noted how essential it is to have rainfall data to make sense of plant-data comparisons, especially that of the rainfall of the growing season just before doing plant monitoring.

During the 10-year monitoring period, annual rainfall varied from 12.5 inches to 4.8 inches. Despite the lack of much growth due to the drought of the past three years, the enclosure shows a net 55 percent closer spacing on the impact site compared to the area rested for 14 years, and the winter use



May 1993. Looking north on the west side of the enclosure. Note total removal of standing vegetation inside the enclosure by 173 cows in 48 hours.

area shows an intermediate response from annual dormant-season grazing. On the monument area, with no grazing since 1989, the standing biomass is higher but is markedly tending towards decadence with many fewer living plants. The much greater standing dead biomass has attracted nearby fires in 1995 and 2002.

I have monitored a nearby fire site since



September 1994. Looking north on the east side of the enclosure. Inside the enclosure (left) there is dramatic green-up after 11 months of total rest from animal impact.

1995 and found that plants came right back initially in about the same density as before the fire, and then have decreased in density due to drought. According to Bill Cordasco, lack of rain always puts desert growth on hold; however, the closer spacing, younger age class distribution, normal form, and higher litter in the impact enclosure means these plants will respond the best when

WEEDS IN WASHINGTON

BY SHEILAH KENNEDY, NOXIOUS WEED CONTROL MANAGER. PHOTOS BY OKANOGAN COUNTY NOXIOUS WEED CONTROL BOARD INSPECTORS.

The Washington State Legislature approved thousands of dollars for the State Wildlife Agency to purchase lands as Wildlife Habitat areas; however, no funding was approved to manage the lands. In Okanogan County, where the Methow Wildlife Area is located, the economy is depressed. Years ago, when ranch operations became available for sale, the adjacent rancher would usually try to purchase the land. Now, ranchers can't compete with the State Wildlife Agency and their budget. Plans are afoot to try to get noxious weed control addressed in the purchase and sales agreements working with state and county Weed Boards to address long-term management.

TOP: Solid stands of diffuse knapweed have begun to infest the wildlife area. Diffuse knapweed provides no wildlife food value. There are unconfirmed reports of wildlife grazing on diffuse knapweed early in the spring; however, it is nothing they will seek. Also this infestation of diffuse knapweed will travel up the hillside in the distance if left untreated or uncontrolled.

BELOW: Alongside a county road, Dalmatian toadflax has entered state wildlife lands and is scattered throughout the property. It can be seen in the distance up to the pine trees.



rains come again.

Why didn't the land within the enclosure die as both cowboys and environmentalists predicted? Concerning grazing and animal impact, it is clear that the fourth dimension of time matters a whole lot, even though this concept is not factored in the normal grazing convention that focuses on numbers of animals. Also, when considering the options of flash-impacting land with large numbers of grazing animals, many other outcomes were possible. With creative planning, animals could be managed to create a mosaic of impact patterns. Timing of impact could have been adjusted to favor the increase or decrease of selected plants—it just depends on having appropriate goals, incentives, and monitoring required for desired outcomes.

I have observed that when people change the convention, they can achieve very different outcomes. Instead of asking, "What should we do with the land?" the real question is: "What do we want the land to be?"

The first question begs for a prescription, which most always produces unintended consequences; while the second requires we work and monitor for a condition outcome. Once we decide what we want the land to be, then institutions, incentives, and science can be used by us in ways that will achieve desired outcomes—and grazing then becomes an uncontroversial tool of whomsoever society designates as the land stewards. More and more land stewards are now using planned grazing impact as a tool for controlling fire hazards, controlling noxious weeds, and building biodiversity.

Most readers will be uneasy about deciding what we want the land to be. This is because our legal system has divided up nature's whole bundle of property rights (minerals, water, air, wildlife, game, forage, wood, access, development rights, etc.) and given dominion of each to all sorts of entities (private citizens, corporations, local and national agencies) which are not even obligated to work with each other.

While this may sound analogous to our system of diverse specialized medical experts working to keep a person healthy, it must be noted that a human patient possesses sovereignty while land does not. A person will demand optimal health for him or herself. Without any such sovereignty, the land may be valued as a dynamic living organism to one right holder, while having value as dead real estate to another. Beauty is in the eyes of the right holders, thus our many ecologically deteriorating public parks seem to be just fine



Looking northwest from inside enclosure toward ranch house, May 1993. After 173 cattle have impacted the area for 48 hours, there is total destruction of above ground plant matter. Five months later, 400 cows were put in for 20 hours. It was a predictable bare-dirt outcome.



Looking northwest from inside enclosure toward ranch house, September 1994, shows a dramatic response to rest after the impact of a year ago. There are many more seed heads inside the enclosure than outside.

to most tourists—after all, the spectacular erosion of places like the Grand Canyon constitute world treasures.

Nature herself shows us that there are multiple outcomes for the same sites from natural forces exerting themselves over time, due to the geo-morphological and biological diversity on the same areas. Because soils, plants and animals are all living, they have a pulse. If society chooses to sustain the potential health of our lands, then, like doctors, our land stewards and scientists must wisely monitor the dynamic pulse of rangeland soils, plants and animals and work together towards sustaining optimum health.

Excuses, blame, litigation, research and regulation all combined are not reversing the

pervasive march of rangeland desertification. Collaboration among all rights holders (stakeholders) working toward a common vision for what we want the land to be is what is required if we are to sustain our mother earth as a "thriving patient." ■

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