

Dry Times: Managing Through a Drought

by Kirk L. Gadzia

If only it would rain! These words have been heard in many parts of the West this year and echoed through the centuries as agriculturists looked to the skies for salvation from drought. While more rain would certainly help the current situation, there is little more that we can do, except to wish, to actually cause more rain to fall.

Unfortunately, it seems that many ranchers caught in the current drought cycle will use "wishing it would rain" as their main tactic for survival. But, hope alone will only ensure that the important steps you should take now to manage your ranch and business most effectively will be put off until it is too late to act. The key components of managing through a drought mirror the whole that encompasses any ranching operation. Namely: people, money, and land. This article will examine ways you can actively affect your future and that of the ranch in a drought cycle.

People-Centered Principles The single greatest aspect of

managing through a drought is the attitude of the persons who are in



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Ranch to address the question of Drought, which is a subject on many people's minds these days. There is some evidence that the incidence of drought in the Southwest may be increasing. We know that drought has a significant effect on the environment, causing increased erosion and sedimentation, damaging already low creeks and rivers and their attendant riparian areas, as well as affecting water quality. This newsletter offers some suggestions for ranchers at this time to help them and the environment they are a part of.

charge and making decisions. Franklin D. Roosevelt once said, "The only thing we have to fear is fear itself." Fear is a natural reaction when you feel out of control of any situation that is critical to your security. While fear may be a good motivator, it often creates the climate for poor decision making. The key to overcoming this is to gain mental control over the situation. This requires that you make a plan of how you are going to deal with the drought and take action on your plan.

However, skipping the planning aspect of this strategy is all too common. It reminds me of the accuracy we are likely to achieve if we follow the orders, "Ready, Fire, Aim!" Once you commit to taking an active rather than a passive role in drought management, the planning or aiming must be done first.

Ask yourself if you have a written drought plan in place or must you create one now? Most people would answer that they have a plan, but it is not written down. There is in

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Grassbanks in the West: Challenges and Opportunities A Two-Day Conference of Ideas and Experience Friday-Saturday, November 17-18, 2000; Santa Fe

Sponsored by The Conservation Fund, The Quivira Coalition, the Malpai Borderlands Group, the Northern New Mexico Stockman's Association, the United States Forest Service, and the NMSU Cooperative Extension Service

In the West today, several grassbanks are providing opportunities for traditional ranching communities to keep the large landscapes they depend upon intact. Grassbanks are still a work-in-progress. One of the best results of their use to date is the increased flexibility, collaboration and creativity engendered between the ranching and environmental communities. The mission of this conference is to further explore grassbanking's potential to help stakeholders manage large landscapes in the black, both financially and biologically.

Conference Topics include:

-What is a grassbank and why are grassbanks needed?

—How and why does a grassbank offer answers to the challenges posed by ecological and economic conditions?

—How is a grassbank assembled? What are the essentials, including land, cooperators, cattle, permits, NEPA, steering committees, social and geographical boundaries?

-How have effective partnerships been formed among ranchers, agency personnel, donors, and conservationists?

—How can grassbanks help federal and state land management agencies accomplish their stewardship objectives?

-What obstacles do grassbanks face?

-How do we measure and maintain grassbank success?

Speakers include: Drum Hadley (Malpai Borderlands Group), Bruce Runnels (The Nature Conservancy), Palemon Martinez (Northern New Mexico Stockman's Association), Kris Havstad (Jornada Experimental Range), Owen Lopez (The McCune Foundation), Virgil Trujillo (Ghost Ranch), Bart McGuire (City of Tucson), Gerald Chacon (NMSU Extension Service), Ed Marston (High Country News), and others.

The Conference will be moderated by **Bill deBuys**, director of The Conservation Fund's Valle Grande Grassbank. The goal of this grassbank is to provide alternative forage for cattle while the home allotments are restored

ecologically through thinning of forest and prescribed fire.

> On Saturday, we will tour the Valle Grande Grassbank, located east of Santa Fe. The Conference will end with a catered BBQ lunch.

There will be a fee for the conference, and space is limited. For reservations or more information, contact Courtney White at (505) 820-2544.

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It's hard to believe we are three years old already.

It seems like yesterday that the three of us sat on a sunny slope in Emory Pass, watching Jim's daughters play in the snow, and talking about whether we could influence the grazing debate. It seemed like a far-fetched idea at the time.

Not anymore.

We believe we are slowly, but surely, affecting the nature of the grazing debate. We see it on a daily basis—by shaking hands with a wide variety of folks, by responding to a rising tide of requests for assistance, and by watching the tenor of the debate shift from the extremes to the "radical center." Our role is small, but growing.

At its June meeting, our Board of Directors decided to push forward with an expanded program for the Quivira Coalition, building on our successes so far. In addition to the educational slate of Outdoor Classrooms and workshops, we will be hosting another herding clinic at Ghost Ranch and expanding our Demonstration Projects significantly.

Our first major publication, The New Ranch: An Owner's Manual, will debut in January at a conference in Las Cruces. This book will review the scientific and economic foundations of progressive ranch management in an easyto-read form that should serve anyone interested in the New Ranch movement.

We are also exploring the possibility of getting into the business of contract monitoring. We believe there is a huge need for third-party, nonpartisan, scientifically directed, cooperative monitoring of land conditions. The Jornada Experimental Range has developed a new scientific protocol for monitoring and has agreed to help establish a certification process by which individuals will be trained to become professional monitors.

We think this could be a critical piece of the grazing debate puzzle.

We are also contemplating an Annual Conference, a study on the effects of sprawl on rural ranches, and another book.

To accomplish these goals, we've made a few changes. As of July 1, Barbara Johnson, cofounder and Vice-Chair of the Quivira Coalition, resigned from the Board to become our Communications Director. At the same time, we hired Tamara Sherburne as our very able Administrative Coordinator.

Merle Lefkoff has agreed to replace Barbara on the Board.

So, despite our youth, we're making progress. Our goal is to remain true to our original mission statement—to promote good stewardship and foster bridgebuilding between different groups—while expanding our influence and impact. We think we are well on our way toward this goal.

There is one more thing we couldn't predict on that sunny day in Emory Pass:

We intend to stick around.

From the Founders

Jim Winder Courtney White Barbara Johnson



Drought: A Scientific Perspective

by Dr. Kris Havstad, Supervisory Scientist, Jornada Experimental Range

"Thus, drought resulting in a reduction in production is the rule not the exception in the arid Southwest, and the resulting reduction in annual yield is substantial."



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During the summer of 1995 we sold 75% of our cows off of the Jornada Experimental Range outside Las Cruces, New Mexico. Precipitation at the Jornada had been around 50% of normal across much of the Range during 1994, and, more importantly, forage production was very low. By July 1995, we entered the growing season (or what we hoped would be a growing season) with our key forage species under severe drought stress and with little residual standing plant material in place from the 1994 growing season. Even if we received normal summer rains (usually about 5" in July, August, and September) our main perennial grasses (black grama, mesa dropseed, and red threeawn) on our upland sites would still be recovering from the 1994 drought.

Even though our stocking rates in 1994 were light to moderate for this desert rangeland, further destocking was our obvious management choice. We gathered our cattle early in the summer, and we were able to sell cow and calf pairs for a relatively high price. As it turned out, the 1995 summer rains were below normal and, by destocking early, we were able to avoid compounding a second year of drought effects with excessive grazing by livestock.

Of course, the Jornada Experimental Range is a research facility run by scientists. We are much more adept at planning research and testing hypotheses than we are at managing a ranch operation. In addition, as a federal laboratory, we don't face the economic realities of bank loans, taxes, and grazing fees. But, we still need to respond to the ecological realities of drought while we manage the natural resources of the Jornada that serve as a basis for our research. Fortunately, we have a considerable set of scientific results we can use to help us understand characteristics of drought, effects of drought, and the importance of post-drought management.

Effects of Drought

The effects of drought (stress due to a water deficit) on plants are tangible and well documented. Effects can be direct (desiccation and changes to plant cell structures) or indirect (plant protein breakdown and reduced photosynthesis rates). More importantly, drought effects may be reversible and harmless, or they can be injurious and finally result in plant mortality. Plants have developed many different mechanisms for avoiding or tolerating drought. Yet, one general observation from research in the Southwest is that drought effects are increased when combined with other disturbances that remove plant tissues, such as fire and herbivory.

One of the reasons the Taylor Grazing Act of 1934 created a federal agency to manage western U.S. public lands was drought and the need to manage its effects. Ninety years ago stockmen realized that rangelands needed to be destocked and carefully managed during and after droughts. However, without regulation, a stockman could reduce his herd size to accommodate

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drought, but if stock water was available, someone else could and would move stock onto that same public land and graze any available forage.

In the western U.S. at the end of the 19th century, many stockmen were contending with this classic "Tragedy of the Commons" scenario as they tried to manage public grazing lands surrounding their homesteads and privately held water rights. The creation of the Grazing Service, the forerunner of the Bureau of Land Management, was, in part, a response to this recognized problem.

Not surprisingly, many of the first scientific publications on range management focused on drought management. One of the classic articles on this subject was USDA Bulletin No. 1031 entitled Range and Cattle Management During Drought written by James Jardine and Clarence Forsling in 1922. This is an article that is still applicable to rangeland grazing management today. [This publication can be viewed on the Internet at usda-ars.nmsu.edu through the bibliography section on the Jornada Experimental Range's web site (usdaars.nmsu.edu/JER/ Bibliog1.htm).]

Defining Drought

It seems as if the reality in the southwestern U.S. is that we are either experiencing a drought or managing our lands during drought recovery. Classically, drought is often defined as a year when annual precipitation is less than 75% of the long-term annual

average. For the Jornada, this would be years where the precipitation is less than 7.3" (<75% of our long-term average of 9.7"). However, this classic definition is not particularly useful. What we are interested in when planning livestock grazing are the forage yields. Though total amount of rainfall is important, forage production is also influenced by other factors, including the timing of the precipitation, the intensity of the individual storm, and the amount of precipitation that is effectively used for plant growth. Total amount of annual precipitation often does not correspond closely to primary production on rangelands.

An operational definition of drought that is more appropriate for rangeland grazing management is simply "a shortage of precipitation sufficient to adversely affect range production."

As an example, the graph on page 19 shows the variation in forage yields from 1960-1988 for a sandy range site in southern New Mexico. Production of perennial grasses varied from 34 lbs/acre in 1983 to 714 lbs/acre in 1977. Years with very similar annual precipitation totals (see 1962 and 1975) and very similar growing season precipitation totals (see 1968 and 1986) produced very different yields. Only five years (1963, 1969, 1975, 1976, and 1987) produced years within 10% of the long-term average of 316 lbs/acre (range of 10% of the mean = 284 to 348 lbs/ acre) and only once in 29 years did that occur in two successive years

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Drought (con't from page 4)

The Quivira Coalition Courtney White, Executive Director

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Wet Meadows: Like Money in the Bank

by Bill Zeedyk

Bill is an internationally known expert in riparian and wetland protection with emphasis on roadriparian relationships. He is the recipient of three national and two southwestern regional awards for wetland conservation focusing on road management practices.



Wet meadows are like money in the bank, a nest egg tucked away for a rainy day or a drought year.

Wet meadows produce higher forage yields than adjacent upland pastures, up to 25 times as much, if well stocked with deeprooted native wet soil species such as sedges, rushes, and wet soil grasses. Wet meadows with wet soil plants can yield up to five times the forage of sites stocked with shallow-rooted Kentucky bluegrass.

Cattle are naturally attracted to the palatable, nutritious, and succulent greenery found in wet areas. High in protein and vitamins, this early forage is also highly attractive to wildlife, especially deer, elk, and wild geese.

Values

Wet meadows provide many values to society and the natural world. As a subset of riparian habitats, wet meadows are key habitats for many different species of plants and wildlife. Their beauty and tranquility offer attractive and restful settings for camping, hiking, and picnicking. Wet meadows are ideal outdoor classrooms for nature study, bird watching, botanizing, and wildlife photography.

Gentle slopes, deep soils, and dense vegetation are factors that make wet meadows valuable in providing natural flood control. Most wet meadows are located in flatter portions of valleys where some natural structure has caused sediments to collect over time. When flood flows streaming off steeper slopes reach these more level areas, they spread out, lose speed and energy, and percolate into the soil to recharge the shallow alluvial water table. Not only are flood crests lowered and delayed, the stored ground water maintains stream base flows through the dry season. In the process, sediments, toxic substances, and nutrients are removed from the water column and stored in the vegetation or soil.

One natural value of wet meadows that everyone appreciates is wildlife habitat. Because they stay moist and are rich in nutrients, wet meadows are key habitat for both riparian dependent and upland species of wildlife. Brewers blackbirds nest along their margins. Wild turkey hens bring their broods of young poults to the edges to feed on grass seeds and grasshoppers which are a rich source of calcium and protein vitally needed to support the growth of bones, muscle, and feathers. Violet-green swallows sweep back and forth patrolling for midges, moths, and other insects that they carry back to their young hidden in nesting cavities in nearby pine snags.

Savings for Drought

Wet meadows are a reliable source of nutritious forage for cattle and wildlife, even during drought years like 1990, 1996, or 2000. Sometimes the only available forage during drought years is that occurring on wetland sites, wet meadows, playas, cienegas, and riparian areas. Fly over New Mexico's parched forests and rangelands in a drought year, and you will see the wet soil areas sparkling like emeralds against the dry, brown landscape.

But a wet meadow, like a savings account in the bank, is not much use in the hard times if it has been drawn down during the good times.

Some impacts that draw

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down the productivity of wet meadows are back-to-back growing season use, season-long grazing, short residual stubble heights at the end of grazing, soil compaction, livestock trailing, improperly drained roads and travel ways, expanding erosion fans, and invading exotic or upland vegetation.

What is puzzling to me is why some ranchers struggle to restore degraded upland pastures capable of producing only 200 to 400 pounds of forage per acre yield while continuing to ignore the declining condition of wetland sites capable of 4000 to 5000 pounds per acre yield, especially when the wetter sites are easier to restore.

Some Key Concepts

1. Moist soil vegetation requires more water than falls directly on site as precipitation. The extra water must get there from somewhere else. It arrives as overland flow from adjacent uplands, as overbank flow spilling from stream channels during storm events or spring snow melt, as subsurface flow moving through the shallow, alluvial water table, or as deep ground water welling from springs and seeps. There are no other natural sources. Any land disturbance which blocks or diminishes the volume of surface or subsurface flow reaching a wet soil area will diminish the productivity of wetland areas whether wet meadow, cienega, playa, or riparian area.

2. Moist soil areas naturally support a variety of specially adapted wet soil plants whose adaptations suit them to the unique environmental conditions common to the local area of concern. These adaptations include: length of the flooding period during which soils remain

saturated; the ability to grow, propagate, and survive during alternate periods of well-aerated and poorly aerated soil conditions; high or low soil pH; high salinity or other factors. What is more, many wetland grasses and grass-like species possess long, fibrous, or rhizomatous root systems that tunnel through the soil and open up passageways for overflowing surface water to infiltrate and percolate through the soil quickly. Wetland species usually propagate themselves both by seed and vegetatively (rhizome, corms, bulbs, and stem parts). Flood waters tend to spread such propagules widely across wetland sites assuring rapid colonization of such areas when favorable conditions exist.

3. Moist soil areas wetted by periodic runoff from adjacent hill slopes tend to exhibit patterns of shallow, low-velocity sheeting that spread evenly across the wet meadow. Maintaining a fairly dense, vigorous stand of sedges and wetland grasses aids in this process. Each and every grass stem, whether dead or alive, erect or prostrate, acts like a tiny dam that impedes, slows, spreads, and disperses the flow across the land. This assures that every part of the land is wetted each time significant runoff occurs.

If a meadow has been grazed too closely and left without sufficient residual stubble, the sheeting flow effect is reduced and surface runoff is quickly lost downslope. Likewise, any unnatural disturbances to the smooth plane of the wet meadow surface, such as wheel ruts, cattle trails, ditches, berms, or gullies, tend to concentrate and accelerate surface runoff rather than slow and disperse it. As a result,

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Wet Meadows: Like Money in the Bank

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Black Grama. (From Common Grasses of Grant and Catron Counties, New Mexico, published by the Upper Gila Watershed Alliance)



Profile of Good Stewardship: Jim Winder

Is it possible to create a drought-proof ranch? According to Jim Winder, a fourth-generation Sierra County rancher, the answer is definitely "yes."

It all starts with attitude. Jim accepts drought as a natural part of doing business. "I assume every year will be a drought year until proven otherwise," Jim says. "This is critically important. The



Jim leading a tour of his Double Lightning ranch. (All photos in this issue are courtesy of Courtney White, unless otherwise indicated.)



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biggest complaint for ranchers is their attitude, not cattle prices, genetics, or rain. Stubborn denial of a problem," says Jim, "has put more ranchers out of business than any environmentalist."

Planning Once

drought is ac-

cepted as an inevitability, then ranchers must develop a plan to carry their ranches through dry times.

For Jim, the first step in drought planning involves water. "In a drought, drinking water for livestock is more limited than forage, especially in wet areas which depend primarily on surface water." The lack of water, not forage, is the principle reason for de-stocking.

His ranch, which receives only ten inches of rain a year on average, does not rely on dirt tanks or creeks. Instead, Jim has invested in a reliable system of water delivery involving submersible pumps, pipelines, and plenty of storage.

Once adequate water is assured, the next step is to balance the stocking rate with available forage. "To do this," says Jim, "we need to know the amount of dormant season forage available for livestock use." This is easily accomplished by clipping and weighing forage samples in typical locations on the ranch. Jim only clips the forage that is to be made available for the livestock.

At the same time, he reserves a significant portion of the dormant plants (usually 50-60%) for wildlife and the ecosystem as a whole. In drought years, he gives 100% of his riparian forage to wildlife.

To get a good estimate of the ranch's total carrying capacity, the clipping samples are converted to pounds of forage per acre which is then multiplied by the number of acres in the pastures.

"If we were going to stock the ranch for the first time," explains Jim, "we could figure the maximum potential stocking rate by dividing the pounds of forage inventory by the average daily forage consumption per cow. I normally use the figure of 25 pounds of dry matter forage per cow per day." (See the article on ADAs on pages 24-25.)

Another approach that Jim recommends is to take the number of cows which are presently stocked and determine if there is enough forage to sustain them until it rains

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again. "If we have, say, 100,000 pounds of available forage," continues Jim, "then dividing by 25 pounds we get 4,000 Animal Days. We know now that we can feed 4,000 cows for one day or 11 cows for 365 days."

It's not all that complicated, says Jim.

Objective Measurement

"I begin my drought planning each year at the end of the growing season in October," he says. "I sample the forage, determine the carrying capacity, then compare it to the needs of the current herd." Then he plans as if it were not going to rain for 12 months. "If the needs are above the calculated carrying capacity, then I reduce the herd. If the needs are significantly below the carrying capacity, then I keep back stockers, buy cows, or graze another rancher's cattle.

"Then I evaluate the stocking rate three more times over the coming months to be sure I have enough forage," says Jim. The first time is in February, after the winter rains have come and he has a good sense of what the weeds will be like. "If we have good rains, I will consider adding more livestock," says Jim. "If not, I will reduce numbers in a time of seasonally high prices."

He repeats the process on May 1st, when the weeds have reached their maximum growth, and again on August 1st, when the summer rains should have arrived.

"The idea is to base stocking rate decisions on objective measurements," says Jim, "and to make adjustments early." Cattle sold early, he notes, receive better prices, and the feed saved by selling ten head in January is enough to feed 50 head for the month of July.

He also aligns his production with the year. He calves when things are green, usually in March and also in July. By calving late he dramatically reduces his supplemental feed bill, and reduces conflicts with predators, who have plenty of other things to eat when grass is growing. (Jim has only killed two coyotes in 14 years.)

Flexibility and Control

It is important to be flexible. "The key to good planning is building long recovery periods into it so that plants can continue to grow, even in a drought." To do this, he uses this planning method in conjunction with short duration grazing.

According to Jim, he's never had to sell a cow for cash during a drought. In fact, he's even expanded his operation since he implemented this system 14 years ago. "I have run more cows in a drought using this method than I did with traditional grazing," said Jim.

The key is **control**. "I cannot control the weather," says Jim, "but I can control how the weather affects my operation."

For example, short duration grazing on the home ranch gives him greater control over the timing, frequency, and intensity of grazing. "Cattle are kept in one herd," says Jim, "because splitting cattle into two herds cuts the avail-

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Good Stewardship: Jim Winder

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"The key is **control**. 'I cannot control the weather,' says Jim, 'but I can control how the weather affects my operation.'"



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Herding Clinic, May 2000 by Jim Thorpe

In early May, Quivira sponsored its first-ever "Low Stress Herding Workshop" at Ghost Ranch. About two dozen ranchers from New Mexico, Colorado, and Arizona took part, with cattle provided by Quivira board member Virgil Trujillo. It was also a first-ever collaboration for the "faculty": Tim McGaffic, a horse/



selves, they shared their lessons from the schools of hard knocks and just plain necessity (often being short handed and almost always vastly outnumbered): it is much easier to get the job done when the cattle in one's care are comfortable with and "trusting" of their handlers. To get to that point, one needs to develop an understanding of predator/prey relationships, flight/fight zones, perception, bio-rhythyms, body language, social hierarchies, and other aspects of cattle physiology and behavior. While many people who have been around livestock most of their lives are keenly observant and extremely knowledgeable about cattle, they have not always taken the time (or seen any reason) to try and view things from the animal's perspective. Just as in contemporary horse training, the more

Instructor Tim McGaffic.



Instructor Steve Allen participates in an award-winning herding operation near Paonia, Colorado.



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Videotaping the proceedings.

stockmanship clinician from Ignacio, CO; Steve Allen of Crawford, CO, stockdog trainer and a leading participant in a 1200 AU pooled wilderness grazing permit (the West Elk Livestock Association; see Vol.2 No.3 of the Quivira Coalition newsletter); and Guy Clossen, nearly singlehanded manager of 200 cows/1200 yearlings on the 50+ section Mesquite Citrove Ranch outside of Jayton, TX.

All seasoned stockmen them-

can understand and take advantage of natural animal behaviors. the more potentially productive can be the results.

stockmen

Economic Benefits

There are bottom line economic benefits as well: research by grazing guru Alan Nation, livestock facilities consultant Temple Grandin, and livestock behaviorists like Burt Smith and Bud Williams indicate that that low-stressed cattle consistently out-perform higher-stressed cattle in all phases of the beef production chain. And for grazing manage-

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and even ill feelings between spouses.

Herding Clinic

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After the "classroom" sessions, a mixture of high/low tech presenta-

Herding cattle in a low-stress manner (left); herding cattle through cones using "pressure and release (below)." (Photo below courtesy of Jim Sprinkle.)

ment purposes, improved herding skills enable stockmen to better control the timing and intensity of grazing periods in remote and/or sensitive areas.

The stockmen present, representing cow-calf, yearling, and feedlot operations on both private and public lands, didn't need much convincing. With their own stories of wild-eyed cows, fighting bulls, flighty steers, and elusive heifers, they all





tions, role-playing, and plenty of "wild cow tales," the herd of herders headed to the corrals. Dividing into teams

Steve Allen whistling to his dogs as conference participants watch. that worked alternately with each in-

seemed very much interested in reducing the stress on their livestock and themselves, stress that too often results in lost time, damage to equipment and facilities, injuries to people and livestock, misunderstandings between neighbors, distrust with bureaucracies, difficulties with other public lands users, hostility of enviros,

structor, they started probing the "recognition" and "flight zones" of indi-

vidual cows and worked their way to an unhurried parading of minimobs through a series of traffic cones.

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The Far Horizon

by Courtney White

"What the public domain needs is just one good rain." —Dr. S.W. McClure, 1936

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Rising from the ashes of the recent forest fires and the dust of the drought is a central question: do humans have the right to manage nature? And if so, what sort of management, and for what purpose?

It is a question that lies at the very heart of the grazing debate, as a new book demonstrates. In fact, whether nature should be "managed" or "left alone" has become a Great Divide for the public lands wing of the environmental movement in general, as well as the fuel for the bonfire of lawsuits and the call for "zero cow" policies.

The new book is *The West*ern Range Revisited: Removing Livestock From Public Lands To Conserve Native Biodiversity (University of Oklahoma Press), by Debra Donahue, a law professor at the University of Wyoming.

The ostensible goal of the book is to catalogue the sins of traditional ranching; but its ultimate objective is to make a case for "unmanaged nature." As such, it is a useful illustration of the philosophical forces at work within the environmental community, as well as the tensions.

It also gives us a chilling look at the dangers of absolutist thinking.

Old News

Ms. Donahue's thesis is straightforward: "Livestock grazing isincompatible with preserving landscape-scale native biodiversity on western ranges averaging 12 inches or less of annual precipitation." Which just happens to be most of the West. When it rains.

She considers ranching to be an irredeemable activity. "Livestock grazing is simply not ecologically sustainable," she writes, "at least on a scale that is economic ...Merely curtailing livestock use will not achieve the goal of preserving and restoring arid land biodiversity. Evicting livestock will be essential."

She rips traditional ranching on political, economic, and social grounds as well. She even dismisses as "plainly speculation" the threat of sprawl and habitat fragmentation as a result of private lands development on former ranches. "The prediction of more real estate subdivisions is seldom supported by the facts," she writes.

She closes her book with a cold-blooded summation: "Eliminating grazing in arid regions of the West would offer tremendous potential benefits while imposing very few costs. The economic impact would be minor...and the cultural concerns overblown."

Unless, of course, you are the one being eliminated.

The first problem with *The* Western Range Revisited is that it is packed with old news. Her litany of outrage is all too familiar: historic overgrazing tremendously damaged rangelands; ranchers have enjoyed a cozy relationship with federal overseers for generations; ranching is an economically marginal activity; overgrazing continues to affect biodiversity; ranchers exert disproportionate political power in excess of their numbers; the cowboy myth is largely a creation of Hollywood; and federal subsidies to ranchers explode the image of self-sufficiency.

As an argument for a judgment of execution, however, *The Western Range* falls flat. That's because the second problem with the book is more consequential—it is

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out of touch with current events.

Biodiversity

The fatal flaw in Professor Donahue's argument is easy to identify. It's called the Empire Ranch. And Ghost Ranch, the Tipton Ranch, the Gray Ranch, the Deseret Ranch, to name only a few ecologically oriented "New Ranches." The omission of holistic ranchers like Sid Goodloe, Jim Winder, Roger Bowe, Cathy and Mike McNeil, Terry Wheeler, and many others, is significant, and damaging.

That's because these progressively managed ranches and their ecologically-minded stewards not only conserve native biodiversity, they often increase it. And many of these ranches do so while operating below Ms. Donahue's 12-inch rule.

Take the U Bar Ranch, for example. Located on the Gila River near Silver City, the U Bar, which is owned by a mining company, managed by a rancher, and employs irrigated agriculture, supports the largest concentration of endangered Southwestern Willow Flycatchers in the world. And the numbers have gone up every year since 1996, the year a long-term study began. In fact, the U Bar apparently has become a source population of Flycatchers for the Gila Valley!

Additionally, according to Dr. Scott Stoleson, of the USDA Rocky Mountain Research Station, and lead researcher on the Flycatcher study, the U Bar is home to the largest concentration of neo-colonial migratory birds in North America.

On a working cattle ranch. In a desert.

One reason for the rise in biodiversity on the U Bar is the willingness of the rancher, David Ogilvie, and the mining company to try new ideas, such as grazing the bird habitat only in the dormant season. David also likes the Willow Flycatcher and wants to see it thrive. In other words, his environmental ethic is large, and his managerial abilities skillful.

The U Bar's biodiversity may not depend on farming and ranching, but its presence on an intensely managed landscape does contradict Ms. Donahue's assertion that conserving native biodiversity starts with eliminating agricultural use of arid lands. More importantly, however, I believe the Flycatcher is flourishing because of David's management, not in spite of it.

Thus we arrive at the crux of the debate.

To Manage or Not To Manage

Debra Donahue's prescripfor conserving native tion biodiversity in the West, beyond simply killing the cowboy, is to employ large contiguous blocks of land as bio-reserves, connected to each other by corridors for migratingwildlife. These Wildlands would be huge, in her estimation, encompassing the majority of BLM lands. They would be so large, in fact, that "active management may not be required," she writes.

Ms. Donahue proposes that nature knows best and should be left alone. Other than a few types of ecological restoration, she considers the management of nature by humans to be undesirable. She blames the current ecological crisis on anthropocentrism. "A utilitarian, mastery-over-nature attitude, along with its biblical roots, is considered fundamental to the Wise Use move-

(con't on page 14)

The Far Horizon

(con'tfrompage12)

Please note that the New Ranch Conference, which was scheduled for September 9 at the Farm and Ranch Museum in Las Cruces, has been rescheduled. We will let you know in the next newsletter when it will be held.



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The Far Horizon

(con't from page 13)

"In a world seriously outof-kilter ecologically and economically, the visionary idealism of Donahue & Co. is not only impractical, it is harmful. It denies that well-managed landscapes can conserve, or even enhance, native biodiversity while accommodating familyscale commercial activity. Their vision ignores or dismisses contradictory evidence and masks its mean-spiritedness under the banner of 'science.""



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ment in the West, in which livestock and other commodity interests are prominent."

It is a view shared by other environmentalists. In Unmanaged Landscapes: "Voices for Untamed Nature (Island Press, 1999), editor Bill Willers argues for "Nature's autonomy," which, he says, can only be found in wild landscapes. "When managed for some human-centered purpose, its autonomy is lost," he writes. "Restoring wilderness conditions on landscapes of all sizes can allow for self-regulation in a state of ancestral wholeness." Although his goal is to recreate an ancestral past, which ancestral past, among so many, is not clear.

Nevertheless, to accomplish this goal, management, in his view, "must become an erasing, a reversing, a minimizing of human impact —a science of letting things be."

But what about the birds on the U Bar? Or all the healthy rangeland on the Empire Ranch? What about all those riparian areas blossoming and healing under the watchful eyes of Sid Goodloe and Jim Winder? What about the biodiversity restored under the intense management of Terry Wheeler? What about the environmental ethic of Roger Bowe or the Davis family?

What about the forest fires? The drought? What about the fragmentation of wildlife habitat due to urban sprawl? What about the one **billion** day-visits made to our public lands annually by recreationists? What about global warming and the CO_2 buildup in the atmosphere? What about poverty and population pressure? What about industrial corporate capitalism and the globalization of the economy?

"Letting things be" does not

solve these problems. Neither does pining for an ancestral past (which was full of land-managing Native Americans, by the way). Instead, I believe we should use the past to inform the future; and we should get to work—now.

That means management.

Democracy

In a world seriously out-ofkilter ecologically and economically, the visionary idealism of Donahue & Co. is not only impractical, it is harmful. It denies that well-managed landscapes can conserve, or even enhance, native biodiversity while accommodating family-scale commercial activity. Their vision ignores or dismisses contradictory evidence and masks its meanspiritedness under the banner of "science."

In a pluralistic society, such as ours, it is a vision that smacks of totalitarianism.

I vote for well-managed landscapes instead.

I vote for the U Bar, the Empire, and Ghost Ranch. I vote for an expanding Southwestern Willow Flycatcher population, healthy riparian zones, and native biodiversity. I vote for open space protection, viable rural communities, strong families, and cultural diversity.

I vote for growing grass, clean water, and cool fires. I vote for sustainable wildlife populations, healthy forests, and robust rangelands. I vote for well-managed herds of cattle living side-by-side with native species, conserving and expanding diversity together. I vote for wilderness, and ranches.

I vote for the values that

(con't on page 18)

This may be a desert, but new research suggests the past two centuries have been the wettest period of the past 1,500 years in New Mexico.

And the past 20 years have been the wettest of all, with rainfall 23 percent above the long-term New Mexico average, according to a study by University of Arizona scientist Henri Grissino-Mayer of more than 2,000 years of tree rings.

The implication of this and other long-term climate data is that the farms, cities and irrigation networks of the modern Southwest were built on rivers swollen by unusually wet weather.

"Climate has allowed us to do this," said Scott Stine, a geographer at California State University, Hayward.

And climate, Stine said, can change.

"That much water is not available long term," he said.

Grissino-Mayer, who studied tree rings to build the New Mexico climate data, sees a warning in the numbers: What goes up most probably will come down, meaning the dry times could return.

"When it occurs we don't know, but we do know it will occur," Grissino-Mayer said. "That's what I've been trying to warn people about."

Climate researchers are cautious about using past averages to predict the future, saying scientists don't yet understand what is driving the year-to-year or century-to-century fluctuations in our weather.

But Stine, while acknowledging the uncertainty, said it's nevertheless prudent to look at the historic trends to try to understand what to expect in coming years.

"People are getting used to

the wet period as being normal," agreed Charlie Liles, head of the National Weather Service office in Albuquerque. "We basically live in the desert."

One result is that what seems like a drought to us today often is a wetter period than the long-term average, according to Grissino-Mayer.

While the devastating New Mexico drought of the 1950s shows up as a legitimate dry spell compared with the long-term average, other lesser droughts of the 20th century don't.

1989, for example, qualified as a modest drought here, according to the federal government's National Drought Mitigation Center. But Grissino-Mayer's data show it was 20 percent wetter that year than the 2,000-year average.

Grissino-Mayer's research provides the first opportunity to make a statement like that, scientists say, because it is the first yearby-year record of rainfall in New Mexico during the past 2,000 years—the period in which human civilization developed in New Mexico.

Modern meteorologists have accurate rainfall records going back more than a hundred years. And archaeologists, working with tree rings, have analyzed rainfall patterns for shorter periods of time, such as the famous droughts believed to have contributed to the end of the Anasazi culture in the Four Corners area.

But Grissino-Mayer's research, completed last year for his University of Arizona doctoral dissertation, is the first study to link historic rainfall to ancient tree rings

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Drought Reigns in N.M. History

Ancient tree rings indicate the past two centuries have been unusually wet

by John Fleck Albuquerque Journal Staff Writer

This is a reprint of an article which appeared in the May 27, 1997 **Albuquerque Journal**, North edition. Used with permission. Permission does not imply endorsement.

[*Ed. Note:* Dr. Grissino-Mayer is currently at Valdosta State University in Valdosta, Georgia.]



Drought Reigns in N.M. History

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to create a complete climate record for New Mexico.

He developed it using 248 Douglas fir and Ponderosa pine samples from El Malpais National Monument near Grants in westcentral New Mexico.

It took him seven field trips to the Malpais over a five-year period to collect the wood.

The individual rings in a cross-section of a tree can be used to measure its growth year by year. In wetter years, the tree grows more, so the ring is fatter.

The wet spell of the past 15 years, for example, shows up as fat

archaeological sites. If they could match overlapping patterns between live trees and dead wood, they reasoned, they could work their way back in time to identify the date trees in prehistoric ruins had been felled.

Matching up fat and thin growth bands in various trees, scientists have developed a chronology of tree rings that in some areas of the Southwest dates back nearly 2,000 years.

But those archaeological tree ring records aren't precise enough to record long-term climate trends, Grissino-Mayer said.



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bands of growth.

"You can actually see that in the tree rings," Grissino-Mayer said.

The 2,129-year average in the Malpais calculated by Grissino-Mayer suggests 14.6 inches of rain a year, compared with 18 inches a year between 1978 and 1992.

Arizona astronomer Andrew Douglass developed tree ring techniques shortly after the turn of the century in an attempt to study the relationship between tree growth, rainfall and sunspot cycles.

Scientists soon realized the value of the technique for dating

For that, he went to the Malpais, which has old live trees and fallen dead wood that hasn't been disturbed by firewood collection and other human activity.

Scientists say tree records are one of the best tools available for reconstructing climate records, but they aren't perfect.

They can miss the heaviest rainfall, said Julio Betancourt, an ecologist with the U.S. Geological Survey Desert Laboratory in Tucson.

Once the soil is saturated,

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extra rain will run off, with no effect on tree growth, Betancourt explained.

But tree ring data are especially effective at detecting droughts, Betancourt said.

Droughts have mattered in the history of human civilization in New Mexico, and Grissino-Mayer's data document several that have been dramatic.

The state was plagued by below-average rainfall for 200 years between 300 and 500, and again between 1400 and 1600.

But the most famous drought, that which some scientists believe brought down the Anasazi culture, shows up as a minor blip in Grissino-Mayer's data.

Drought was part of the problem then, said University of Arizona archaeologist Jeff Dean.

"If you have a prolonged drought it's going to affect people who are farmers because they're not getting enough water for their crops," Dean said.

The bigger problem, Dean believes, was wild weather fluctuation from year to year and decade to decade.

On the Colorado Plateau, Dean said, "the pattern just went berserk for two centuries."

Compounding the problem was that the Anasazi population had undergone unprecedented growth, leaving little flexibility to adapt to the changing situation by moving.

"Populations were enormous because it's a very long, wet period," Grissino-Mayer said.

"It was definitely a complicated phenomenon, but they had painted themselves into an adaptive corner," said John Ware, an archaeologist at the Museum of New Mexico in Santa Fe.

Ware points to the effect of climate changes on earlier populations in the Animas Valley of southern Colorado. Those people, he said, had the flexibility to move around in response to climate changes, moving to higher, wetter ground in response to drought.

Grissino-Mayer's data appear to support that idea, showing the Anasazi drought was far more mild than the dramatic drought that lasted from 300 to 500.

Grissino-Mayer and his colleagues are continuing to gather more tree ring data on New Mexico's climate. They'll return to the Sandia Mountains this summer to a site near Sandia Crest that has ancient trees similar to those found at the Malpais. And they are paying special attention to the explosive tree growth in the past 20 years, which is well recorded in the Sandia trees, said Tom Swetnam, one of Grissino-Mayer's colleagues at the University of Arizona's Laboratory of Tree-Ring Research.

"It is really just off the scale," Swetnam said.

There is some evidence, he said, that spring is arriving earlier in the Northern Hemisphere.

"The growing season is lengthening," Swetnam said.

See these sites for more information on drought

NOAA's Drought Information Center www.drought.noaa.gov/

The Climate Prediction Center www.cpc.ncep.noaa.gov/index.html

The Drought Monitor: Forecasts http://enso.unl.edu/monitor/ forecast.html

Drought Reigns in N.M. History

(con't from page 16)

Public Lands Day: September 23, 2000 **Grassland Ecosystem** Restoration Quemado Ranger District, 8 a.m.

Grasslands are being lost to woody plant encroachment, primarily pinon, juniper and rabbitbrush. There is considerable public concern about the use of herbicides to remove these plants. The Forest Service wishes to bring together ranchers, hunters, environmentalists, and anti-herbicide groups to hand cut encroaching plants and to learn about existing conditions, possible management techniques, ecosystem function, relationship of wildlife habitat, range management, and the firewood program to accomplish restoration and maintenance of functioning grasslands ecosystems.

For more information, see Upcoming Events, page 28.



Herding Clinic (con't from page 11)



Guy Closson (left) and Steve Allen.



Tim McGaffic. (Photos courtesy of Jim Sprinkle.)



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Learning and Unlearning

It was both a learning process and an "unlearning" one as the accustomed use of shouts and whistles, waving of arms, and aggressive haranguing of stragglers was forbidden. While seeming counter-intuitive at first (and certainly guaranteed to fetch some snickers if related to "the boys back home"), it soon became clear, as the cattle became more familiar with and responsive to the non-threatening behavior of their handlers, that something was taking place that just might work back on the ranch.

To indicate its further possibilities, Tim, applying Ray Huntesque "pressure/release" techniques while on horseback, quietly induced a lone cow to hop into a stock trailer. When all else failed and defeatist cries arose for a hotshot to jolt a sulky cow through a squeeze tub, this Colorado "cow-whisperer," using a horse clinician's little flimsy flag, regained her confidence and cooperation.

"Gus" and "Sam," Steve Allen's star duo of Australian shepherds, also showed the invaluable contribution that well-trained stockdogs, ones that can actually release pressure as well as apply it, can provide to a short-handed outfit (unfortunately, too many ranchers, myself included, need to put their own over-achieving dogs in the back of the pickup when the real work begins).

Low Stress. Not No Stress

"Low stress" does not mean "No stress," however. Rather it means using the minimum amount of stress required (followed by the maximum amount of release from stress practical), all in a gradually introduced manner that the cattle can learn to accept and tolerate. Newly received groups of cattle, such as hypercharged mobs of droopy-eared yearlings, will in the long run be much easier to work with if given a patient "orientation" to their new handlers and surroundings. Cattle will pen easier if they go to the pens more often than just on those high-pressure branding or shipping days, especially if they get an occasional "treat" or reward. "Herd Quitters" too, who have previously learned that the herd is a place where "bad things happen," will be convinced that the herd is actually "a good place to be."

"Whether you know it or not, you are training your cattle all the time, for good and bad," says Guy. "While you're at it, you might as well make it good."

Time constraints, shipping schedules, oncoming weather, overzealous helpers, the urgencies of the task at hand, and just plain bad luck will at times conspire to break the sometimes Job-like patience required of a Low-Stress Stockman. Yet all in attendance seemed eager to go home, overcome these impediments, and apply the lessons learned (and return for any future workshops). I, for one, came back to Newkirk to await the arrival of two truckloads of steerslet's see by October how stressed out we are!

The Far Horizon (con't from page 14)

promote good stewardship of the land. I vote for a real land ethic, one that seeks to create sustainable, selfregulating natural and human communities simultaneously. Call it "bioanthropocentrism."

I vote for cooperation, innovation, conservation, restoration, and work. I vote for an end to bigotry, ignorance, and tyranny.

I vote for democracy. Real democracy.

I may be a dreamer, but as someone famous once said, there's more of us every day.

(1975-76). Thus, an "average" year is a somewhat unusual and often isolated event. In ten years, yields were more than 10% greater than the long-term average, and these years tended to be grouped

(1961-62, 1977-78, 1984-86). In 14 years, yields were less than 90% of the long-term mean, and these years also tended to be grouped (1964-65, 1967-68, 1970-71, 1973-74, 1979-83) and were more common than high-yield years. More importantly, these 14 drought years averaged 52% of the long-term forage yield.

We could "crunch" these numbers in other, more sophisticated ways and develop more intricate

interpretations. However, there is one simple, relevant, and predominant observation. Nearly half of these 29 years resulted in yields that were only about half of the average yield. Thus, drought resulting in a reduction in production is the rule not the exception in the arid southwest, and the resulting reduction in annual yield is substantial.

We know that in the southwestern U.S. droughty periods occur frequently and can have a marked effect on rangeland resources. The severe drought of 1951-56 greatly changed vegetation in parts of the Southwest and these effects still persist in some areas. Yet, shorter and less severe

drought events can also have significant impacts.

We have learned that the key to recognizing rangeland drought is to observe effects of water stress on vegetation produc-

Drought (con't from page 5)

Annual variation (1960-1988) in precipitation and yield of perennial grasses on a sandy desert range site (from Herbel & Gibbens, 1995, Post-drought vegetation dynamics on arid rangelands in southern New Mexico, NM Agr. Exp. Sta. Bul. No.



tivity rather than tracking precipitation deficits over the growing season or the course of a year. Plant yields relate to vegetation structure, and structure influences ecological functions. We have long recognized the importance of managing for drought in the Southwest and coping with the effects of water stress as the norm. It all starts with watching how the plants are actually responding to the moisture received and implementing as needed a drought management plan that is already clearly established.



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Dry Times: Managing Through a Drought

(con't from page 1)

People-Centered Principles

FDR said, "We have nothing to fear but fear itself." Attitude is everything!

You must be in charge of the situation rather than reacting to circumstances.

Make a drought plan and be prepared to make difficult strategic and financial decisions.

Accept the fact that paperwork and planning will do more to help during the drought than worrying and spending money. Don't fear the office and the computer.

Accept the fact that droughts are a normal part of ranching and that what you learn from the current drought will help you through the next one.

Work with others who have a positive attitude and spend less time at the coffee shop!



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fact a big difference between a rough mental idea and a clearly laid out plan that you and others can see and discuss. Commit your plan to paper if you want it to succeed. For example, if you plan to destock, when do you plan to do so? How many animals and which individuals or classes of stock are you planning on taking action on? When these factors are put on paper, the consequences, in terms of money, forage savings, etc., can be clearly evaluated.

Remember that the drought you are now experiencing is a normal part of the weather pattern. In fact, climate data indicate that much of the West has experienced a long-term wet cycle and that we are overdue for drier conditions to return. While this offers little encouragement, take the long-term view that what you learn by managing your way through this tough time will help you even more the next time drought occurs.

Doing the hard work of initial evaluation and planning will also highlight the strategic or long-term factors you should have been taking action on while times were relatively good. Although you may be constrained from doing so now, make sure items such as water development, cross fencing, or other methods of gaining control of the timing, intensity, and frequency of grazing become a high priority when you are contemplating future actions and expenditures.

Planning is difficult to do on your own. Now is the time to reach out to co-workers, friends, and others for creative ideas and help in evaluating your written strategy. Seek out and work with those who have a positive attitude. Don't spend your time at the local "gloom and doom" café with those who will just reinforce the fact that times are tough.

The truth is that most people will avoid the hard work and office time of planning that could actually help them survive a tough situation such as a drought. They seem paralyzed by the conflicting emotions of fear and hope that the drought triggers. Meanwhile, local prices plummet for the commodities they cling to, their land and long-term productivity deteriorates from poor management decisions, and they often end up spending money they can never hope to recoup.

Financial-Centered Principles

The link between human and financial principles in drought management is very strong. Three human tendencies often keep us from creating a profitable plan:

—The tendency to allow production costs to rise to anticipated income.

-The tendency to borrow against anticipated income.

-The tendency to spend very little time or effort planning on paper. Monitoring efforts are often too late or non-existent.

Planning for a profit is different than budgeting or cash flowing. It is about aggressively setting a target level for income and expenses and having the management determination to bring your plan to fruition.

You are unlikely to make sound financial decisions if you have not committed to maintaining a positive, "take charge" attitude in the face of adversity. Likewise, the written drought plan you produce will obviously have financial consequences for each option you consider. You must work through several scenarios to determine the best course of action for your particular situation. For example, what will destocking cost you this year, and in coming years, if breeding stock are sold? How does

(con't on page 21)

destocking by 10% early in the season compare with having to destock by 50% late in the season if no significant rainfall occurs?

Knowing these numbers means you can choose the best course of action compatible with the risk that your business and you can bear. It also means that you can keep your banker, tax advisor, and business partners informed in a timely manner of the likely financial consequences of the drought. Few people appreciate financially disastrous surprises, least of all bankers. Re-plan your livestock production worksheets and annual financial plan to reflect proposed actions and consequences. Enlist the help of your financial advisors and partners in finding solutions to any shortfalls and deciding the most appropriate actions.

Since profitability may be a difficult goal in a drought, you must plan some reserves that are generated in good years to help you through the lean times. These may be invested in the business as easily liquidated assets or kept as interest-generating reserves. If you have never done so before, put a plan for building reserves into action when the drought breaks.

Just like reserves, many of the suggested financial principles require action prior to a drought to be effective. Investments in long-term water availability and alternative control of animal movements such as fencing or herding allow you greater flexibility in planning your grazing to minimize the effects of drought and the need for massive destocking. Have you made the investments in your own training to explore alternative grazing strategies and management methods? These kinds of investments are cheaper than drought feeding and keep paying dividends for long periods of time.

The low prices that develop regionally in drought-stricken areas

provide a double whammy to livestock producers who must destock. Remember that marketing is still possible in a drought. Are you letting others profit from your situation by avoiding marketing? Another related benefit to planning early destocking by smaller amounts is that you tend to get a higher price for those animals you do sell.

A ranching friend in Colorado recently told me about a neighbor of his who was feeding a group of cows in adverse conditions. When he stopped to talk to him, the neighbor remarked that, "With this high-priced hay, I've already got more money tied up in these cows than their calves can hope to bring this fall." My friend then asked his neighbor what he was going to do. The reply was, "I guess I'll feed 'em."

Purchasing feed is a common reaction during a drought. It usually has financially disastrous consequences due to the fact that, unless the feed is extremely cheap and locally available, you are unlikely to ever regain the value of any feeding program. The "hope" is that the feeding will only have to take place for a short while, "just until we get some rain." Unfortunately, you do not have a clue as to how long the drought will persist, and you are likely to exhaust your financial resources on this expensive delaying tactic.

Principles for Land and Livestock

Many of the principles put forward for human and financial management during a drought also apply to the land and livestock. Mental preparation for tough decisions is the first step. Creating a plan for dealing with your actions in a well-thoughtout manner is second. Understanding how the land reacts to drought

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Dry Times: Managing Through a Drought

(con't from page 20)

Financial-Centered Principles

Get in charge of your financial situation and have a plan for profit.

Build cash reserves from good years to help you through lean times.

Have a stock reduction plan and know the financial consequences of all proposed actions in advance.

Water developments and fencing are cheaper investments than drought feed, and they keep paying dividends for long periods of time.

Replan your livestock production and annual financial plan to reflect proposed actions. Keep your banker and tax advisor informed of your decisions.

Marketing is still possible, even in a drought. Are you letting others profit from your situation by avoiding marketing and other options?

Remember that drought feeding is seldom a good investment.

Do the paperwork and make the calculations yourself.



Dry Times: Managing Through a Drought

(con't from page 21)

and your options for livestock management are the third.

Water cycle refers to the effectiveness of capturing, storing and safely releasing rainfall. Rangeland can have an effective or non-effective water cycle depending on how we manage. If the water cycle is effective, the land will be well covered with plants and plant material so that water is captured and incorporated into soil where it falls. Conversely, an ineffective water cycle on the same area will be characterized by low plant densities and lack of soil cover, leading to high runoff and evaporation rates.

The difference in response of such areas to limited rainfall is dramatic. An inch of rainfall in an area with an effective water cycle can produce double or triple the forage amounts that it can where the cycle is non-effective. This factor alone can mean the difference between financial ruin or sustainability in a ranching situation.

The single biggest influence on rainfall effectiveness on land grazed by livestock is the manner in which the livestock are managed. If grazed plants are given adequate recovery periods to restore the removed plant parts and underground root systems, this enhances the effectiveness of the water cycle. In addition, limiting the exposure time of the animals to the plants and soil also tends to improve the water cycle through reduced compaction. Overgrazing of plants (prolonged grazing periods and inadequate recovery periods) tends to shorten root systems underground, which makes them even more sensitive to drought.

Having a better understanding of the water cycle is crucial to managing in a drought. You cannot create an effective water cycle overnight. It must be cultured through careful management over the years and through wet and dry cycles. Thus, planning grazing carefully even when times are good is just as important as doing so in a drought. Research also shows that areas with effective water cycles recover much quicker from a drought.

The most important factor in grazing management during a drought is to increase the recovery periods given to an area that is grazed. Increasing recovery periods without excessively prolonging grazing periods requires that you have more pastures per herd. This can be practically accomplished by combining herds, working with neighbors, constructing temporary fences, herding, or other creative ways of keeping the animals moving onto fresh ground and letting areas where they have grazed recover longer. Remember, these will only be options if watering facilities are adequate.

The plan for the livestock will probably need to include a stock reduction aspect.

In order to make this decision with some degree of accuracy, you must be able to inventory your forage resources as soon as drought conditions warrant. When doing this, you should normally assume that what forage is present is all that there will be. You now need to know how much that is and how long it will last with the stock you have on hand and with various stock reduction options you may be considering. Wildlife also make their home on most ranches and you will need to make cover and feed allowances for their survival as well.

There are many ways of assessing forage quantity on land. Estimating pounds per acre of useable forage is a common method employed by many agencies and some ranchers. This can be translated into Animal Unit Months (AUMs) of forage available and compared with the AUMs of

(con't on page 23)



forage you are planning to remove. Perhaps a more user-friendly method is to estimate the Animal Days per Acre (ADAs) of forage remaining. This is a relatively simple way of calculating forage based on visual samples of the land in various areas. It is rapid, easy to learn, and can be very accurate with practice. (See article on pages 24-25.)

Stock reduction is a difficult decision to make. Your plan should indicate which groups of animals will be sold first and by what date. Again, remember that the earlier you make the decision to reduce, the more likely you are to get a better price and the more feed will remain for the stock that are not sold. You do run the risk of selling too early and then getting rainfall. But, weigh this against the risk of delaying the decision and the drought continuing. You will then have to destock significantly more head, and the animals you sell are likely to be in poorer condition and bring a lower price.

Other options for breeding livestock are to wean the calves early and sell them. A dry animal is much better able to maintain itself in tough conditions. Depending on your enterprises, you may also consider delayed breeding or only exposing a portion of the stock. This might be an option when you have very valuable genetics and selling females is worse than not having offspring to sell. Obviously each of these decisions has financial consequences that should be calculated and put in your plan.

Drought-prone areas should always include a large margin of safety in dormant season biological plans. This is referred to as a "drought reserve," and in some areas should amount to almost a full year of forage. If you are in an area that has typically highly erratic rainfall patterns, consider your enterprise mix carefully.

The most difficult enterprise to deal with when destocking must be done is the cow-calf enterprise. Stocker enterprises and small stock such as sheep and goats are more adapted to the fluctuations that may be needed in a drought. Running a mix of enterprises may be a good choice in such areas.

Dry Times: Managing Through a Drought

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Summary

The key to surviving a drought is planning the consequences

Principles for Land and Livestock

Do your dormant season planning! Assume no more forage will grow. Determine how much existing forage there is and how long it will last with current numbers or various stock reduction options.

Become accurate at estimating Animal Days per Acre (ADAs) of forage on the land in various conditions.

Combine herds as soon as possible. Combining herds gives you more flexibility and reduces grazing periods relative to recovery periods.

Increase recovery periods for pastures as long as possible.

Be creative about increasing pasture numbers per herd. Use temporary fencing and work with others to combine herds and increase numbers of pastures available.

Plan long-term water availability and volume. Put your plan into action when times are good.

Remember that drought effects are less severe when the water cycle is functioning effectively. Plan your grazing carefully at all times.

Be prepared to vary stock numbers according to a stock reduction plan.

Reduce numbers early, according to predetermined critical dates. Prices will be better and there will be more feed for the remaining stock.

For breeding herds, wean offspring early. Consider options such as delayed breeding and/or reduced breeding vs. selling your genetics.

Remember that drought feeding is rarely a good investment. Calculate the costs and make the comparisons yourself.

Ensure your enterprise mix is compatible with drought risk in your area.

to land, people, money, and animals as a whole. The tradition of hoping it will rain and then taking expensive reactionary steps when it does not has proven disastrous. What is needed is a plan for action based on calculations of forage availability, financial consequences of various options, and the implementation of progressive management that will improve the longterm resiliency of the land and business.



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ADAs: Animal Days per Acre

by Kirk Gadzia

Kirk Gadzia leading a workshop at Sid Goodloe's Carrizo Valley Ranch.



This article is for those wishing information on how to understand and use the concept of Animal Days per Acre (ADAs) as an alternative to Animal Unit Months (AUMs)

The beneficial use of the tool of grazing requires that the timing, frequency, and intensity of its application be controlled by the manager. The intensity of grazing itself has three variables: the number of animals in a pasture, how long they are there, and the size of the pasture they

> are in during that period. To manage intensity thus requires a tool that has components of time, animals, and land area.

Animal Unit Months (AUMs) has only two components: animals and time. Furthermore, the time component is expressed in months, which makes it an awkward measure for smaller time periods.

Understand Formula

The place to start is getting the formula in your head by understanding what it means. Whenever you say Animal Days Per Acre, think of it as a formula. That is, multiply the

number of animals times the number of days they graze a particular area. Then substitute the words "divided by" for "per" to give you the formula—animal numbers times the number of days divided by the number of acres in the pasture.

Think of Animal-Days simply as a unit of forage volume. The higher the animal numbers and/or the longer the days, the greater the volume of forage removed. If you then divide this number by the unit of land the animals were on, you obtain the ADA figure you are after. So, Animal Days Per Acre can be understood as the volume of forage that will be removed from each acre of land. Another way of expressing it would be grazing intensity.

Andre Voisin, in his book Grassland Productivity, was the first person to introduce this concept. Even at this time he realized the difficulty people might have in understanding this concept because of the formula. He says. "No doubt the formulas will make the reader shudder but they are simpler than words in the long run."

Voisin's points are well taken, but it is important to make ADAs a concept that is readily understandable and useable by the average person. What is required is that you begin using the concept on the land. Nothing short of that actual experience will help you make that crucial connection.

Ways to Use

There are two basic ways to use this information: 1) To look at what will happen in the future; or 2) To assess what has already been done. Both uses will allow you to improve future management.

The following is a partial list of some of the uses for ADAs:

1. Assessing pasture qualities relative to one another.

2. Determining if a pasture can supply the necessary forage for a future planned grazing.

3. Dormant season grazing planning.

4. Reassessing pasture quality following grazing.

5. Emergency replanning in case of drought, fire, etc.

6. Determining the area required to supply the daily forage requirements for one animal unit.

7. Weighing up different possible policies for future management decisions.

8. Accounting for wildlife needs in dormant season planning.

9. Setting stocking rates for

(con't on page 25)

growing or dormant season grazing plans.

An Example

Let's quickly review an example to see one way ADAs can be used. Let's say you knew that over the course of the coming dormant season you would remove approximately 14 animal days of forage volume on each acre of land.

You arrived at this figure by adding the normal period of dormancy to the drought reserve you would like to have available. In this example, let's assume that the dormant period was usually around 180 days and you would like to have a drought reserve of 60 days. The total number of days of forage required is then equal to 240.

Normally, the easiest part of the whole process is plugging in the number of animals to be carried over that period. Most people already know this figure. In our example, the animal number is 200 cows.

So now we simply multiply the number of days by the number of animals to give us the volume of potential forage removal. You can relate that number to pounds of forage if you desire, but it's easier to conceptualize as an amount of forage visibly removed from the land.

The last thing we do is to divide that volume of forage by the number of acres available from the area to be grazed. In this case, we want to know the entire size of all the pastures planned to be grazed including areas of drought reserve, which is 3,450 acres.

That means that any acre on the cell is going to have to support 14 cows for one day. The period of time and acreage have all been reduced to one unit, so your decision has been made relatively simple.

Now, we can make that assessment even simpler by dividing out the number of animals and reducing the factor to one. To do that, take the ADA factor of 14 and divide it into the area of an acre (4,840 yds.) to come up with the square yards it will take to feed one animal for one day. The square root of that figure gives you the number of yards and check on the land—in this case, roughly 18 yards on a side.

Get on the Ground

Now, the only thing remaining is to get out on the ground and have a look. Remember to phrase the question you will ask so as to reflect the physiological need of the animal (i.e., "Would a dry pregnant cow be able to survive on this amount of feed for one day?" or "Would this feed a lactating cow comfortably for one day?" or "Would this feed a yearling heifer very comfortably for one day?").

Often those most unsure of their estimation of ADAs become the most accurate when they gain some confidence in making those estimates and judgments for each pasture to be grazed. You will begin to clearly see how the time and number of animals relates directly to forage volume. Your knowledge of diet selectivity will also be enhanced as you note the various items the stock are selecting at different times of the year.

The advantages of understanding and using ADAs are many. This method allows rapid assessment of different areas and requires no special tools other than a calculator with a square root button. Over time the ranchers who use this method become very good at accurately assessing ADAs in various conditons. If you are not yet using this method and want to learn more, attend one of Quivira's rangeland health outdoor classrooms where we will actually make our estimates in grazed and ungrazed pastures. (See Upcoming Events on page 28.)

ADAs: Animal Days per Acre (con't from page 24)





August 2000

Wet Meadows: Like Money in the Bank

(con't from page 7)

". . .maintaining a healthy, meandering stream channel which has not become too deeply entrenched is critical to maintaining a healthy wet meadow grassland."



increasingly larger areas dry out and convert to upland species.

4. Stream channels lose water to adjacent wetlands both as overbank flow and as subsurface flow oozing through the streamside soil. Gravity pulls the overbank flow down into the fine-grained surface soil, but capillary action pulls it both upward from the shallow groundwater and laterally from the streambank.

Capillary action in finegrained silty or loamy soil can lift water as high as 40 inches above the alluvial water table but, if the soil profile is made up of coarse-grained particles (gravel, pebbles, or sand), capillary water will rise only a few inches. A lens of coarse-grained material sandwiched in the soil strata will interrupt the flow of capillary water just as surely as a light switch breaks the flow of electricity. Therefore, it is critical that subsurface flows can reach up to the capillary zone to maintain meadow productivity. That is why maintaining a healthy, meandering stream channel which has not become too deeply entrenched is critical to maintaining a healthy wet meadow grassland.

An indication that a former wetland site no longer receives sufficient surface or subsurface moisture is apparent in the replacement of wetland plants by invading rubber rabbitbrush, shrubby cinquefoil, ring pussy toe, grama grass, pines, or junipers. These species cannot survive in periodically saturated soil.

Strategies for Keeping Wet Meadows Healthy

There are several strategies which a concerned rancher might use to build up the ready reserve in his or her wet meadow account.

1. Reduce the use of wetland and riparian areas during normal or wet years so that wet soil plants can move into and fully occupy potentially suitable soil types and build healthy root systems to sustain themselves through dry cycles.

2. If an intensive grazing system is not in effect which places special emphasis on the productivity of wet soil areas, fence wetland and riparian areas into a separate pasture or pastures, for more intensive management. Closely limit stocking and the duration of the grazing period so that the pasture receives uniform grazing pressure and that a residual stubble height of eight inches remains when livestock are removed. This will ensure an adequate thatch to slow and disperse surface runoff, especially snowmelt.

3. A third strategy is to inspect the land for apparent irregularities in the drainage pattern and correct any fixable problems. Surface features which may result in a loss of wet soil productivity include entrenched roads and travel ways that capture and direct water out of or away from the meadow surface. Roadside ditches or berms, poorly placed culvert locations on stream crossings or culverts installed too deeply, livestock trailing, old or abandoned ditch systems, terraces or berms, livestock tanks, and pit tanks that funnel water out of the wet soil area may also result in a loss of wet soil productivity.

4. A final strategy is to install stream channel improvements that raise the stream bed elevation or increase the sinuosity of mean-

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Wet Meadows

(con't from page 26)

dering stream channels and lower stream channel gradient so that storm runoff does not run off so quickly.

This doesn't mean damming up or diverting the river! Modifying stream/road crossing culverts is one way of returning an eroded stream channel or gully to its proper elevation relative to the meadow surface. Removing the culvert and installing a porous road fill embankment is another. A more radical method is to completely replace an eroded stream channel with a redesigned and reconstructed channel. Obviously, such endeavors require skilled professionals and appropriate permitting from regulatory agencies, but they can have big payoffs in terms of restored productivity of wetland and riparian pastures.

To sum up, wet meadows are highly productive. If healthy, they have a good deal of resiliency to withstand occasional heavy grazing pressure in drought years if allowed to recover during more normal conditions. They are like money in the bank. Are you doing everything you can to keep your account growing so it will be there when you need it?



Kentucky Bluegrass.

(From Common Grasses of Grant and Catron Counties) able recovery period in half for grazed plants." According to Jim, cattle perform better when they are moved into a new pasture every few days, even if it has been grazed before. "It helps them keep a positive attitude and they get out and forage better instead of waiting for the feed wagon."

It's not about fences, however. There are only five pastures on Jim's Lake Valley Ranch, which covers 80 sections. Instead of fencing, Jim controls his cattle by controlling access to well water, turning water on and off depending on when and where he wants them to go. He also uses natural barriers such as ridges and arroyos to control the herd.

Contrary to popular opinion, this method does not require more labor. While more time is spent on planning, less time is required to manage the herd. "The hardest work I ever did," said Jim, "was chasing down cattle spread all over the ranch. Now, with them in a herd, I spend only a fraction of my time moving them."

The thinking part is something else, however. "Ranchers hate office work," says Jim. "They'd rather dig a ditch. This method requires them to bite the bullet and do the planning. It's a pain, but it works."

It certainly works for Jim, but will this method work on any ranch in New Mexico? "Absolutely," he said. "As long as the manager has an open mind, I guarantee you it will work anywhere, anytime."

Good Stewardship: Jim Winder (con't from page 9)

JOIN US!

Would you like to join the Quivira Coalition? We rely on donations. If you would like to help us continue our educational mission, please send your contribution with this form to our Santa Fe address.

Yes! I would like to join the Quivira Coalition. I can contribute:

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-	Other

Contributions entitle you to receive this newsletter, notices of upcoming events and publications, and preference in enrollment for our Outdoor Classrooms, Conferences, and Workshops.

Thank You!



August 2000

UPCOMING EVENTS

FREE Tour of Jim Williams' Ranch, located near Quemado Saturday August 12, 9am-4pm

This tour will highlight the changes taking place on Jim & Joy Williams' public and private lands ranch. In 1999 Jim switched to a short-duration, planned grazing strategy, including dormant season grazing in his riparian area. The benefits have been numerous, including increased forage, fatter cows, healthier rangelands, and an improved relationship with the Forest Service. The financial cost of all these benefits has been practically zero!

We will be joined by Kirk Gadzia, who helped develop the new grazing plan, and members of the Forest Service. This is a must-see tour for anyone interested in the New Ranch. Space is limited.

Outdoor Classrooms on Rangeland Health

Sat-Sun, Aug. 26-27, Sid Goodloe's Carrizo Valley Ranch; Sat-Sun, Sept. 16-17 at Ghost Ranch Cost: \$35 per person for QC Members, \$50 for non-members. Limit: 25 people per Classroom

Under the overall instruction of Kirk Gadzia, educator, author, and range expert, we will spend two days studying the details of range health in a grazing context. Topics covered will include water and mineral cycling, energy flow, erosion, the impact of cattle on the land, fire, riparian health, botany, and monitoring. This is a chance to learn how environmentally healthy rangeland and economically robust ranches can be compatible.

Sid's ranch, located near Capitan, is justly famous as a model of progressive ranch management. He will explain in detail his efforts to restore his watershed to health in cooperation with the Forest Service. He will also discuss the benefits of conservation easements and his rancher-friendly land trust. At Ghost Ranch west of Abiquiu, we will be joined by manager Virgil Trujillo. Come learn about range ecology, biodiversity, electric fencing, history, and culture in one of the most beautiful settings in the state (at the best time of year!)

Public Lands Day: Grassland Ecosystem Restoration

September 23, 2000, 8 a.m., Quemado Ranger District Office

Help restore the grassland ecosystem around Quemado. Forest Service will provide hand tools; volunteers are encouraged to bring gloves, boots, hat, rain gear, lunch and personal tools if they so desire. For more information, see the box on page 17. If you have any questions, please contact John Pierson or Pat Morrison at (505)773-4678. For reservations, contact Courtney at (505)820-2544.

Overgrazing and Rest: the Good, the Bad, and the Ugly October 7-8 (Sat-Sun) at the Sevilleta Wildlife Refuge

Back by popular demand! This workshop is an expanded version of one we held in June. The goal is to intensively examine the ecological issues related to livestock overgrazing, rest, and biodiversity in a nonjudgmental manner. This is an essential primer for anyone looking to get beyond the fiery rhetoric of the grazing debate. Led by Kirk Gadzia. **Cost:** \$35 for Quivira Coalition members; \$50 for non-members. Includes BBQ supper. Overnight accommodations are available (at \$20 per person extra). Workshop limit: 30 people.

The Quivira Coalition 551 Cordova Road, #423

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